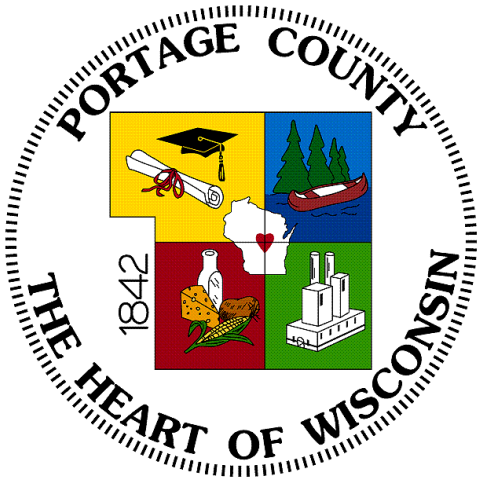
Portage County



Strategic Energy Management Plan

Phase One:
Electricity & Natural Gas
April 2011

Portage County
Strategic Energy Management Plan

Recommended by Space and Properties Committee:
April 4, 2010

Adopted by County Board of Supervisors:
April 19, 2011

Space and Properties Committee Members

Jeanne Dodge, Chair
Donald Jankowski, Vice-Chair
Lonnie Krogwold
Tom Mallison
David Medin
Andrew Halverson, City of Stevens Point (Courthouse issues only)

Smart Energy Team Members

Jeanne Dodge, County Board Supervisor, Chair of Energy Team
Phil Idsvoog, County Board Chairman, Vice-Chair of Energy Team
Al Haga Jr., County Board Supervisor
Todd Neuenfeldt, Facilities Director
Jeff Schuler, Planning & Zoning Director
Jennifer Stewart, UW-Extension Community Development Educator
Patty Dreier, County Executive

Acknowledgements

This report was developed by the Portage County Smart Energy Team and written by Joe Kottwitz, Portage County Sustainability Specialist. The plan was developed over a 6 month period beginning July, 2010.

Also thank you to:

Don Keck, Focus on Energy Advisor
Mike Resch, Wisconsin Public Service Account Representative
Sarah Wallace, Associate Planner, Portage County Planning and Zoning
All County employees who took time to fill out the survey

Table of Contents

List of Tables

List of Figures

EXECUTIVE SUMMARY

Reducing energy consumption and saving money is on the forefront for many organizations and local governments as energy prices continue to rise and budgets tighten. Planning for capital expenditures, management strategies, and education will facilitate the reduction of energy use over time for Portage County, resulting in saved tax dollars and positively impacting the environment.

This Strategic Energy Management Plan will be a cornerstone for strategic management and planning for Portage County facilities and programs for the future.

The 2009 inventory of electricity and natural gas use (2009 baseline) highlight the level of energy usage in its operations. Portage County used 46,638.3 million Btu's (MMBtu's) of electricity and natural gas in 2009 at a cost of $691,613.86. In 2009, natural gas accounted for nearly 60% of the MMBtus, but only 30% of the cost. A single MMBtu cost $24.39 for electricity and $8.09 for natural gas. In previous years, Portage County implemented energy efficiency measures in coordination with Focus on Energy. Portage County spent a total of $156,681 and received $30,576, or 20% of capital investment, in incentives from Focus on Energy. Focus on Energy estimated a savings of $156,163 resulting from these projects to date. Focus on Energy estimated a net return on investment of $31,094 to date.

This goal set forth in this plan is for Portage County to reduce its electricity and natural gas consumption 10% in the calendar year of 2015 compared to the calendar year of 2009 (base year). At the goal of a 10% reduction in electricity and natural gas use, a savings of nearly $70,000 annually would be realized. Implementing all of the recommendations in this plan, at an estimated capital expense of $2.2 to $3.4 million dollars, could produce significantly more savings, potentially $100,000+ annually. Capital investment is required to implement some recommendations, while others require no investment. Not all recommendations are final. As recommendations are considered for implementation, a facility life analysis should be done to see how the return on investment of the recommendation coincides with the life of the building and if it is the right decision for Portage County. An estimated 62-72% ($1.6 to $2.6 million) of the total estimated recommendation costs is to address facilities maintenance needs. As a result of implementing these maintenance requirements with energy efficient options Portage County will realize an estimated $35,000 in annual energy savings.

This Strategic Energy Management Plan starts with an inventory of all electric and natural gas use in County facilities and parks. Relationships of energy use in each facility were analyzed. Energy use and the factors that affect energy use in each facility are documented.

Issues with Portage County's current energy use and possible solutions to improve energy management and efficiency are identified in Section 6 of this document. An employee survey, energy audits from Focus on Energy, and comments from the Facilities Director were used by the SMART Energy Team to identify issues and solutions.

The Plan also provides a set of goals, objectives, and actions that establishes a framework to implement an aggressive energy management program. The goals, objectives, and actions focus on three areas: increased energy management and efficiency, increased leadership in energy, and increased environmental protection. The Plan outlines Portage County's commitment to reducing energy consumption, stewardship of tax levy dollars and our environment, and sustainable energy management.

The Plan also provides a list of energy management and efficiency recommendations for each facility. The recommendations were prioritized in Section 8 by ease of installation, installation costs, estimated energy savings, implementation feasibility, and change in employee comfort. Then in Section 9 the recommendations were put into tables that include a budget for funding capital projects and a timeline for when the recommendations should most appropriately be completed. The recommendations include boiler replacements, whole building lighting studies and retrofits, technology upgrades for motors, pumps, and fans, control systems verifications/replacements, and more.

The Plan concludes with a section that identifies specific roles and responsibilities for carrying out on-going energy recommendations over time. Critical issues in this section include managing the financing of capital investments, tracking energy use, employee energy education, and oversight of plan recommendations.

Phase two of the Strategic Energy Management Plan will be an inventory of current gasoline and diesel fuel use and recommendations to reduce that use. This will be included in this plan by the end of 2011.

SECTION 1: INTRODUCTION

Energy conservation, defined as reduced energy consumption, is considered to be the single most effective strategy for organizations to reduce energy costs. According to the EPA, "The energy that most effectively cuts costs, protects us from climate change, and reduces our dependence on foreign oil is the energy that's never used in the first place." At the local level, for every dollar the County does not spend on energy, there is a dollar available for something else.

Municipal Governments across the nation are working hard to become more energy efficient to reduce energy consumption. In 2008, Wisconsin's overall energy bill set a new record of more than $23.5 billion, an increase of $11.5 billion since 2000 (95.8% increase). Since Wisconsin imports most of its energy resources like coal and oil, the majority of this money leaves our local economy, as much as $16 billion. It is estimated that Portage County residents spent a total of $271.5 million dollars on energy in 2008. This is money leaving Portage County residents' pockets and ending up in other states and even other countries.

Organizations and governments typically see their energy consumption rising over time pending growth within the organization. At the same time, the cost of energy has typically been rising (not necessarily the case from year to year, but over the past ten years this is true) which results in a compounding effect in their energy bills. This creates a financial burden for many operational budgets. Some organizations are finding by reducing their energy use, it counteracts the rising price of energy, resulting in a flat energy bill. This is advantageous for organizations, companies, and especially governments since there is typically little room for budgets to cover increasing energy bills.

At the end of calendar year 2009, a project was proposed to replace the boilers at the Portage County Health Care Center. The project was approved by the Portage County Space and Properties Committee, but ultimately did not make it onto the Capital Improvement project table due to a lack of additional funding required for this project. As a result of this and other similar experiences, interest increased for the County to develop a comprehensive energy management plan. This plan will facilitate energy projects by providing an analysis of need, basis for funding, and a timeline.

On April 27, 2010 the Portage County Board adopted Resolution 5-2010-2012, which established the Portage County Smart Energy Team and called for the development of a Strategic Energy Management Plan. The Plan will be used to limit the County's energy use, to better utilize alternative energy sources, and to monitor energy consumption and costs over time. In July, 2010 a Sustainability Specialist was hired to develop an energy baseline for the County (an analysis of existing use), and aid in plan development. This position was paid for by the Portage County Facilities Department and a UW-Extension Innovative Grant.

Purpose of the Plan

The purpose of this plan is to provide a blueprint for meeting the energy reductions goal set forth by Portage County. To do this, the plan contains an inventory of existing electricity and natural gas use across Portage County government facilities, a set of goals and objectives for energy use and conservation that apply to County operations, and energy management options and implementation strategies to monitor, manage, and reduce energy consumption in County Facilities. The plan focuses on improving energy efficiency and conservation through various means such as operational changes, building retrofits, the purchase of energy efficient equipment, the use of alternative energy resources, and by educating employees and implementing energy saving policies.

Portage County Board Resolution 5-2010-2012 also called for the County's vehicle fleet to be included in the analysis. As a result of discussions by the Smart Energy Team, the Portage County fleet vehicles were not included in this particular planning project but will be examined and added to the Strategic Energy Management Plan in 2011.

Previous Efforts

Measures to improve energy efficiency have been undertaken by Portage County government over the past 10 – 15 years. Rebate incentives were applied for from Focus on Energy for these projects. A total of $156,681 was spent on fourteen projects. To date, the implemented projects have produced an estimated cumulative return on investment of $31,094 (estimate completed by Focus on Energy).

The retrofits implemented in the past were not always the most energy efficient upgrade possible; instead, more consideration was given to what type of retrofit would have the greatest cost-benefit. For example, the steam boilers in the Courthouse were replaced with newer, more efficient steam boilers and not with hot water boilers (more efficient than steam) because the more expensive retrofit was deemed too costly and was an unapproved capital investment.

Below is a list of major energy efficiency projects that have been completed here to date. Note: Some of the projects completed were not done solely for energy savings but for general equipment replacement/maintenance. Appendix A summarizes the energy efficiency projects, showing cost of project, incentive from Focus on Energy, savings since installation, and total return on investment.

- Replaced laundry equipment in the Law Enforcement Center
- Replaced rooftop direct expansion (DX) unit at the Courthouse
- Replaced lighting with high bay fluorescents at the Materials Recovery Facility
- Installed variable frequency drive at the Library
- Replaced lighting with fluorescents at the Parks Department
- Replaced lighting with high bay fluorescents at the Highway Garage
- Completed boiler tune-up at the Library
- Replaced lighting with fluorescents at the Library
- Completed chiller tune-up at the Annex

- Replaced lighting with fluorescents at the Health Care Center
- Installed condensing hot water heaters at the Health Care Center
- Completed hot water study at the Health Care Center
- Replaced laundry equipment in the Health Care Center
- Put stickers on light switches and thermostats that remind employees to turn off the lights when not needed and to keep the thermostats at lower temperatures during the winter and higher temperatures during the summer

Planning Method

After their formation, the Portage County Energy Team initially rotated their meeting locations to the different County buildings in order to tour them to increase their first hand knowledge of the facilities. The tours were meant to familiarize the Energy Team members with the buildings and energy use within them. Overall, the Energy Team followed a seven step process to develop this strategic energy plan.

Step 1 *Developed a 2009 baseline figure for energy usage in County buildings.*

The Sustainability Specialist, working cooperatively with the County's energy service providers, developed an inventory of every County electric and natural gas meter to create a baseline (2009) for electric and gas usage.

Step 2 *Developed and distributed a survey to County employees.*

The on-line survey was meant to gather implementation recommendations, assess knowledge and feelings about energy conservation, and gain insight into energy issues in County buildings and operations.

Step 3 *Conducted energy audit evaluations on selected buildings with Energy Advisor from Focus on Energy (See Appendix D for full energy audits).*

The energy audits were used to identify and prioritize building retrofits and energy efficiency measures that could be done to specified buildings.

Step 4 *Researched and prioritized other potential energy efficiency strategies for County operations.*

The Energy Team brainstormed a list of potential energy saving operational/policy changes and other building retrofits appropriate for the County.

Step 5 *Drafted a strategic energy management plan with goals, objectives and actions, and final recommendations budget and timeline.*

The plan includes an energy baseline report, recommendations from the Energy Team, results from the employee survey, Focus on Energy audit recommendations.

Step 6 *Reviewed strategic energy management plan with all affected stakeholders including relevant committees, department heads, and building managers.*

This was done to familiarize the affected stakeholders with the plan and garner support for plan implementation. Feedback was used to revise the plan where seen fit.

Step 7 *County Board adoption.*

Setting an Energy Reduction Goal

Setting a goal for energy reduction (electricity and natural gas) is an important step in the energy planning process. The goal should be realistic and attainable but should also be large enough to represent the County's commitment to energy conservation and saving tax levy dollars.

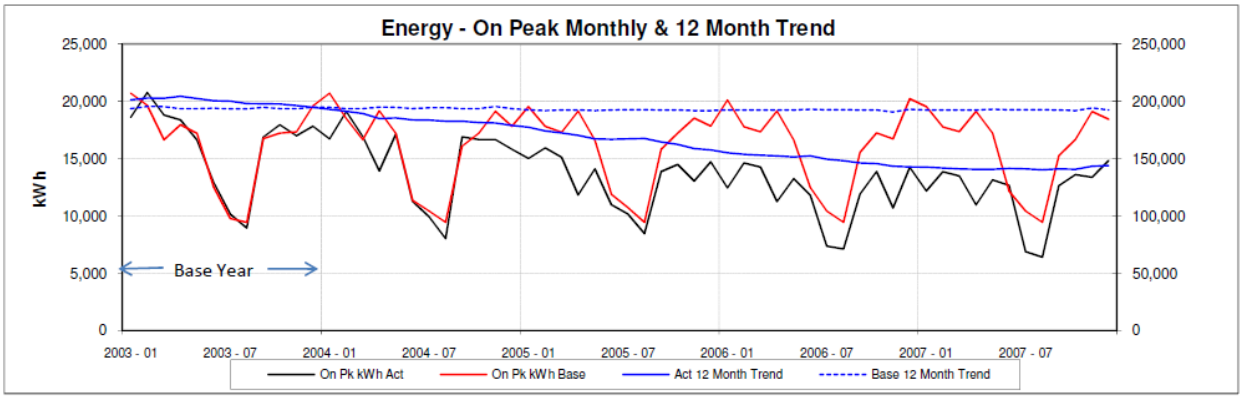
The methodology used to develop an energy reduction goal was a two step process. First, previous Portage County energy bills were examined to see how much energy was saved for different types of previously implemented projects. It was found that some projects, such as variable frequency drives and occupancy sensors on lights are not measurable on energy bills but larger projects, like lighting retrofits, are noticeable. For example, the Portage County Highway Department completed a lighting retrofit from inefficiency Metal Halide (MH) lamps to high efficiency high bay fluorescent lighting. About a 15% reduction in energy use is measureable in the department's energy bill. This example provides an idea of how much savings is possible from implementing certain types of projects which helps to identify what a realistic and attainable energy reduction goal could be.

Second, examples of other organization's and school district's energy reductions were acquired from a local energy services contractor and examined. The contractor provided real energy tracking data from organizations that are in the process of completing energy management and efficiency improvements. It was found that organizations realized around a 2% savings compared to base year in year one of the energy management program. In year two savings increased to an average of about 8% compared to the base year. In year three a 12% savings increased at typically 1% to 2% per year relative to the base year. The contractor stated that these savings percentages are similar for both electric and natural gas consumption.

For example, Figure 1 is a building in a school district that implemented energy management and efficiency strategies. The graphic shows on peak (this is typically

energy use from 7am-7pm) kilowatt-hour consumption for 2003 through 2007. The actual consumption and the modeled base year (2003) consumption are both plotted on the graphic for comparison. Also plotted are the actual 12 month trend and base year (2003) 12 month trend for comparison. A clearly measurable difference can be seen in 2005, just two years after their energy management and efficiency strategies were started.

Figure 1



Source: Wilinski Associates, 2010

With these criteria in mind the SMART Energy Team concludes that a **10% energy savings (electricity and natural gas measured in MMBtu's) in the calendar year of 2015 compared to the 2009 base year** is a realistic, attainable, and cost-effective goal. The goal represents the County's commitment to both energy conservation and saving tax dollars. A 10% savings compared to the base year equates to a reduction of 4,663.83 million Btu's (MMBtu). If Portage County's energy savings are equivalent to 10% for both gas and electric similar to savings realized by other organizations, a reduction of almost $70,000 could be realized by Portage County. If there is more electricity MMBtu's saved, the monetary savings will be greater because the current cost per MMBtu is higher for electricity than gas. If there are more savings in gas consumption than electricity consumption, the savings realized will be less because the current cost per MMBtu is lower for gas than electricity.

It is important to note that if all recommendations within this plan are implemented, a savings of over 10% is likely.

SECTION 2: INVENTORY OF CURRENT ENERGY USE (ELECTRICITY AND NATURAL GAS)

A Snapshot

Number of Portage County government buildings: 15 (not including park shelters)
County energy use (kWh & therms) in 2009: 46,638.3 MMBtu's
Cost of County energy (kWh & therms) use in 2009: $691,613.86
Average energy intensity of selected buildings: 0.136 MMBtu/ft2
County CO2 emissions (electric & natural gas) in 2009: 12,701,047 lbs.

Current Energy Sources

Portage County obtains its natural gas and electric energy from three sources. Wisconsin Public Service (WPS) supplies electricity and natural gas to almost all County government buildings, facilities and parks while Central Wisconsin Electric Cooperative (CWEC) supplies electricity to Standing Rocks County Park and Alliant Energy supplies electricity to some of the other Parks in Portage County. WPS is an investor owned utility that serves more than 437,000 electric customers and 317,000 natural gas customers in northeast and central Wisconsin and an adjacent portion of Upper Michigan. Central Wisconsin Electric Cooperative is a small electric utility serving approximately 8,000 people. Alliant Energy is an investor owned utility that serves more than 1.4 million customers in Iowa, Minnesota, and Wisconsin.

Current Energy Use

Portage County government consumes the great majority of its electricity and natural gas energy (96%) in buildings that house its operations. There is also a small amount of energy used at County parks, as well as for the fountains, irrigation, and signage at the Portage County Business Park. According to the U.S. Energy Information Administration (EIA), 63% of energy used in office buildings goes towards heating, cooling, and lighting. Another 16% is used for office equipment such as computers and printers. It is assumed that Portage County office buildings use energy in a similar way to the EIA's findings. Natural gas is primarily used for water heating, space heating and cooking in County buildings. Parks electricity and natural gas use consists of use at shelters and by outdoor lighting in the parks.

In this study, electricity and natural gas use is documented in three categories; 'buildings', 'parks', and 'fountains & irrigation'. In order to better understand energy consumption by end use, all data measurements (kWh for electricity and therms for natural gas) have been converted to million BTU (MMBtu) equivalents. This allows for a true comparison of how much energy is used. The Portage County government consumed 46,638.3 million BTU's of energy in 2009. Table 1 summarizes current energy use by energy type for all County buildings, parks, fountains, irrigation, and signs.

Table 1. Portage County 2009 Energy Use by Type of Energy and End Use

End Use	Type of Energy Consumed	Unit	Annual Consumption	MMBtu	Percent of Total Usage
Buildings	Electricity	kWh (kilowatt hours)	5,126,636.0	17,492.1	37.5%
	Natural Gas	Therms	273,436.4	27,343.6	58.6%
		Sub-Total	**N/A**	**44,835.7**	**96.1%**
Parks	Electricity	kWh (kilowatt hours)	185,796.0	633.9	1.4%
	Natural Gas	therms	107.5	10.8	0.0%
		Sub-Total	**N/A**	**644.7**	**1.4%**
Fountains & Irrigation	Electricity	kWh (kilowatt hours)	339,355.0	1,157.9	2.5%
		Sub-Total	**N/A**	**1,157.9**	**2.5%**
		Total	**N/A**	**46,638.3**	**100.0%**

Source: Data gathered from Wisconsin Public Service, Alliant Energy, and Central Wisconsin Electric Cooperative.

Calculations used to determine MMBtu: Electricity MMBtu = kWh * 3412/1,000,000;
Natural Gas MMBtu = therms/10

Energy Costs

The largest energy expenditure in 2009 was for buildings: $420,948.27 for electricity, followed by $221,182 for natural gas. Together they make up nearly 93% of energy costs for the County's electricity and natural gas usage. In total, the County spent $691,613.86 on electricity and natural gas.

Table 2. Portage County 2009 Energy Cost by Type of Energy and End Use

End Use	Type of Energy Consumed	Dollars	Percent of Total Dollars
Buildings	Electricity	$420,948.27	60.9%
	Natural Gas	$221,182.36	32.0%
	Sub-Total	**$642,130.63**	**92.9%**
Parks	Electricity	$25,657.64	3.7%
	Natural Gas	$158.31	0.0%
	Sub-Total	**$25,815.95**	**3.7%**
Fountains & Irrigation *	Electricity	$23,667.28	3.4%
	Sub-Total	**$23,667.28**	**3.4%**
	Total	**$691,613.86**	**100.0%**

Source: Data gathered from Wisconsin Public Service, Alliant Energy, and Central Wisconsin Electric Cooperative.

* Calculated as 40% of Portage County Business Park total. 60% is paid by parcel owners.

Table 3 shows the dollar cost per MMBtu for electricity and natural gas. Electricity costs more per Btu than natural gas, making the County's expenses for electricity higher than natural gas even though natural gas consumption on a Btu basis is greater than electricity.

Table 3. 2009 Dollars per MMBtu by Energy Type

Energy Type	$/MMBtu
Electricity (kWh)	$24.39
Natural Gas (therms)	$8.09
Average	***$14.83***

Source: Data gathered from Wisconsin Public Service, Alliant Energy, and Central Wisconsin Electric Cooperative.

Projected Energy Costs if No Recommendations are Implemented

If Portage County's energy use remains the same as it is currently it's estimated that five years from now, at the end of 2015, Portage County could be spending $850,000+ on electricity and natural gas annually. Assumptions of a 3% increase in electricity rates (average commercial electricity inflation rate over the past ten years – calculated from U.S. Energy Information Administration data) and 5% increase in natural gas rates (average commercial natural gas inflation rate over the past ten years – calculated from U.S. Energy Information Administration data) were used to perform this estimate. Electricity rates have been rising steadily for many years. Natural gas rates have been flat from 1985 to 2000 but have nearly doubled over the past ten years. Natural gas prices fluctuate significantly from year to year due to supply and demand forces.

Emissions by End Use and Energy Type

Figures 1 and 2 below summarize the percent of CO2 emissions by end use. CO2 emissions are higher from parks, fountains and irrigation systems because they only use electric energy, which emits more carbon dioxide per energy unit compared to natural gas. The percent CO2 emitted is also higher for electricity than it is for natural gas because producing electricity emits a significant amount more CO2 than natural gas does.

Figure 2

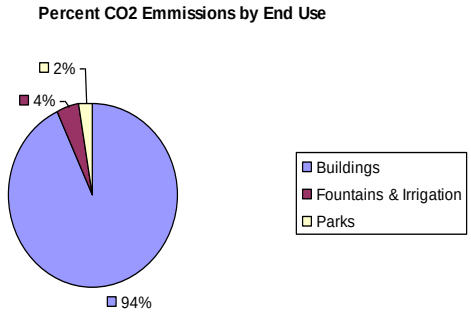
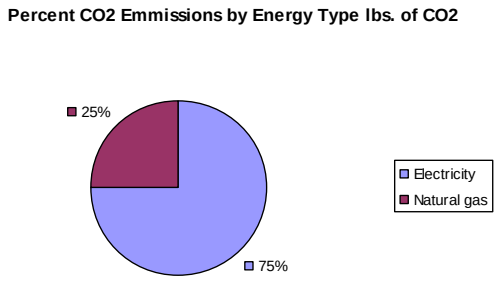


Figure 3



Weather Effects on Energy Use

It is important to note heating and cooling degree days for 2009 compared to an average of heating and cooling degree days from previous years. Degree days are the amount of degrees the actual temperature is over or under the base temperature of 65 degrees. This information provides a reference of whether 2009 was a hot or cold year compared to an average year. Making this distinction is important because the amount of heating and cooling degree days affects energy use. For example, the hotter a summer is, the more an air conditioning system will have to work to achieve proper cooling within a building.

Table 4 lists the heating and cooling degree days from 2004 to 2009. 2009 has 6.7% more heating degree days and 40% less cooling degree days than a 2004 to 2008 average does. This means 2009 was slightly colder during the winter and considerably cooler in the summer than the previous five years were. With this in mind, we expect to see the energy use for heating to be slightly higher in 2009 than an average year and energy use for cooling to be somewhat less than an average year.

You may use Table 4 to compare 2008 and 2009 heating and cooling degree days to actual electricity and natural gas energy use for each of the years. Take into consideration there are more variables then just weather playing a role in total energy use. Occupancy, equipment upgrades, and other building variables also play a role in total energy use.

2008 natural gas use is 684 MMBtu's less than in 2009 and 2008 electricity use is 169 MMBtu's more than in 2009. There are 259 more heating degree days in 2008 than there are in 2009 and 138 more cooling degree days in 2008 than there are in 2009. There is an anomaly present with natural gas use and heating degree days. Less natural gas MMBtu's were used in 2008 but there were more heating degree days. There is a correlation present with electricity use and cooling degree days. More electricity MMBtu's were used in 2008 and as expected there are more cooling degree days in 2008.

2008 Energy Use (MMBtu's)	
Electricity:	19,453
Natural Gas:	26,670
2009 Energy Use (MMBtu's)	
Electricity:	19,284
Natural Gas:	27,354

Table 4. Heating & Cooling Degree Days 2004 to 2009

Year	Heating Degree Days	Cooling Degree Days
2004	7439	342
2005	7329	683
2006	6861	576
2007	7298	601
2008	8177	457
2009	7918	319
2004 – 2008 Average	7420	532

Source: National Oceanic and Atmospheric Administration, Historical Climatological Series

SECTION 3: FACILITY ENERGY USE AND ANALYSIS

This section will examine the energy use of Portage County's buildings. The buildings have a variety of functions, from administrative offices to facilities like the Law Enforcement Center, Health Care Center, Materials Recovery Facility, Transfer Center, and Highway Garage, which all have specialized uses in most of the building but have office space as well. The Portage House is utilized for temporary housing and the Jefferson House is used for daytime mental health services. Table 5 isolates the Btu totals from the County's building facilities. For comparison, refer to Table 2 for the electric and natural gas costs for buildings.

Table 5. Portage County 2009 Building Energy Use

Energy Type	Consumption	MMBtu's	Percent of Btu's
Electricity	5,126,636.0	17,492.1	39.0%
Natural Gas	273,436.4	27,343.6	61.0%
Total		**44,835.7**	**100.0%**

Source: Data gathered from Wisconsin Public Service, Alliant Energy, and Central Wisconsin Electric Cooperative.

Table 6 shows energy intensity for selected buildings in the County. Energy intensity is a measure of kWh's, therm's, or MMBtu's used in a facility compared to the floor space in square feet. Energy intensity calculations are useful to see which buildings are performing better or worse than others. A comparison can then be made between buildings taking into consideration their energy intensity, use, occupancy, function, and equipment present. The comparisons, dependent upon expected performance, may illustrate the need for energy management in different buildings. Energy retrofits and management may then be focused on buildings that are not performing as expected.

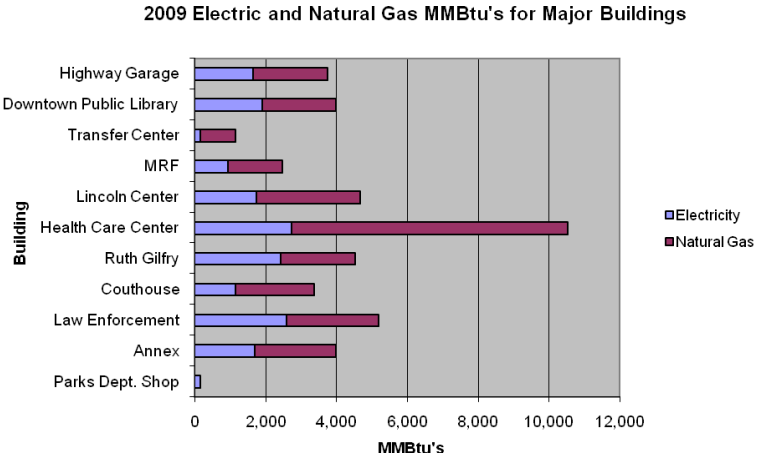
Table 6. 2009 Energy Intensity of Selected Portage County Buildings

Energy Intensity (unit/ft2)			
Building	*MMBtu/ft2*	*kWh/ft2*	*therm/ft2*
Lincoln Center	0.136	14.92	0.85
Health Care Center	0.128	9.79	0.95
Transfer Center	0.125	5.30	1.07
Jefferson House	0.124	12.76	0.81
Portage House	0.107	10.24	0.72
Ruth Gilfry Building	0.103	16.25	0.48
Law Enforcement Center	0.096	14.03	0.48
1/2 City/County Building	0.094	9.42	0.62
Public Library	0.089	12.43	0.47
Annex Building	0.083	10.41	0.48
Material Recovery Facility	0.083	9.23	0.51
Highway Garage	0.068	8.86	0.38
Parks Shop	0.024	7.14	0.00
Average	0.097	10.83	0.60

Source: Data gathered from Wisconsin Public Service, Alliant Energy, and Central Wisconsin Electric Cooperative.

Figure 4 shows the Btu's of electricity and natural gas used in the selected County buildings. The Health Care Center consumes the largest amount of Btu's compared to any other County owned building. It consumes almost double the amount of Btu's compared to the next highest consumer which is the Law Enforcement Center because of the number of occupants, 24/7 occupancy hours and size of building. Figure 4 shows the natural gas consumption in the Health Care Center is very high compared to other buildings, likely due to the inefficiency of its boilers.

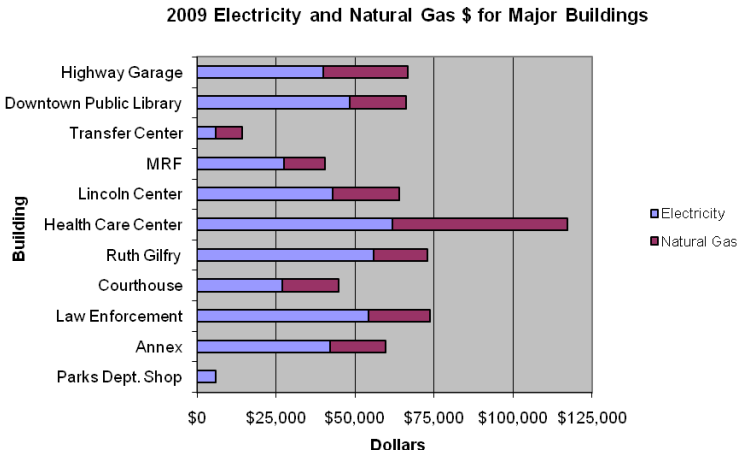
Figure 4



Source: Data gathered from Wisconsin Public Service, Alliant Energy, and Central Wisconsin Electric Cooperative.

Figure 5 shows the cost of electricity and natural gas in selected County buildings. The Health Care Center is by far the most costly to the County followed by the Law Enforcement Center and Ruth Gilfry Building as a close second and third.

Figure 5



Source: Data gathered from Wisconsin Public Service, Alliant Energy, and Central Wisconsin Electric Cooperative.

The Highway Garage, Library, Lincoln Center, Ruth Gilfry, Law Enforcement Center, and Annex have very similar Btu consumption and costs. The Transfer Center and Parks Department Shop are the smallest energy consumers with the least cost.

The following information describes potential factors influencing energy intensity for each building. These factors include number of occupants, occupancy hours, age of occupants, use of building, age of building, and equipment present in the building. There are also lighting and HVAC system considerations included in the discussion and whether or not they play a role in the building's energy intensity.

Lincoln Center, 1519 Water Street

The original Lincoln Center (16,344 square feet) was constructed in 1980 with an 18,000 square foot addition completed at the end of 2002 for a total of 34,330 square feet. The Lincoln Center has high occupancy hours because it is used all day for the Portage County Aging and Disability Resource Center (ADRC) and in the evenings for meetings. There is high occupancy in the building for most of the day and some evenings. Food service equipment is present in the building so meals can be prepared and served to users.

The age of the occupants who use the building (senior citizens) may have an effect on the preferred temperature within the Lincoln Center. During winter, the thermostat setting may be higher than other County buildings and during summer it may be cooler than other County buildings so users are comfortable. Although, according to the director of the Lincoln Center, it doesn't matter how high or how low the thermostats are set, there will always be rooms that are too hot or too cold. In these rooms the temperatures are set higher or lower to achieve a comfortable temperature and may

result in spaces competing against each other. This uses a great deal of energy and partially explains the high electric (kWh) and gas (therm) energy intensity.

There is some inefficient lighting in the Lincoln Center that contributes to high electricity use and costs. Most all of this lighting is being converted to energy efficiency lamps as part of the 2010 energy projects.

The Lincoln Center is owned by the City of Stevens Point. The agreement between the City of Stevens Point and Portage County states that Portage County is in physical possession of the building for purposes of maintaining and operating a senior citizen center. It states the County shall provide the operational expenses of the senior citizen center, which includes the utility expenses. Any payments for improvements exceeding $1,000 are the responsibility of the City of Stevens Point and are subject to approval through a joint committee. Any improvements costing less than $1,000 are the responsibility of Portage County.

Ruth Gilfry Building, 817 Whiting Avenue

The Ruth Gilfry Building was built in 1980. The Ruth Gilfry building has high occupancy hours because of evening meetings and some employees work hours extending into the evening. There are very high occupancy numbers in the building. The Ruth Gilfry building has the largest concentration of computers (132) of any County building due to the fact it has more employees than any other building. Computer energy use is correspondingly high. According to the Focus on Energy Advisor working with Portage County on this planning process, lighting in the building is excessive, resulting in many areas being over lit. From the employee survey, it was found that some employees are extremely cold, especially during the summer. The thermostat settings may be extreme or sensors are dysfunctional resulting in excessive air conditioning or heating.

Between the number of computers present, excessive lighting, and excessive cooling in the building there is no surprise that the electric (kWh) energy intensity is the highest of all County buildings. There are many opportunities available in this building for energy conservation/efficiency. They are documented in the recommendations section of this Plan.

Downtown Public Library, 1001 Main Street

The Library was completely reconstructed in 1992; only the north and west side facades were kept from the original building. The library has high occupancy hours; it is open 9:30am-9:00pm Monday through Thursday, 9:30am-6:00pm Friday, 9:30am-5:00pm Saturday, and 1:00pm-5:00pm Sunday. On a typical day there are a lot of occupants in the building using a number of computers, and book display and reference areas must be properly illuminated. Also, the lighting must be sufficient for people to read, which means the actual light output in the library is high. The Illuminating Engineering Society suggests that libraries be lit to 30 foot-candles for a sufficient amount of light. The basement and first floor meet this standard but the second floor does not; it's currently at 10-12 foot candles. There are large windows around the whole building which make heat loss/transfer an eminent problem.

The downtown Stevens Point location is the main library for the Portage County Library System. The building is owned by the City of Stevens Point and is leased to the County for free. The current lease is from September 1, 1992 and ending August 31, 2012. The lease agreement states that the City of Stevens Point is responsible to pay installation charges for gas, electric, telephone, water, and sewer connections. All payments for improvements not exceeding $2,000 are the responsibility of the County. All payments for improvements exceeding $2,000 are the responsibility of the City. It also states the County is responsible for all utility payments with the City reimbursing the County 50% of the charges in the first year of the lease and decreasing 5% every year until the County assumes all of the utility expenses. At the time of this writing, the County is responsible for all utility payments.

Plover Branch Public Library, 2151 Roosevelt Drive

The Plover branch of the public library system is open Tuesday through Saturday: Tuesday, Wednesday, and Thursday, 10am-8pm; Friday 10am-5pm; Saturday 9:30am-1pm. The building was formerly a church. The building must be properly lit for reading. The Illuminating Engineering Society suggests that libraries should be lit to 30 foot-candles to provide a sufficient amount of light. The upstairs and downstairs currently meet this standard.

There is a very small boiler in the basement used for baseboard heating for the basement. There are also two roof-top air handling units that both cool and heat the building. These units consume a considerable amount of energy, although are not necessarily inefficient. Two roof-top units may have been required to adequately ventilate the space to meet air circulation code requirements for public buildings.

The Plover Branch Library building is owned by the Village of Plover and leased to the County for free. The current lease is from October 8, 1991 and ending August 12, 2012. The lease agreement states that the Village of Plover is responsible to pay installation charges for gas, electric, telephone, water, and sewer connections. All payments for improvements to the building costing less than $2,000 are the responsibility of the County. All payments for improvements exceeding $2,000 are the responsibility of the Village of Plover. It also states the County is responsible for all utility payments with the Village reimbursing the County 50% of the charges in the first year of the lease and decreasing 5% every year until the County assumes all of the utility expenses. At the time of this writing, the County is responsible for all utility payments.

Health Care Center, 825 Whiting Avenue

The Health Care Center is in use 24 hours a day, 7 days a week. About 90 people at any given time are living in the Health Care Center. This results in a very high occupancy level since there are people living and working there 24/7. There are a lot of energy consuming electrical machines and computers in use due to occupant health care needs. The building uses a lot of energy for food service, producing 3 meals a day for 365 days a year. The boilers that heat the building are over 40 years old, consume large amounts of energy, nearing the end of their life, and will need to be replaced soon.

The building was built in 1931 and may have some energy efficiency issues due to its age. A ninety bed addition was built in 1964, and in 1993 an 8,850 square foot addition was built including a new activity area, beauty shop, family room, and activity kitchen. Considering the high energy use in this building (see Figure 3), it's interesting the energy intensity is not higher. This could be due to the basement, the part of the building with low energy use, being included in the energy intensity calculation. The large basement is mostly used for storage (low energy use) and adds considerably to the square feet of the building, subsequently affecting the energy intensity.

Transfer Facility, 650 Moore Road

The Transfer Facility was built in 2007. It is used as Portage County's site for solid waste disposal. The Transfer Facility has low occupancy and is occupied from 7am-5pm. There is high gas (therm) energy intensity most likely because there are large bay doors frequently opening, resulting in heat loss. The heat loss is a problem because the heating system needs to run frequently in colder months to keep the work space warm enough.

Jefferson House, 2030 Jefferson Street

The Jefferson House was built in 1966. The Jefferson House is a building that is currently used for helping people with special needs during the day. It is a place occupants can spend time, eat healthy meals, and interact with each other. The issues in the house are all relatively easy to correct. First, there is incandescent exit signs that could be replaced with LED's. Second, there are incandescent light bulbs throughout the whole house. And lastly, the windows throughout the house are out of date and transfer cold air, especially in the basement where they seem to actually be leaking air. Storm windows could be installed in all the windows to prevent air leakage.

Annex, 1462 Strongs Avenue

The Annex is occupied for most of the day, including regular work hours and meetings in the evenings. There are many people who work in the building, including County employees and tenants that rent space on the second floor. The County has 92 computers running in the building daily and the tenants on the second floor have an additional 30 computers. Currently the tenants are paying $11.50 per square foot per year for renting the space. The USDA rents 6,150 square feet for $70,725 per year. Portage County pays the utility bill for the whole building and is partially reimbursed for it through the rental payment.

The Annex is not a very old building, being built in 1998. This provides the opportunity to implement occupancy sensor HVAC controls for conference rooms; meaning the heating/cooling turns on when they are being used and shuts off when they aren't being used. This may be the only building where these controls may work. According to the energy survey (see Appendix C), ten employees responded that the building is over lit (zero responded under lit) which indicates there is more energy used for lighting than needed. Regarding energy intensity, it is in the mid-range of energy intensities for Portage County buildings.

Portage House, 1019 Arlington Place

The Portage House was built prior to 1940. The County gained ownership of the house in 1940. The Portage House is a building used to rehabilitate criminal offenders after being incarcerated. This is a very old building with a field stone foundation. Everything seems to be up to date and functioning properly in the Portage House. It is an older building with fewer options for energy efficiency.

Law Enforcement Center, 1515 Strongs Avenue

The Law Enforcement Center was built in 1991. The Law Enforcement Center is occupied 24 hours a day, 7 days a week. The building houses inmates and has law enforcement staff working there year round. The building uses energy in the food service area, producing 3 meals a day for 365 days a year. The dishwasher has an electric booster heater which is less efficient than gas. Food service will be contracted to a private service starting in 2011. The contractors will continue to use the equipment in the kitchen.

There may be issues with the hot water heaters producing water that's hotter than it needs to be. An evaluation should be completed on the domestic hot water system within this building to better understand how hot water is being used within the building and how efficiently the hot water heaters are being used to heat water for the building.

It's not clear if the HVAC system and controls are properly working in tandem to heat/cool the building as efficiently as possible. A detailed evaluation of the HVAC system should be completed by the Portage County Maintenance staff to determine whether it is operating efficiently.

There are 69 computers present in the building and a number of them are used 24/7 for emergency response. In the back of the building there is a garage for squad cars. The large bay doors in the garage make heat loss an issue for the building.

Considering all the energy use in the building, it is interesting to note that the energy intensity is not higher than it is. This may be due to the large square footage of the basement (that has a low energy intensity) being included in the energy intensity calculations. Since the basement is used mainly for storage and not much energy is consumed there, including it in the energy intensity calculations will lower the total energy intensity of the building considerably.

County/City Building (Courthouse), 1516 Church Street

The County/City Building was constructed in 1958. The County's "half" of the building has a large number of occupants throughout the day. The County's "half" of the building is the home for 84 computers. In the energy survey, four employees said the building is over lit. A number of survey respondents also said that the building is either too hot or too cold year round. The temperature of the building fluctuates in different areas of the building due to a piece-meal HVAC system. This causes a lot of inefficiency because employees are constantly opening windows, using space heaters, and changing the thermostats. Considering the HVAC problems, it is interesting to note that the energy intensity is not higher than it is.

The building is occupied by both Portage County and the City of Stevens Point. A large area of the building, equal to almost half, is leased to the City of Stevens Point by Portage County. The City and County split the maintenance costs, which includes the utility bill. Through an agreement between Portage County and the City of Stevens Point, 40.45% of the maintenance costs are charged to the City. This percentage is based on the City of Stevens Point's occupancy square footage within the building.

Material Recovery Facility, 600 Moore Road

The Material Recovery Facility was constructed in 1993. The Material Recovery Facility is occupied from 6am-5pm. The facility has low occupancy numbers. There is heavy machinery present in the building that uses energy. The energy intensity is low because there is little heating and cooling in the building. During winter it is kept warm enough for employees to work and machinery to run but is not heated to normal room temperature, which is 65 to 75 degrees; this helps explain the low energy intensity for gas (therms). During the summer only the office area is air conditioned.

SECTION 4: EMPLOYEE ENERGY SURVEY RESULTS AND EVALUATION

The 2010 employee energy survey was used to solicit practical ideas for energy conservation from employees, identify employee interest in contributing to future efforts, gauge how energy conscious/aware employees are, and gauge how comfortable employees are with temperatures in their workplaces currently. Roughly 600 surveys were sent to employees and 236 were completed. This is nearly a 40% response rate.

Please refer to the full survey report to identify energy saving strategies in County facilities (see Appendix C). Employees' responses about employee comfort levels in the summer and winter are documented as well as what the ideal temperature is in their building during summer and winter. Employees' opinions about the lighting in their workspaces are documented by building. Also documented are employees' attitudes towards participating in future energy conservation/efficiency measures and renewable energy options.

After the survey report was developed, staff took the qualitative suggestions from question #10 and culled out the suggestions that have already been done or are not feasible. The remaining suggestions were then ranked using the following parameters: feasibility, potential energy savings, employee comfort, capital expense, return on investment, and number of employees that made the suggestion. The ranked suggestions were then taken to the Energy Team for approval and are summarized below.

#10. What specific things could be done by YOUR department or by County government to conserve energy and reduce our dependence on fossil fuels (defined as heating, cooling, water usage, fuel usage, vehicle miles traveled, etc…)?

*Number of employees with response is in parenthesis after each response

- Turning off lights (18)
- Shut down PC's at night (26)

- Better management of thermostats and opening windows for heating/cooling. Consists of facilities managing the thermostats properly, programmable thermostats, setting lower/higher temps and people wearing appropriate clothes (26)
- De-lamping some areas of buildings (11)
- Motion lights in restrooms/hallways/conference rooms (19)
- Employee education (4)
- Remove personal appliances in offices (11)
- Develop engine idling policy
- Energy efficient vending machines (2)
- Heavy duty shades for south windows (7)
- Courthouse and Lincoln Center upgrades (12)
- Electric hybrid cars
- Car pooling program (5)
- Solar panels, wind, other renewable energies(3)
- Consolidate trips at work. Coordination/communication to do this(8)
- Reminder signage for employees
- Reduce mileage re-imbursement
- Eliminate or reduce lawn watering (4)
- Dual flush toilets, low flow sink nozzles (2)
- 4 day work weeks (9)
- Convert landfill to solar farm
- Reduce or eliminate supervisors' mileage reimbursement (3)

SECTION 5: ENERGY AUDIT RESULTS AND EVALUATION

An energy audit is an inspection, survey and analysis of energy flows and systems that control energy use in a building, followed by recommendations to reduce the amount of energy input into the systems without negatively affecting the output. In some cases, it is possible that the energy input into the systems may be reduced while positively affecting the output.

Focus on Energy is a state wide program created in 2001, funded by the Utility Public Benefits Fund, which is funded by utility companies. They deliver energy efficiency and renewable energy services for residential, business and government customers throughout the state. Portage County utilized the *Focus on Energy School and Government Program Advisor* to conduct energy audits of the County's selected buildings. The audits are listed in Appendix D.

Walk-throughs were done in each of the selected buildings, then reports were written with an analysis of the buildings energy use and recommendations to reduce the amount of energy used. Some buildings were not audited either because they have already been audited and large energy efficiency projects were completed or the building is simply too small to realize major energy savings. The audits were one of the tools that were used to draft the Issues Section of this Plan. Also, the recommendations from the audits were prioritized by the Focus on Energy Advisor and a point system (Appendix G). This is a critical component of the Implementation section of this Plan.

SECTION 6: ISSUES AND SUGGESTED SOLUTIONS

Some Environmental Impacts of Current Energy Use in Portage County

In addition to monetary costs, energy use has environmental costs. Environmental costs have been a major topic in government institutions for many years now. Government units, including counties, have either been mandated or choose to regulate certain practices that have an impact on our environment. Energy use is one that's currently not mandated for counties to regulate but many have chosen to do so in recent years to reduce their environmental impact and save money.

The environmental impacts of energy use are very hard to accurately quantify. The impacts can and will be different for many reasons including the source of raw materials, type of raw materials, geographic location of the energy user and power generation station, and performance of the energy infrastructure. It's hard to know exactly how the electricity used by Portage County is generated and where the resources are coming from because electricity is distributed from a grid, interconnected around the state.

Over 80% of Wisconsin's energy consumption is comprised of petroleum (29.2%), coal (29.9%), and natural gas (23.2%). While our state has many natural resources, virtually all of the energy we use is imported: coal from western states and the Appalachia region; oil from the Middle East and elsewhere; and natural gas from other states. Coal, imported to produce the majority of Wisconsin's electricity, is harvested from mountains in two ways; mining and physically blowing the top off of them. The latter creates sediment that washes into nearby streams, polluting them with toxins. Natural gas, used mainly for heating in Wisconsin, is pumped from the ground. A new method of natural gas capture is being explored to get harder to reach gas from the ground; it's called fracking. Fracking uses fluid at very high pressures to break open rock in order to reach the natural gas. Fracking, although very new and unstudied, may be considered harmful to the ecosystem and especially to groundwater. It is believed that the use of fracking will increase over time to reach less vulnerable pockets of natural gas.

The transportation of energy to Wisconsin from around the country requires the use of energy, resulting in emissions. The transmission of energy also affects the environment. As demand for electricity and natural gas increases, more infrastructure is required. An increase in transmission lines results in additional fragmentation of land which affects some key wildlife species negatively. An increase in natural gas pipelines results in a higher chance of a pipe blow out that could pollute surrounding land and destroy ecosystems.

Overall, the less energy one uses results in reduced pollution, fragmentation of land, and risk of accidents that could impact the environment.

Some Considerations to Highlight

Portage County buildings are the County's largest energy consumer. There are many opportunities throughout the County's facilities for energy efficiency upgrades. By

thoroughly examining the facilities and documenting these possible upgrades, the County is building capacity to retrofit their buildings to be more efficient, less costly, and more functional into the future.

In the years from 2004 to 2010 there was a lot of time and effort put into the analysis for construction of a new Justice Center. In 2008, a referendum to build a new $72 million Justice Center failed. The Justice Center would have provided the space in a new building for a number of the County's operations (courts, jail, sheriff's department, and some administration). Again, in 2010 a referendum failed which proposed the building of a new Courthouse.

The future of a new jail or new courthouse is uncertain at best. This affects the views and opinions of decision makers regarding the implementation of energy efficiency projects in currently occupied County buildings because they do not know if the County will continue to occupy these buildings. A valid concern is the possibility of investing in buildings the County may not be occupying in the future.

There may be resistance to large scale spending on renewable energy and large energy efficiency projects unless the projects need to be done for other reasons, such as failure of the current system. The high cost of the installation, long pay-back associated with the installation, or both, may be reasons decision makers are cautious to invest in buildings they are not sure the County will be occupying into the future.

In 2004 as part of the analysis for a new Justice Center, DLR Group was contracted by the County to complete a long range facilities planning study. The study outlines future facility needs and the state of current facilities to develop a road map for future capital investments. The DLR study identified that there are and will continue to be increasing space needs. The study is now seven years old but it may be referenced for relevant information regarding facilities needs.

Currently, a good number of County operations are housed in a tightly knit, four block area in downtown Stevens Point. The downtown campus includes five of the fifteen County buildings; some with the highest use and most intense occupancies. Having these County buildings located in the downtown area makes them easy to walk or bike to from anywhere in town. The location promotes less driving overall, resulting in reduced energy use by the public.

There are smart energy opportunities where buildings are located in close proximity to each other like the County buildings are downtown. A centralized geothermal heating/cooling system could be installed for the area that would distribute geothermal energy to all buildings. There are also opportunities for solar applications that could be used to heat water for all the buildings. In general, the practicality of using solar to heat water increases with the amount of hot water used in buildings; which makes a potential solar application for the downtown buildings more attractive because of the shared hot water used among the five buildings.

Identifying Energy Use Issues and Possible Solutions

Developing the energy baseline, conducting the employee survey, completing energy audits, and noting employee comments have revealed a number of issues related to energy use in County buildings and operations. The issues for each building are documented below in paragraph form for different categories. The identified issues serve as a basis for the recommendations put forth in the sections following.

- Lighting

Issue 1: Amount. There are many opportunities for energy savings when considering lighting in County buildings. Lighting is very non-prescriptive for each building, meaning there are no rules to follow about the number and orientation of lights in a room that will achieve the proper amount of light within that room. There is, however, a standard for the amount of light that should be present in different spaces, whether it's an office, hallway, foyer, or common room, which can be accomplished through many different types, numbers, and orientations of lights.

The minimum foot-candles standards set forth by the Occupational Safety & Health Administration (OSHA) are listed in the table below for different spaces. These measurements are in foot-candles, which is the *luminance on a 1-square foot surface of which there is a uniformly distributed flux of one lumen*.

Through the energy audits and employee energy survey it was found that some workspaces are significantly over-lit. The survey yielded a number of "over-lit" responses on question #5 for a number of buildings including the Annex, Ruth Gilfry Building, Courthouse, Lincoln Center, and Law Enforcement Center.

Table 7. OSHA Minimum illumination intensities: Foot-Candles

Foot-Candles	Area of Operation
3	General construction areas, concrete placement, excavation and waste areas, access ways, active storage areas, loading platforms, refueling, and field maintenance areas.
5	Tunnels, shafts, and general underground work areas.
10	General construction plant and shops (mechanical and electrical equipment rooms, shops, lofts and active storage rooms, mess halls, restrooms, and workrooms.)
20	Indoors: warehouses, corridors, hallways, and exit ways.
30	First aid stations, infirmaries, and offices.

Source: Occupational Safety and Health Administration, 1926.56(a), Table D-3.

During the audits, the Focus on Energy Advisor took foot-candle measurements with a meter and found startlingly high numbers throughout some office and conference room spaces. Some of the foot-candle measurements were as high as 130 foot candles and the standard minimum measurement for that space is 30 foot candles.

In addition to over lighting issues, some spaces within buildings have issues with the evenness of lighting due to the fixture configuration. This is the case in most of the Ruth Gilfry Building; there are too many fixtures in the center of the office space and the

fixtures don't go far enough to the outside walls to light the cubicles around the perimeter of the office space.

Possible Solution: "Overlighting" was found so frequently throughout the audits, the Focus on Energy Advisor recommended the Whole Building Lighting Program for these buildings: Annex, Law Enforcement Center, Ruth Gilfry Building, Health Care Center, Lincoln Center, and Courthouse. The Whole Building Lighting Program is meant to financially support the additional study needed to evaluate alternatives to standard lighting design and use advanced design strategies to increase energy efficiency. Lighting retrofits could be implemented that would dramatically reduce the energy consumption of the lighting and provide proper lighting throughout the space.

The Whole Building Lighting Program could consist of de-lamping, or removing some fixtures, and replacing the remaining T8 lamps with 25W 5000K lamps (T5's) and high efficiency low ballast factor ballasts. Due to the T5 lamps being brighter, there does not need to be as many. By switching to lower wattage lamps and by de-lamping there could be a reduction in lighting energy costs by 60%-70%.

Issue 2: Efficiency. Other building spaces are lit using old technology of very inefficient lighting such as Metal Halides (MH) and High Pressure Sodium (HPS) lamps. These lamps use 150w-400w per lamp. Metal Halides are still present in the Lincoln Center and Law Enforcement Center and should be replaced. There are also HPS spots located on the outside perimeter of buildings and adjacent to flag poles that could be replaced. In some buildings such as the Lincoln Center, Jefferson House, and Portage House there are incandescent bulbs still being used. These bulbs use 100w-150w per bulb.

Possible Solution: MH and HPS lamps could be replaced with fluorescent lamps that use 35w-75w a piece instead of 150w-400w per lamp. The outdoor MH and HPS lamps could be replaced with recently developed Light Emitting Diode (LED) lamps for these applications. The incandescent bulbs being used at the Lincoln Center, Jefferson House, and Portage House should be changed out with 13w-42w compact fluorescent light bulbs.

Issue 3: Duration of Use. Lights remaining ON in unoccupied spaces is another lighting issue in County buildings. Frequently unoccupied spaces in County buildings are bathrooms, conference rooms, storage rooms, basements, and some hallways. Specifically, the basement of the Law Enforcement Center and Health Care Center are lit all the time and are only occupied periodically.

Possible Solution: Motion sensors could be installed in all of the previously mentioned spaces to prevent wasted electricity and reduce costs.

- Heating, Ventilation, and Air Conditioning (HVAC)

Issue 1: General. There are many issues related to the HVAC systems in County buildings. These range from issues as large as systems being completely obsolete, like the boilers at the Health Care Center, to as little as failed steam traps. The U.S. Department of Energy website says that about 44% of a building's energy bill is heating and cooling (the largest percentage group) so maintaining and upgrading HVAC

systems to be as energy efficient as possible could result in large reductions in energy use. Another, more specific issue is the use of automatic sliding doors at the Lincoln Center. These let a large volume of air travel in and out of the building when they open.

Possible Solution: Simply fixing steam leaks by repairing failed steam traps is something that should be done in the Courthouse and Health Care Center to improve the efficiency of their HVAC systems. A revolving door could be installed at the Lincoln Center so the building envelope is not completely broken every time the door is opened.

Issue 2: Balancing. In some buildings there are extreme problems with HVAC balancing; which is the amount of air flow through the HVAC system to certain spaces and how well all the components of the HVAC system are performing together. In the Courthouse, HVAC components have been patched in through the years and as a result the system does not heat and cool spaces evenly throughout the building. Information gathered from employees through the energy survey has identified that most areas in the Courthouse and Ruth Gilfry Building have fluctuating temperatures through the year. Employees said in some spaces it will be consistently too hot in the winter and too cold in the summer and in other spaces it will be too cold in the winter and too hot in the summer. When this happens, employees set thermostat temperatures higher or lower for each room trying to achieve a comfortable temperature. When this is done the HVAC system ends up battling itself because the HVAC system may be cooling one space in the building while it's heating a different space; this wastes energy and does not provide an effective work environment for employees.

While talking with employees during the energy audits, a few concrete examples were brought up about poor HVAC performance. Some employees in the Courthouse said they open windows during the winter when they arrive in the morning because it is too hot. This is a case of overheating a space. It's also a case of heating a space too much at night, when it should not be heated. A programmable thermostat should be controlling the systems, turning them on and off properly to heat the building through the day and shut down the systems at night for energy savings. In the Ruth Gilfry building some employees actually taped over their air vents because they didn't want any cold air blowing on them. It was already cool enough in their space and the extra cool air was giving them stiff necks and headaches.

Some buildings such as the Courthouse and Health Care Center still heat by steam. The U.S. Department of Energy website states the process of creating and condensing steam is inherently less efficient than hot water systems.

Possible Solution: Converting to a hot water system would save energy in these buildings. Replacing a whole heating system is costly but could fix balancing and overheating issues within these County buildings. Some buildings such as the Lincoln Center have old versions of hot water boilers that aren't as efficient as new Energy Star hot water boilers and could be replaced to save energy.

Issue 3: Use of Outside Air. In some buildings, such as the Lincoln Center, Law Enforcement Center, and Annex, the HVAC systems seem to be cooling air when they may not need to.

Possible Solution: Further evaluation is needed on these systems to properly identify the issue. After evaluation, the proper steps should be taken to maximize efficiency.

Issue 4: Boiler Temperature. Boilers may be producing water with temperatures higher than needed.

Possible Solution: Further evaluation is needed on the boilers to properly identify the issue. Depending on the results of the evaluation, outside air temperature reset controls may be an option to manage these systems. The colder the outside air temperature is, the controls on the boiler will adjust its temperature higher.

- Water Heating

Issue 1: Type of Heaters. Water heating in County buildings is very dynamic. Some buildings such as the Ruth Gilfry Building have electric hot water heaters, which in general cost more than gas hot water heaters because of the price of electricity.

Possible Solution: The electric hot water heaters should eventually be replaced by high efficiency gas hot water heaters.

Issue 2: Temperature Control. There are also a couple buildings such as the Health Care Center and Law Enforcement Center that have their hot water heater temperatures higher than they should be. Typically, a hot water heater should be set around 120 degrees Fahrenheit according to the Focus on Energy Advisor. In these buildings it is set to 150 degrees or higher.

Possible Solution: An evaluation of hot water needs should be performed at these buildings. Where the hot water is used and the required temperature for the specified use should be identified. After evaluating the need for hot water in these buildings, a professional design for the hot water system should be drawn up that meets the needs of the specified building and maximizes energy efficiency.

- Personal Computer Power Management

Issue 1: Duration of Use. It was found that nearly half of all computers used are left ON at night. This wastes energy that could be saved throughout the night. Per the computer energy study (see Appendix E), when a computer is left on at night it goes into power save mode after a while which uses about 43% less energy than when it is not in power save mode. When a computer is shut down for the evening, it uses close to zero energy; this is a large difference that can reduce energy use and costs considerably.

Possible Solution: The County has 457 computers in operation. Of these, about half are being shut down at night and the other half are left on. This means there is quite an opportunity for energy savings. Two options to reduce PC energy use are PC power

management software or creating policy that all computers must be shut down in the evenings. The advantage of PC power management software is it shuts all computers down automatically. The advantage of policy is it doesn't cost anything. If policy was drafted and adopted, it may include provisions for IT staff to run a weekly report of those who didn't shut down their computers and a subsequent e-mail may be sent to remind employees to shut their computers down with consequences if they are non-compliant.

- Food Service

Issue 1: Efficiency of Appliances. There is food service present in three County buildings; the Health Care Center, Lincoln Center, and Law Enforcement Center. Storing and preparing meals uses energy in many ways including refrigerating, freezing, cooking, keeping food warm, and washing dishes. There are many appliances in a kitchen that can be evaluated for energy savings. After evaluating the kitchens in County buildings, opportunities have been identified for energy savings.

The Health Care Center produces the most number of meals per year compared to other County food services. They make 3 meals a day, 365 days a year, for 90-100 people. Some of the equipment issues are an inefficient electric steamer and convection oven that are not ENERGY STAR certified, as well as water heating waste from the current dishwashing machine. These are all appliances that use more energy than they should and because of the number of meals prepared there, they have a significant impact on energy use.

Possible Solution: The appliances should be replaced with ENERGY STAR certified appliances. Another very easy thing to do is install a low flow pre-rinse spray nozzle on the dish machine sprayer. This saves on the amount of hot water needed for pre-rinsing dishes.

Issue 2: Maintenance of Appliances. In the Lincoln Center and Health Care Center the refrigerators and freezers may not be performing as well as they should be.

Possible Solution: These refrigerators and freezers could be evaluated and any issues found could be remedied, whether it is cleaning the coils, repairing seals, or adjusting settings.

Issue 3: Update of Appliances. In the Law Enforcement Center there are some issues with the kitchen appliances and should be remedied to save a significant amount of electricity. First, the hot water booster on the dishwasher and the steamer are electric. These are more expensive to operate than gas booster heaters. Also, the hot food holding cabinet is considered inefficient according to Focus on Energy standards. Lastly, the out of date refrigerator/freezer evaporator motors should be replaced.

Possible Solution: Both the hot water booster on the dishwasher and the steamer should be replaced with gas units. The hot food holding cabinet should be replaced with an ENERGY STAR version to improve efficiency. The refrigerator/freezer evaporator motors

should be replaced with high efficiency Electronically Commutated Motor's (ECM) to save a significant amount of electricity.

- Plug Loads

Issue: Throughout many County buildings there are vending machines, refrigerators, and other appliances. Vending machines use a surprising amount of electricity to operate. There are techniques available to reduce their energy use. The leaps and bounds that have been made in domestic refrigerator technology have been drastic over the past 10-20 years and now there are very efficient refrigerators available compared to the units that are present in some County buildings.

Possible Solution: In some cases the appliances are old and should be replaced with ENERGY STAR appliances. As for vending machines, Vending Misers should be installed on some machines to raise the cooling temperature and shut off lights when there is no one around; and on other machines the lamps and ballast should simply be disconnected. This is dependent upon the occupancy hours of the building where the machine is located. If there are people always walking past the machine then it doesn't make sense to install a vending miser, but instead, the lamps and ballasts should just be disconnected.

- Fountains & Irrigation

Issue: In the Portage County Business Park there are a series of fountains for attracting customers and for aeration of the retention ponds so algae does not become a problem. There are also irrigation systems at the business park and a few other areas around County buildings. The energy use for County fountains and irrigation may be surprising, at 339,355 kWh which is about equal to half of the electricity use in the Courthouse. These pumps are very expensive to power. There is a fee structure for businesses in the Portage County Business Park so that 60% of the fountain pumps electricity costs are paid for by businesses that own parcels in the park. Portage County pays for 40% of the costs which amounts to almost $24,000 on electricity for fountains and irrigation systems.

Possible Solution: Strong consideration could be given to replacing the existing fountain pumps with aeration pumps that would be much cheaper to operate.

- Employee Behavior

The employee energy survey results made it clear that employees' self image towards energy awareness and willingness to participate in energy saving behaviors is high (69% of respondents, or 167 employees, said they do things to reduce personal energy use "most of the time" and 21.9% of respondents, or 53 employees, said they do things to reduce personal energy use "all the time"). Yet when conducting energy audits and gathering information throughout the planning process, some evidence may contradict those results. While doing walkthroughs of buildings, there were lights left on in bathrooms, hallways, and conference rooms that didn't need to be.

Possible Solution: One strategy that will improve employee behavior is energy education. A newsletter with energy facts and information could be distributed to employees. This could help improve employee behavior, save energy, and reduce costs. Another way that would improve employee behavior to be more conducive to energy stewardship is creating standard operating procedures and policies. Standard operating procedure may include provisions for employees to turn off lights in spaces when not in use, maintain certain thermostat temperatures, and more.

SECTION 7: GOALS, OBJECTIVES, AND ACTIONS

Portage County's primary goal is to decrease energy expenses for the operation of County facilities. This goal positions Portage County to become a leader in energy management and efficiency. It should be recognized that the goals, objectives, and actions set forth in this plan are not exclusive, but instead should be integrated with other Portage County plans.

Goal 1: Energy management and efficiency resulting in reduced costs. Portage County will reduce its electricity and natural gas consumption by 10% in calendar year 2015 compared to the calendar year 2009 (base year). Portage County will also incorporate gasoline and diesel fuel use into the Strategic Energy Management Plan.

Objective 1.1: Portage County will systematically implement energy efficiency improvements per the Final Recommendations Budget and Timeline section (page 36) of this Strategic Energy Management Plan.

Action a: The Portage County Executive and Space and Properties Committee will provide oversight for the evaluation and implementation of the Strategic Energy Management Plan recommendations, giving priority to projects with rapid return on investment.

Action b: The Portage County Facilities Director will provide quarterly reports to the Portage County Space and Properties Committee on new energy efficiency improvements.

Action c: The Portage County Executive will recommend a funding strategy for energy projects by June 1, 2011. The funding strategy will require approval from Space and Properties Committee, Finance Committee, Capital Improvements Committee, and County Board of Supervisors. The strategy for funding will include identifying a process to pursue grants and incentives.

Objective 1.2: Portage County will consider including standard operating procedures and policies that will improve energy conservation and efficiency within County policies.

Action a: The Portage County Executive will develop recommendations for standard operating procedures and policies by June 1, 2011, incorporating ideas and feedback from Portage County employees.

Action b: The Portage County Executive and Space and Properties Committee will write and approve standard operating procedures and policies for managing energy systems efficiently before December 1, 2011. The standard operating procedures and policies will require approval by the Space and Properties Committee and County Board.

Objective 1.3: Portage County will provide training for energy management and improve methods of energy management that will maximize the efficient use of energy.

Action a: Once per year the Portage County Facilities Director and advisors from Focus on Energy, the utility companies, etc., will develop and present an energy management training for maintenance staff.

Action b: The Portage County Facilities Director and County Executive will collaborate on the need for additional staff orientation and training to ensure the success of energy management and efficiency projects.

Action c: The Portage County Facilities Director will provide daily oversight for all energy management decisions and changes.

Action d: The Portage County Facilities Director will provide quarterly reports to Space and Properties Committee on energy management projects.

Objective 1.4: Portage County will develop Phase II: Gasoline and Diesel Fuel Use for the Strategic Energy Management Plan by December 1, 2011.

Action a: The Central Wisconsin Resiliency Project – Municipal Energy Specialist will document gasoline and diesel fuel use for 2010 for use in the Strategic Energy Management Plan by July 31, 2011.

Action b: The Energy Team will develop recommendations for gasoline and diesel fuel conservation, which when approved by the County Board, will be incorporated into the Strategic Energy Management Plan by December 1, 2011.

Objective 1.5: Portage County will monitor energy use and costs on a monthly and annual basis.

Action a: The Portage County Executive will oversee creation of a centralized energy billing and tracking process to be in place no later than December 31, 2011.

Action b: The Facilities Director will review monthly bills for abnormalities and record energy use and energy costs on tracking spreadsheets. Contingent on funding, the Central Wisconsin Resiliency Project – Municipal Energy Specialist will perform this task, reporting abnormalities to the Facilities Director.

Action c: The Facilities Director will develop an energy use report of all fuels for the previous year and present it to the Portage County Space and Properties Committee on or before the June Space and Properties Committee meeting. Contingent on funding, the Central Wisconsin Resiliency Project – Municipal Energy Specialist will prepare the report for the Facilities Director.

Action d: On or before its June meeting, the Space and Properties Committee will review the annual energy reports and monitor progress compared to the 2009 base year. Simultaneously they will update the Strategic Energy Management Plan's goals, objectives and actions as needed.

Goal 2: Leadership. Portage County Government will lead and set an example for energy management and efficiency in Portage County and Wisconsin.

Objective 2.1: Portage County will share energy management and efficiency strategies with stakeholders, employees, and the public.

Action a: The Portage County Executive will educate employees about energy management and efficiency utilizing various educational techniques, e.g., distributing a monthly employee newsletter that includes an energy section.

Action b: Portage County Department Heads and building managers will familiarize themselves and employees with the Strategic Energy Management Plan and bring forth energy management and efficiency issues and opportunities to the Facilities Director.

Action c: The Portage County Executive will engage the public by sharing energy management and efficiency progress and soliciting feedback on energy related issues and plans.

Objective 2.2: Portage County will collaborate with other municipal governments on energy management and efficiency projects.

Action a: Portage County will continue to work cooperatively on energy management and efficiency with the City of Stevens Point, Village of Plover, Village of Rosholt, and other municipal governments that co-own/co-operate buildings with Portage County.

Action b: Portage County will collaborate with other municipal governments throughout the state that are pursuing energy management and efficiency efforts.

Objective 2.3: The Portage County Executive and Space and Properties Committee will research and consider alternative energy sources.

Goal 3: Environmental Protection. Portage County will utilize energy management and efficiency to be a steward of our natural resources.

Objective 3.1: Portage County will implement the Strategic Energy Management Plan.

Objective 3.2: Portage County will pursue other actions, not included in the Strategic Energy Management Plan, that increase energy stewardship.

SECTION 8: PLAN IMPLEMENTATION

2010 Energy Projects

During the time period from July 2010 and December 2010, Focus on Energy offered a bonus incentive for customers that currently receive service under Wisconsin Public Service (WPS). The bonus incentive application form states:

- In general, only unrelated projects completed within six months of each other qualify for the bonus. Installations of multiple units of a similar type do not qualify as multiple projects. "Unrelated projects" are defined as those projects that improve the efficiency of separate energy-using systems in the facility. For example, the installation of a variable frequency drive (VFD) on an HVAC fan and a water heater retrofit are unrelated projects and do qualify for the bonus. However, the installation of a VFD on an HVAC fan and the installation of a chiller on that same HVAC system do not qualify because they both serve the same end-use system. In this context, a "project" is an individual energy-efficient technology type that Focus on Energy provides incentives on. Multiple projects must be at the same site address.
- Equipment tune-up and repair projects are excluded from this promotion and do not count toward a multi-project bonus.
- Total incentives, including the bonus incentive, will be capped at 75 percent of total project costs.
- The bonus incentive cannot exceed $25,000.

The Portage County Energy Team recommended a multi-project effort to take advantage of the Multi-Project Bonus Incentive. The Portage County Sustainability Specialist, working with the Facilities Director, Focus on Energy Advisor and the WPS Account Representative, identified and implemented multiple projects at six different site addresses owned by the County; the Courthouse, Annex, Law Enforcement Center, Health Care Center, Ruth Gilfry Building, and Lincoln Center; as well as the parks.

Most of these projects are small financial investments that will realize significant electricity savings. Some projects, such as the VFD on the Ruth Gilfry Building cooling tower, are larger projects the Facilities Director has previously identified to be completed. Now that there is a bonus incentive for multiple projects, combining the projects, completing them by the deadline, and receiving extra incentives has been identified as beneficial for the County to pursue. There are a different number of 2010 projects that were identified at each site address. Some site addresses are identified to have one project completed while other site addresses have three projects identified (this increases the bonus incentive; receiving a 50% bonus on incentives at that specific site address).

All costs associated with the following list of projects, with the exception of the VFD at the Ruth Gilfry building, are simply materials and do not include installation costs; the installations were completed by Facilities Maintenance Technicians. The projects include:

Annex (one category – 0% bonus)
6 – Occupancy sensors in restrooms
3 – Occupancy sensors in basement

Courthouse (two different categories – 25% bonus)
6 – Occupancy sensors in restrooms
1 – Vending Miser

Lincoln Center (three different categories – 25% bonus)
8 – Occupancy sensors in restrooms
1 – Vending Miser
Lighting retrofit in Holly Shoppe to MaxLite fluorescents
Lighting retrofit for "common area" – incandescent spots to LED floods lamps

Law Enforcement Center (three different categories – 25% bonus)
6 – Occupancy sensors in restrooms
4 – Occupancy sensors in basement
1 – Vending Miser

Health Care Center (two different categories – 0% bonus)
2 – Occupancy sensors in basement restrooms
2 – Occupancy sensors in basement break room

Ruth Gilfry Building (three different categories – 50% bonus)
8 – Occupancy sensors in restrooms
1 – Vending Miser
1 – VFD on cooling tower

The funding for these projects came from a previously authorized Capital Improvements project. In 2009, the Capital Improvements fund included a $100,000 appropriation for energy conservation projects and audits. As of June 2010, there was approximately $46,000 remaining from the original amount. The estimated cost for the 2010 projects is

$22,870. As a result of these projects, the estimated incentive payments in the amount of $3,530 from Focus on Energy will be returned to this fund.

Recommendations Rankings

The following recommendations were developed collaboratively from the employee survey, background research, suggestions from the Facilities Director, and recommendations made by the Focus on Energy Advisor in the building audits. The synthesis of this data and research is important to identify and prioritize changes, whether they may be physical or operational, that should be made over time in County buildings and operations to reduce energy use and costs.

There are three methods of prioritization used. First, the recommendations were assessed using a point system based upon ease of installation, installation costs, estimated energy savings, implementation feasibility, and change in employee comfort. The point assignments are available to view in full detail in Appendix G. Second, the recommendations were assessed by the Focus on Energy Advisor and he provided his expertise on which recommendations should be implemented before others and why. Third, the recommendations were assessed by the Portage County Facilities Director and he provided the availability of his staff to implement the projects, where the funding may come from and when it could be available. The recommendations with higher capital investments ended up being financed over long time frames in the Final Recommendations Budget and Timeline section of the plan. This is so large amounts of funding and project oversight do not have to be available all at once, but instead is spread out.

The section below shows the report's point system and the Focus on Energy Comments but does not show the Facilities Director's comments. Instead, the Facilities Director's comments were incorporated directly into the next section of the plan: Recommendations Budget and Timeline.

The following acronyms are used in this section:

HVAC	Heating, ventilating, and air conditioning
AC	Air conditioning
DHW	Domestic hot water
VFD	Variable frequency drive
LED	Light emitting diode
HID	High intensity discharge
CFL	Compact fluorescent light bulb
ECM	Electronically commutated motor

Annex

Focus Rec.		Points
#7	HVAC – Adjust boiler outside air temperature reset control	**18**
#8	HVAC – Adjust economizer controls	**18**
#6	HVAC – Door sweep installation	**14**
#10	HVAC – Reduce Air Infiltration – Receiving doors	**12**
#3	Insulate the AC lines on the Liebert roof-top AC unit	**12**
#5	DHW – Circulation pump time lock on domestic hot water system	**12**
#9	HVAC – Chilled water pumps variable frequency drives	**12**
#2	HVAC – VFD for boiler hot water pump	**10**
#1	Lighting – Custom Fluorescent recommendation	**10**
#4	Plug Loads – Vending Miser on vending machine	**2010 Projects**

Focus on Energy Comments:

1. Focus Recommendations #3, #5, #6, and #10. These are easy to do, very inexpensive maintenance improvements that will have a quick payback.
2. Focus Recommendation #7. Checking the boiler outside air temperature reset controls and adjusting accordingly is a top priority. If possible, add unoccupied offset controls as well to increase efficiency during unoccupied times.
3. Focus Recommendation #8. Checking into the economizer controls is also a top priority; why was the chiller running on a 55 degree day?
4. Focus Recommendation #2. Installing a VFD on boiler hot water pump is a high priority. The valves are 10-15% open; they should be 100% open and then the pump can adjust power accordingly, after a VFD is installed.
5. Focus Recommendation #9. Installing a VFD on the chilled water pumps is also a high priority.
6. Focus Recommendation #1. Address the lighting after the previous recommendations have been implemented.

Courthouse

Focus Rec.		Points
#2	HVAC – Preventative maintenance program - Insulate AC lines	**14**
#3	HVAC – Preventative maintenance program - Check and repair steam traps	**14**
#5	HVAC – Boiler steam to hot water conversion	**10**
#1 and #4	Lighting – Custom fluorescent recommendation	**10**

Focus on Energy Advisor Comments:

1. Focus Recommendations #2 and #3. These are easy to do, very inexpensive maintenance improvements that will have a quick payback.
2. Focus Recommendation #1 and #4. Consider a whole building lighting approach to make this buildings lighting more efficient.

Lincoln Center

Focus Rec.		Points
#3	HVAC – Adjust economizer controls	**18**
#7	Food Service – Refrigeration system maintenance	**12**
#2	HVAC – Ventilation controls	**12**
#8	HVAC – Boiler replacement to high performance	**12**
#1	Lighting – Custom fluorescent recommendation	**10**
#4	Lighting – Replace HID with MaxLite fluorescent bulbs	**2010 Projects**
#5	Lighting – Replace incandescent spots with CFL	**2010 Projects**
#6	Food Service – Install ECM in coolers/freezers	**2010 Projects**

Focus on Energy Advisor Comments:

1. Focus Recommendations #2 and #3. Retro-commission the HVAC system to verify ventilation is operating properly. This could have huge payback consequences.
2. Focus Recommendations #1. Consider a whole building lighting approach to make this buildings lighting more efficient.

Law Enforcement Center

Focus Rec.		Points
#5	HVAC – Adjust economizer controls	**20**
#2	DHW – Hot water temperature study and adjustment	**16**
#3	DHW – Electric to gas conversion on booster water heater	**14**
#8	Lighting – T8 or T5 replaces HID (inside and out)	**12**
#12	HVAC – Boiler replacement to high performance	**12**
#10	Food Service – Gas ENERGY STAR steamer	**10**
#11	Food Service – ENERGY STAR hot food holder	**10**
#1	Lighting – Custom Fluorescent recommendation	**10**
#4	Plug Loads – Vending Miser on vending machine	**2010 Projects**
#6	Lighting - LED Exit Lighting	**2010 Projects**
#7	Lighting – Occupancy sensors in basement	**2010 Projects**
#9	Food Service – Install ECM in cooler/freezers	**2010 Projects**

Focus on Energy Advisor Comments:

1. Focus Recommendation #5. Simply adjusting controls may result in large savings in this building.
2. Focus Recommendation #8. Replacing the HID lights in front entrance with high efficiency fluorescent lights should be done to reduce electrical consumption.
3. Focus Recommendation #2. Evaluate water heating needs so high efficiency water heaters can operate at a lower temperature.

Ruth Gilfry Building

Focus Rec.		Points
#4	Plug Loads – Disconnect walk-in refrigerator, replace with ENERGY STAR	**16**
#3	DHW – Replace hot water heater with gas ENERGY STAR	**12**
#1	Lighting – Custom fluorescent recommendation	**10**
#2	Plug Loads – Vending Miser on vending machine	**2010 Projects**

Focus on Energy Advisor Comments:

1. Focus Recommendation #4. As I understand, this will be done shortly along with the other 2010 projects.
2. Focus Recommendation #1. Consider a whole building lighting approach to make this buildings lighting way more efficient. This is highly recommended for this building.
3. Focus Recommendation #3. Installing a gas hot water heater will decrease fuel cost for this purpose.

Jefferson House

Focus Rec.		Points
#1	Lighting – Replace all lamps with compact fluorescents	**2010 Projects**
#2	Lighting – LED exit lighting	**2010 Projects**

Focus on Energy Advisor Comments:

1. As I understand, these will be done along with the 2010 energy projects.

Health Care Center

Focus Rec.		Points
#4	DHW – Reduce water temperature on hot water heater	**18**
#1	Lighting – Reconfigure lighting layout	**14**
#2	Food Service – Refrigerator sealing maintenance	**14**
#7	Food Service – Hood fan controls	**14**
#6	Food Service – Replace dishwasher with high efficiency model	**12**
#8	Lighting – Low wattage fluorescents replacement	**10**
#10	HVAC – Replace burners on boilers with high efficiency	**10**
#11	Food Service – Replace convection oven with gas ENERGY STAR	**10**
#12	Food Service – Replace steamer with gas ENERGY STAR	**8**
#3	DHW – Booster water heater	**8**
#13	HVAC – Boiler steam to hot water conversion	**8**
#5	Plug Loads – Vending Miser on vending machine	**2010 Projects**
#9	Food Service – Install ECM on cooler/freezer	**2010 Projects**

Focus on Energy Advisor Comments:

1. Due to the high hours of operation lighting and food service have great opportunities for savings.
2. Focus Recommendation #4. Determine if water heater temperature has to be 164 degrees. Reduce to as low as 120 degrees if possible.
3. Focus Recommendation #1 and #8. Reconfigure the lighting layout and utilize low watt fluorescent lamps in all areas other than hallways and guest rooms. This is not eligible for the whole building lighting approach – not enough area to be retrofitted.
4. Focus Recommendations #3, #6, and #7. Dishwashing – booster heater conversion to natural gas and high efficiency dishwasher upgrade. Natural gas booster heater will cost 80% less in energy to operate. The dishwasher will consume 65% less hot water to wash dishes. Kitchen exhaust hood controls will prevent unnecessary loss of building heat.

Downtown Library

Focus Rec.		Points
#3	HVAC – Adjust economizer controls	**18**
#2	HVAC – Install VFD on boiler hot water pump	**12**
#4	HVAC – Install VFD on basement air handling unit	**12**
#1	Lighting – Retrofit all 3 lamp fixtures in offices and children's library	**10**
#5	HVAC – Replace chiller system with high efficiency unit	**8**
#6	HVAC – Boiler steam to hot water conversion	**8**
#7	HVAC – Insulation on roof when it's re-roofed	**8**

Focus on Energy Advisor Comments:

1. Focus Recommendation #3. Simply evaluating and adjusting the economizer controls on the HVAC system could realize significant savings.
2. Focus Recommendation #1. Retrofit lamps in children's area and offices.
3. Focus Recommendation #4. Add VFD to basement air handling unit.

Plover Branch Library

Focus Rec.		Points
#3	Lighting – Install compact fluorescent lamps	**14**
#2	HVAC – Install programmable thermostat	**14**
#5	Plug Loads – Replace refrigerator with high efficiency ENERGY STAR refrigerator	**14**
#4	DHW – Pipe insulation on DHW lines	**12**
#1	Lighting – Retrofit all 4 foot lamps with 25w low ballast factor ballasts	**10**

Focus on Energy Advisor Comments:

1. Focus Recommendation #5. Disconnect refrigerator in children's room.
2. Focus Recommendation #1 and #3. Retrofit all fluorescents with 25 watt lamps and low ballast factor ballasts. Replace incandescent lamps with compact fluorescent lamps near front desk.
3. Focus Recommendation #2. Install programmable thermostat to control space temperatures accordingly when occupied or unoccupied.

SECTION 9: RECOMMENDATIONS BUDGET AND TIMELINE

The following tables are final recommendations based on analysis done to date for each audited building. The tables include the description of the recommendation, where the funding will come from, the year the recommendation is suggested to be completed, the estimated cost and the estimated annual cost savings (completed by Focus on Energy and Portage County Facilities Director). The three methods of prioritization used to develop the tables are a points rating system, Focus on Energy Advisor's comments, and the Portage County Facilities Director's comments. The process used for prioritization is described in more detail in the previous section.

The tables below are suggested energy management and efficiency recommendations. Recommendations will be evaluated on a project by project basis. A holistic facility analysis and return on investment analysis will be done before implementing recommendations so the best decision is made for Portage County.

The payback column was calculated without Focus on Energy incentive payments included. It is likely, depending on what Focus on Energy is offering for incentives, that payback years will be less for a lot of recommendations. Some recommendation payback years will be significantly less than represented in the following tables, depending on Focus on Energy incentive payments.

Note:

Shaded rows indicate a need to complete the recommendation for reasons other than energy efficiency. The need is described in text below each table.

Annex

Focus Rec. #	Description	Funding Source	Year	Estimated Cost	Estimated Annual Savings	Payback (No Focus Incentives Included)
#7 & #8	HVAC - Verify boiler outside air temperature reset control and economizer controls	Facilities Budget	Completed in 2011	$500 Funded	$4,299	< 1
#6	HVAC – Door sweep installation	Facilities Budget	Completed in 2011	$100	$23	4 ½
#10	HVAC – Reduce air infiltration on receiving doors	Facilities Budget	2011	$250	$415	< 1
#3	HVAC – Insulate AC lines on roof-top	Facilities Budget	2011	$250	$193	1 ½
#9	HVAC – Chilled water pumps VFD's	Energy Efficiency Fund	2012	$2,550	$1,512	2

#2	HVAC – Boiler hot water pumps VFD's	Energy Efficiency Fund	2012	$2,550	$1,176	2
#1	Lighting – Custom fluorescent recommendation	Capital Improvements	2012 evaluation 2013 implement	$9,600 $20-40,000	$7,224	4 - 7

- ✓ Focus Recommendation #4 – Plug Loads – Vending Misers on vending machine are being completed as part of the 2010 projects
- ✓ Focus Recommendation #5 – Circulation pump time clock has been installed

Courthouse

Focus Rec. #	Description	Funding Source	Year	Estimated Cost	Estimated Annual Savings	Payback (No Focus Incentives Included)
#2	HVAC – Preventative maintenance – Insulate AC lines	Facilities Budget	2011	$1,000 - 2,500	$240	4 - 10 ½
Facilities Director Rec.	DHW – Circulation pump time clock	Facilities Budget	2012	$500	$200*	2 ½
#5	HVAC – Boiler steam to hot water conversion	Capital Improvements	2012 evaluation 2013 implement	$40,000 $500,000 – 1.5 million	$11,130	48 - 100+
#1 & #4	Lighting – Custom fluorescent recommendation	Capital Improvements	2012 evaluation 2013 implement	$14,000 $20-75,000	$8,640	4 - 10

- ✓ Focus Recommendation #3 – HVAC – Preventative maintenance (check and repair steam traps) has been completed

The boilers in the Courthouse are nearing the end of their life. The Facilities Department estimates the boilers should last for another five to ten years. Converting the steam system to a hot water system will make controlling the temperature within the building easier and dramatically increase the systems efficiency.

Lincoln Center

Focus Rec. #	Description	Funding Source	Year	Estimated Cost	Estimated Annual Savings	Payback (No Focus Incentives Included)
#2 & #3	HVAC – Verify ventilation controls and economizer controls	Facilities Budget	In progress & 2011	$500 **Funded**	$7,238	< 1
#7	Food Service – Refrigeration system maintenance	Facilities Budget	2011	$1,000	$31	32
Facilities Director Rec.	DHW – Circulation pump time clock	Facilities Budget	2012	$500	$200	2.5
#1	Lighting – Custom Fluorescent recommendation	Capital Improvements	2012 evaluation 2013 implement	$6,000 $20-40,000	$7,470	3 ½ – 6
#8	HVAC – Boiler replacement to high performance	Capital Improvements	2014 evaluation 2014 implement	$10,000 $100,000	$4,916	22

- ✓ Focus Recommendation #4 – Lighting - Replace HID with fluorescent lighting are being completed as part of the 2010 projects
- ✓ Focus Recommendation #5 – Lighting - Replace incandescent spots with CFL's are being completed as part of the 2010 projects
- ✓ Focus Recommendation #6 – Food Service - Install ECM in coolers/freezers are being completed as part of the 2010 projects

Law Enforcement Center

Focus Rec. #	Description	Funding Source	Year	Estimated Cost	Estimated Annual Savings	Payback (No Focus Incentives Included)
#12	HVAC – Boiler replacement to high performance	Facilities Budget Capital Improvements	2011 evaluation 2011 implement	Contractor $70-$100,000	$1,840	38 - 54
#5	HVAC – Verify economizer controls	Facilities Budget	In progress & 2011	$500 **Funded**	$3,528	< 1
#2	DHW – Hot water temperature study and adjustment	Facilities Budget Capital Improvements	2011 evaluation 2012 implement	$5,000 In House	$810	6
#3	DHW – Electric to gas conversion on booster water heater	Facilities Budget Capital Improvements	2011 evaluation 2012 implement	$1,000 $10,000	Further Study	N/A
#10	Food Service – Gas ENERGY STAR steamer	Energy Efficiency Fund	2012	$10,000	$124	80

#11	Food Service – ENERGY STAR hot food holder	Energy Efficiency Fund	2012	$10,000	$103	97
Facilities Director Rec.	HVAC – Gas Conversion (boiler to dishwaser?)	Energy Efficiency Fund	2012	$10,000	Further Study	N/A
#1 & #8	Lighting – Custom fluorescent recommendation	Capital Improvements	2012 evaluation 2013 implement	$10,800 $50-75,000	$3,672	16 - 23
Facilities Director Rec.	HVAC – Chiller study and replacement	Capital Improvements	2012 evaluation 2013 implement	$5,000 $150,000	Further Study	N/A

- ✓ Focus Recommendation #4 – Plug Loads – Vending Misers on vending machine are being completed as part of the 2010 projects
- ✓ Focus Recommendation #6 – Lighting – LED exit lighting are being completed as part of the 2010 projects
- ✓ Focus Recommendation #7 – Lighting – Occupancy sensor in basement are being completed as part of the 2010 projects
- ✓ Focus Recommendation #9 – Food Service – Install ECM in coolers/freezers are being completed as a part of the 2010 projects

There are four boilers in the Law Enforcement Center. Two of the boilers need to be replaced immediately as a result of failure. The Facilities Department will recommend this project for the 2011 capital improvement process and be installed in 2012. The other two boilers were replaced in 2009 and are expected to last for another fifteen years.

The chiller at the Law Enforcement Center should be replaced as soon as possible. The useful life of the chiller is twenty years and it is currently twenty years old. In 2010 a compressor failed and had to be replaced. It is possible that another compressor could fail and need replacing at the cost of $8,000. Considerable energy savings could be realized with a new energy efficiency chiller.

Ruth Gilfry Building

Focus Rec. #	Description	Funding Source	Year	Estimated Cost	Estimated Annual Savings	Payback (No Focus Incentives Included)
#4	Plug Loads – Disconnect walk-in refrigerator and replace with ENERGY STAR kitchen refrigerator	Facilities Budget	Completed in 2011	$1,000	$491	2
Facilities Director Rec.	Plug Loads – Dispose of boiler room refrigerator	Facilities Budget	2011	$25	$75	< 1
#3	DHW – Replace hot water heater with gas ENERGY STAR	Facilities Budget Energy Efficiency Fund	2011 evaluation 2012 implement	Contractor $10,000	$546	18
#1	Lighting – Custom fluorescent recommendation	Capital Improvements	2012 evaluation 2013 implement	$8,800 $20-60,000	$9,360	3 - 7
Facilities Director Rec.	HVAC – Boiler replacement	Capital Improvements	2011 implement	Funded	Further Study	N/A

- ✓ Focus Recommendation #2 – Plug Loads – Vending Miser on vending machine are being completed as part of the 2010 projects

The boiler replacement at the Ruth Gilfry Building will be completed in 2011. The boiler has a useful life of thirty years and it is over thirty years old. Since this recommendation is already funded it is not included in budget calculations.

Jefferson House

- ✓ Focus Recommendations – #1 compact florescent light bulb installations, #2 including LED exit lighting, and #4 storm windows for the basement, are being completed as part of the 2010 projects.

Health Care Center

Focus Rec. #	Description	Funding Source	Year	Estimated Cost	Estimated Annual Savings	Payback (No Focus Incentives Included)
#4	DHW – Evaluate and reconfigure hot water heater temperature	Facilities Budget	2011	In House	$286	< 1
#2	Food Service – Refrigerator sealing maintenance	Facilities Budget	2011	$1,000	$150	6 ½
#1 & #8	Lighting – Custom fluorescent recommendation	Capital Improvements	2012 evaluation 2013 implement	$16,000 $35-60,000	$5,175	9 ½ – 15
#10 & #13	HVAC – Evaluate boiler system and implement steam to hot water conversion, new boilers	Capital Improvements	2013 evaluation & implement	$35,000 $500,000	$10,880	49
#3, #7, #6, #11 & #12 (lumped together to achieve capital improvement status)	Food Service – Install hood fan controls, replace dish washer with high efficiency model, replace convection oven and steamer with gas ENERGY STAR models, and install gas booster hot water heater	Capital Improvements	2014	$80,000	$3,214	25

- ✓ Focus Recommendation #5 – Plug Loads – Vending Misers on vending machine are being completed as part of the 2010 projects
- ✓ Focus Recommendation #9 – Food Service – Install ECM on coolers/freezers are being completed as part of the 2010 projects

The boilers at the Health Care Center are in excess of fifty years old. They have a useful life of fifty years. Converting the steam system to a hot water system will make controlling the temperature in the building easier and dramatically increase energy efficiency.

Library

Focus Rec. #	Description	Funding Source	Year	Estimated Cost	Estimated Annual Savings	Payback (No Focus Incentives Included)
#3	HVAC – Verify economizer controls	Library Maintenance Budget	2011	In House	$1,376	< 1
#2	HVAC – Evaluate and install VFD on boiler hot water pump	Energy Efficiency Fund	2012 evaluation & implement	Contractor $2,550	$705	3 ½
#4	HVAC – Evaluate and install VFD on basement air handling unit	Energy Efficiency Fund	2012 evaluation & implement	Contractor $2,550	$843	3
#5	HVAC – Replace chiller with high efficiency unit	Capital Improvements	2012	$150,000	$3,096	48
#6	HVAC – Boiler steam to hot water conversion	Capital Improvements	2012 evaluation 2013 implement	$30,000 $150,000	$8,577	21
#1	Lighting – Custom fluorescent recommendation	Capital Improvements	2012 evaluation 2013 implement	$9,000 $50-60,000	$2,838	20 – 23
#7	HVAC – Insulation on roof when it's re-roofed	Capital Improvements	2015	$25,000	$976	25

The chiller at the Library should be replaced soon with a high efficiency unit. The useful life of the chiller is twenty years and it is already twenty years old.

The boiler replacement and steam to hot water conversion should be completed soon as well. The boilers have a useful life of thirty years and are already twenty years old. The tubes in one boiler have already failed and needed to be replaced. Converting the steam system to a hot water system will make it easier to control temperatures in the building and increase the energy efficiency of the system.

The City of Stevens Point is responsible for all improvements over $2,000 in the Library. All projects will need to be coordinated with the City of Stevens Point in City owned buildings.

Plover Branch Library

Focus Rec. #	Description	Funding Source	Year	Estimated Cost	Estimated Annual Savings	Payback (No Focus Incentives Included)
#3	Lighting – Install compact fluorescent lamps throughout building	Library maintenance budget	2011	In House	$114	< 1
#2	HVAC – Install programmable thermostat	Library maintenance budget	2011	$1,000	$114	8 ½
#5	Plug Loads – Dispose of children's room refrigerator	Library maintenance budget	2011	$25	$34	< 1
#4	DHW – Pipe insulation on DHW lines	Library maintenance budget	2011	$500	$36	13
#1	Lighting – Custom fluorescent recommendation	Capital Improvements	2012 evaluation 2013 implement	$1,000 $10,000	$617	17

Summary of Budget for Recommendations with Need

The following table is recommendations extracted from the previous tables that will need to be completed due to possible failure of equipment and equipment that is at the end of its useful life. The extracted recommendations are some of the most costly recommendations in the plan. It is essential to budget ahead of time for costly recommendations such as these because they require high capital investment.

Focus Rec. #	Description	Funding Source	Year	Estimated Cost	Estimated Annual Savings	Payback (No Focus Incentives Included)
Courthouse						
#5	HVAC – Boiler steam to hot water conversion	Capital Improvements	2012 study 2013 implement	$40,000 $500,000 – 1.5 million	$11,130	48 - 100+
Law Enforcement Center						
#12	HVAC – Boiler replacement to high performance	Facilities Budget Capital Improvements	2011 study 2011 implement	Contractor $70-$100,000	$1,840	38 - 54
Facilities Director Rec.	HVAC – Chiller study and replacement	Capital Improvements	2012 study 2013 implement	$5,000 $150,000	Further Study	N/A
Ruth Gilfry						
Facilities Director Rec.	HVAC – Boiler replacement	Capital Improvements	2011 implement	Funded	Further Study	N/A
Health Care Center						
#10 & #13	HVAC – Evaluate boiler system and implement steam to hot water conversion, new boilers	Capital Improvements	2013 study & implement	$35,000 $500,000	$10,880	49
Library						
#5	HVAC – Replace chiller with high efficiency unit	Capital Improvements	2012	$150,000	$3,096	48
#6	HVAC – Boiler steam to hot water conversion	Capital Improvements	2012 study 2013 implement	$30,000 $150,000	$8,577	21
Total				**$1,630,000 to $2,660,000**	**$35,523 +**	**45 - 75**

Summary of Total Budget

The following tables describe how much funding is needed each year and from what source the funding should come from. The last table describes the total amount of funding that's needed for each year from 2011 to 2015 and also shows the total amount of funding needed through the years 2011 to 2015. The capital expenses shown below are for all energy management and efficiency recommendations.

Recommendations will be evaluated on a project by project basis. A holistic facility analysis and return on investment analysis will be done before implementing recommendations so the best decision is made for Portage County.

Facilities Budget	2011	$12,125 to $13,625
	2012	$1,000
	Total	**$13,125 to $14,625**

Energy Efficiency Fund*	2011	$0
	2012	$50,200
	Total	**$50,200**

Capital Improvements	2011	$70,000 to $100,000
	2012	$310,200
	2013	$1,560,000 to $2,720,000
	2014	$190,000
	2015	$25,000
	Total	**$2,155,200 to $3,345,200**

Library Budget	**Year**	**Project Costs**
	2011	$1,525
	Total	**$1,525**

	Year	**Project Costs**	**Estimated Savings****
Sum by Year And Totals	2011	$83,650 to $115,150	$20,483
	2012	$361,400	$9,315
	2013	$1,560,000 to $2,720,000	$71,036
	2014	$190,000	$8,130
	2015	$25,000	$976
	Total	**$2,220,050 to $3,411,550**	**$109,940**

Recommendations based on Facilities maintenance needs: $1.6 – $2.6 million
Recommendations based on energy efficiency opportunities: $.6 - $.8 million

*Fund not established as of January, 2011. Refer to Objective 1.1: Action C

**Numbers under this column represent the estimated annual savings resulting from the projects implemented in that year.

Summary of Roles and Responsibilities

Planning often unites different groups and brings everyone together around a common vision. Going through a planning process brings to the table issues that need to be resolved with goals, objectives, and recommendations which take manpower and resources to accomplish. Establishing the roles and responsibilities of each party involved with the implementation of the plan will help set expectations for time and resource commitments.

Portage County Executive

- Convene with the Finance Director and Facilities Director to develop the details of the funding strategy, including the Capital Improvements Plan and Energy Efficiency Fund.
- Work to get energy recommendations that include capital purchases passed through the capital improvement plan.
- Work with relevant committees and all employees to develop standard operating procedures and policies for improving energy conservation and efficiency.
- Develop a centralized system for utility bills that will simplify the tracking process for energy use and costs.
- Educate employees about energy efficiency and conservation utilizing various educational techniques, including a monthly employee newsletter with an energy section.
- Engage the public by sharing energy management and efficiency progress and soliciting feedback on energy related issues.
- Research and consider alternative energy sources.

Portage County Facilities Director

- Oversee all changes to energy consuming systems in buildings.
- Use training and oversight to manage the energy consuming systems appropriately.
- Work with the City on energy efficiency upgrades and management in buildings that the City and County collaboratively own and operate.
- Convene with the County Finance Director and County Executive to develop the details of the funding strategy, including the Capital Improvements Plan and Energy Efficiency Fund.
- Oversee the implementation of the Strategic Energy Management Plan.
- Utilize energy improvement fund dollars to purchase equipment and materials for implementing projects per the recommendations section of this plan.
- Work with a Focus on Energy Advisor to apply for all eligible rebates.
- Respond to energy issues that are raised by monitoring energy use and costs.
- Work with Focus on Energy Advisor to develop and conduct energy management training for maintenance staff once per year.
- In the absence of a Central Wisconsin Resiliency Project – Municipal Energy Specialist, the Portage County Facilities Director will be responsible to:
    - Monitor monthly energy use and costs, utilizing the new centralized energy billing and tracking process to be developed by the Portage County Executive.
    - Develop a yearly energy report every January and present it to Space and Properties Committee on or before their June meeting.

- Report progress of recommendation implementation and management strategies to Space and Properties Committee.

Portage County Maintenance Technicians

- Complete projects as assigned by the Facilities Director.
- Report to Portage County Facilities Director for any changes to systems that may affect the use of energy in those systems.

Portage County Space and Properties Committee

- Develop a process for centralizing and maintaining all contracts and agreements related to energy use in County facilities in the Facilities Department.
- Provide oversight for energy management and energy efficiency improvements in Portage County facilities.
- Review and if needed, amend the Strategic Energy Management Plan on or before the June meeting of every year.

Portage County Finance Director

- Convene with Facilities Director and County Executive to develop the details of the funding strategy, including the Capital Improvements Plan and Energy Efficiency Fund.
- Oversee and manage Energy Efficiency Fund into the future.

Portage County Building Managers

- Become familiar with the Strategic Energy Management Plan.
- Consider and incorporate the Strategic Energy Management recommendations into the everyday work environment in their buildings.
- Instill energy management and efficiency education into employees that work in their building.

Portage County Employees

- Become familiar with the Strategic Energy Management Plan.
- Work to implement smart energy conservation behavior on a daily basis.

Portage County Board of Supervisors

- Consider and approve funding required for energy management and efficiency projects.

Portage County Library System

Plover Branch

- Work with Portage County Facilities Department and Library Director to implement recommendations and management strategies in the Plover Branch Library building.

Rosholt Branch

- If Portage County becomes the responsible party for paying the library's energy bills in the future, they should work with the Portage County Facilities Department and Library Director to develop and implement energy management and efficiency recommendations in the Rosholt Branch Library.

Almond Branch

- If Portage County becomes the responsible party for paying the library's energy bills in the future, they should work with the Portage County Facilities Department and Library Director to develop and implement energy management and efficiency recommendations in the Almond Branch Library.

Central Wisconsin Resiliency Project – Municipal Energy Specialist

- Document fleet vehicle energy use and costs as well as develop recommendations to reduce fleet vehicle energy use for incorporation into the Strategic Energy Management Plan.
- Monitor monthly energy use and costs utilizing the new centralized energy billing and tracking process to be developed by the Portage County Executive.
- Develop a yearly energy report every January and present to Space and Properties Committee on or before their June meeting.

Focus on Energy Advisor

- Work with the Facilities Director to develop and conduct energy management training for maintenance staff once per year.
- Work with Portage County on energy projects and rebate applications as energy projects are implemented by Portage County staff.

City of Stevens Point

- Work with Portage County on energy efficiency upgrades and management in buildings that the City and County collaboratively own and operate including the County/City Building, Lincoln Center, and downtown Stevens Point Library.

Glossary

Ballast	A device intended to limit the amount of current in an electric circuit.
Boiler	An enclosed vessel in which water is heated and circulated for heating spaces within buildings. Either hot water is used or it is converted to steam.
Economizer Controls	Mechanical devices intended to reduce energy consumption, or to perform another useful function like preheating a fluid. Also called free cooling.
Energy Conservation	The act of not using energy by reducing thermostat temperatures, turning off lights, etc.
Energy Efficiency	The act of reducing energy consumption through technology improvements such as installing energy efficient boilers, water heaters, light bulbs, etc.
Energy Intensity	A measure of the amount of energy used within a certain space, typically measured in units of energy per square foot.
Chiller	A machine that removes heat from a liquid via a vapor-compression or absorption refrigeration cycle.
Compressor	A HVAC component that compresses a refrigerant from a saturated vapor to a superheated vapor which then goes to the condenser
Condensor	A HVAC component that condenses a superheated vapor to a saturated liquid, dispensing heat, which after goes into the evaporator.
Evaporator	A HVAC component that allows the saturated liquid to evaporate, therefore removing heat from the air which is then sent through the HVAC system to cool spaces.
Hot Water Heater	An enclosed vessel in which water is heated to be used directly as domestic hot water or process hot water.
Lumen	A measure of the power of light perceived by the human eye.
On Peak	The time of day with the highest use of energy, typically 7am-7pm.
Off Peak	The time of day with the lowest use of energy, typically 7pm-7am.
Time Clock	A device used to control systems within buildings based on need corresponding to the time of day. Shuts down systems to save energy during the times of day when they are not used.
Variable Frequency Drive (VFD)	A system for controlling the rotational speed of an electric motor by controlling the frequency of electrical power supplied to the motor.

Portage County Focus on Energy Projects

	Year	Project Cost	Incentive	Cost Savings/Year	Savings Since Installation
Health Care Center – DHW Heater	**2006**	$26,327	$2,240	$5,744	$22,976
Health Care Center – Lighting	**2006**	$16,733	$720	$5,326	$21,304
Health Care Center – Hot Water Study	**2006**	$2,110	$1,055	$0	$0
Health Care Center – Laundry Equipment	**2007**	$41,900	$5,460	$18,195	$54,585
Facility Dept. – Chiller Tune Up	**2007**	$1,376	$680	$4,080	$12,240
Library – Lighting	**2007**	$4,006	$2,000	$5,833	$17,499
Justice Center – Laundry Equipment	**2008**	$20,240	$1,428	$3,570	$7,140
Courthouse – Rooftop DX Unit	**2008**	$7,571	$809	$153	$305
Material Recovery – Lighting	**2008**	$10,221	$5,559	$4,658	$9,315
Parks Department – Lighting	**2009**	$3,633	$1,890	$1,583	$1,583
Highway Garage – Lighting	**2009**	$8,769	$5,040	$4,244	$4,244
Library – Heating Tune-up/Boilers	**2009**	$427	$200	$1,943	$1,943
Library – Variable Frequency Drives	**2009**	$6,368	$3,000	$3,028	$3,028
Highway Garage – Lighting	**2010**	$7,000	$495	$606	$0
	Totals	**$156,681**	**$30,576**	**$58,963**	**$156,163**

Total Project Costs		**$156,681**
Total Incentive Payments	+	**$30,576**
Energy Savings to Date	-	**$156,163**
Total Return on Investment		**$31,094**

These projects have produced a positive return on investment since they were implemented
These projects will continue to save energy and money resulting in an increased ROI

The cost savings represented here are projections.

Appendix B

RESOLUTION NO. 5-2010-2012 AMENDED

RE: ESTABLISHING THE **PORTAGE COUNTY SMART ENERGY TEAM**

TO THE HONORABLE CHAIRMAN AND MEMBERS OF THE PORTAGE COUNTY BOARD OF SUPERVISORS

WHEREAS, Portage County has many facilities that use energy, including electricity, natural gas, and petroleum products; and

WHEREAS, the county is aware of how energy use affects its budget and the environment; and

WHEREAS, many counties in Wisconsin have undertaken energy planning and realized financial and environmental benefits; and

WHEREAS, the Facilities Management Department and Space and Properties Committee support the development of a comprehensive Portage County Energy Management Plan; and

WHEREAS, a team composed of the County Board Chairman, the County Executive, the Chairpersons of the Finance Committee and Space and Properties Committee, the Directors of the Planning and Zoning Department, Facilities Management Department and the UW-Extension Community Development Educator are best suited to oversee the creation of an Energy Management Plan and comprise the **PORTAGE COUNTY SMART ENERGY TEAM.**

FISCAL NOTE: Monies to fund the initial work of the TEAM will be utilized from the capital improvement account designated for this purpose, in an amount up to $12,000.00. These monies may be utilized to hire and or contract for the use of subject matter expert consultants. It is anticipated that the **SMART ENERGY TEAM** will make budgetary and monetary recommendations for long term energy efficient investments in the future consistent with the goals of set forth in this resolution.

ADMINISTRATIVE NOTE: An ad-hoc team is not, by definition, a permanent standing committee of the Portage County Board of Supervisors and therefore is not to be listed in section 3.1 of the Portage County Code.

NOW, THEREFORE, BE IT RESOLVED by the Portage County Board of Supervisors that an ad-hoc committee is hereby established and authorized, to be known as the **PORTAGE COUNTY SMART ENERGY TEAM**, with a charter to document energy consumption and costs associated with county operations and to develop an energy management plan, with reports, options and plans to be filed and overseen by SPACE AND PROPERTIES COMMITTEE and other county board committees as needed, with further coordination with county and city officials, with the committee to cease operations no later than December 31, 2011, subject to future resolutions.

BE IT FURTHER RESOLVED that the **TEAM** shall consist of the County Board Chairman, the County Executive, the Chairpersons of the Finance Committees and Space and Properties Committees, the Directors of the Planning and Zoning Department, Facilities Management Department and the UW-Extension Community Development Educator. The Facilities Management Administrative Assistant is designated as the secretary of the **TEAM**. The **TEAM** shall utilize the resources and personnel of county staff wherever possible. County Board Supervisor members of the Team shall receive per diem payments.

BE IT FURTHER RESOLVED THAT THE GENERAL CHARTER, DUTIES, AND RESPONSIBILITIES OF THE **TEAM** SHALL BE AS FOLLOWS (BUT NOT LIMITED THERETO). THE TEAM MAY, IN THE COURSE OF ITS WORK, EXPAND THE EXTENT OF THE CHARTER RELATING TO ITS ROLE REGARDING COUNTY ENERGY USE.

1. Work with and possibly contract for an energy management specialist to guide the energy planning process and provide consultation as determined by the **SMART ENERGY TEAM.** Determine whether and how partnerships with other agencies, municipalities and entities should be managed for this process.

2. Evaluate the level of effort needed to analyze all types of energy sources, including electricity, natural gas, propane, and petroleum fuels. Select the scope and timeline for the energy planning process.

3. Compile information regarding the types of energy consumed in county operations and service delivery.

4. Compile and review study designs or evaluation frameworks now available to counties and other public institutions to document current and anticipated energy consumption and costs. Evaluate the direct costs and benefits of each evaluation framework. In so doing, determine whether it is possible to implement the evaluation using available staff and resources or will it be necessary to contract a systems-based evaluation.

5. Select a method or evaluation framework.

6. Compile and review the current policies, methods, and management approaches now used in Portage County to conserve energy.

7. Compile and evaluate examples of management approaches and specific techniques now used by other counties or municipalities in Wisconsin, and elsewhere, to conserve energy. In so doing, provide case examples of different institutional approaches which have been used to measure current energy use, reduce energy consumption, monitor energy use and costs through time, and evaluate alternative sources of energy. In evaluating these examples, identify the general strengths and shortcomings of each approach.

8. Develop by **Dec. 1, 2010** a written **PORTAGE COUNTY STRATEGIC ENERGY PLAN** for submission to and review by the County Board of Supervisors. Using the knowledge gained, develop a written energy conservation plan which could be used to limit the county's energy use, utilize alternative energy sources if viable, and to monitor its energy costs and consumption through time. Ideally, the energy conservation plan should include:

A. A set of goals and objectives for energy use, alternative sources and conservation that would apply to county operations that is measurable and attainable.

B. A specific listing of management options and implementation strategies that are recommended to measure, manage, and reduce energy consumption from county facilities and the county vehicle fleet.

C. Each recorded management option will include a detailed description of the option and its associated implementation activities, the affected stakeholders, the advantages and disadvantages of pursuing the option, its measures of success, and opportunities for funding. These strategies will then be utilized to develop county policies that will affect long-term energy management for county operations.

At a minimum, these options will include:

ii. The alteration of building operation to conserve energy.

iii. The purchase of any energy-efficient equipment.

iv. The use of alternative energy sources.

v. The education of employees about energy conservation methods.

D. A five (5) year budget that projects anticipated costs and funding sources that will be pursued to implement the program recommendations.

E An ongoing monitoring program with assigned duties and responsibilities to systematically measure ongoing energy consumption and to evaluate change and energy savings through time.

Dated: April 27, 2010.

Respectfully submitted,

PORTAGE COUNTY SPACE AND PROPERTIES COMMITTEE

By: Jeanne Dodge, Chair

Tom Mallison

Don Jankowski, Vice-Chair

David Medin

Lonnie Krogwold

EXECUTIVE/OPERATIONS COMMITTEE

By: O. Philip Idsvoog, Chair

Lonnie Krogwold, First Vice-Chair

David Medin, Second Vice-Chair

James Gifford

Marion Bud Flood

Appendix C

Portage County Employee Energy Survey

Portage County Smarty Energy Team

Background

The Portage County Smart Energy Team was charged with developing a plan that identify ways the County can manage energy wisely, which may result in better office conditions, cost savings, and reduced environmental impact. The team decided to administer an energy survey to employees as a part of its planning process. The survey is a modified version of Chippewa County's energy survey.

The purpose of the survey was to solicit practical ideas for energy conservation from employees, identify employees interested in contributing to future energy conservation efforts, gauge how energy conscious/aware employees are, and develop a baseline of how comfortable employees are with temperatures in their workplaces.

236 surveys were returned and results were tabulated. The survey was sent to roughly 600 employees so there was about a 40% response rate. Questions 1, 3, and 5 include the building the employee works in if they're answer was NOT "About right" for those questions. For question 10, all answers were summarized with the number of occurrences in parenthesis.

1.

During winter, the temperature of your place of work is:		
Answer Options	**Response Percent**	**Response Count**
Too hot	21.6%	52
About right	50.7%	118
Too cold	27.8%	64
	answered question	234
	skipped question	9

Specified buildings for answers that were "Too Cold" or "Too Hot"

Building	Too Cold	Too Hot
MRF	0	0
HCC	1	2
Ruth Gilfry	27	18
Annex	4	8
LEC	12	3
Courthouse	11	14
Lincoln Center	3	5
Highway	1	0
Parks	1	0
Portage House	1	0
Library	0	2

2.

In the winter, what temperature should your place of work be?		
Answer Options	**Response Percent**	**Response Count**
60 to 62	1.2%	3
63 to 66	8.7%	21
67 to 70	51.2%	124
71 to 73	32.2%	78
Greater than 73	2.0%	5
Don't know	3.8%	9
Don't care	0.9%	2
	answered question	242
	skipped question	1

3.

In the summer, the temperature of your place of work is:		
Answer Options	**Response Percent**	**Response Count**
Too hot	24.5%	57
About right	39.9%	93
Too cold	35.6%	83
	answered question	233
	skipped question	10

Specified buildings for answers that were "Too cold" or "Too hot"

Building	Too Cold	Too Hot
MRF	0	0
HCC	1	2
Ruth Gilfry	32	12
Annex	13	5
LEC	6	16
Courthouse	18	12
Lincoln Center	11	5
Highway	0	1
Parks	0	1
Portage House	0	0
Library	2	1

4.

In the summer, what temperature should your place of work be?		
Answer Options	**Response Percent**	**Response Count**
68 to 70	42.3%	102
71 to 73	40.2%	97
74 to 76	12.5%	30
Greater than 76	1.2%	3
Don't know	2.1%	5
Don't care	1.7%	4
	answered question	241
	skipped question	2

5.

Do you feel your workspace lighting is:		
Answer Options	**Response Percent**	**Response Count**
Overly bright	17.4%	42
About right	77.6%	187
Not bright enough	5.0%	12
	answered question	241
	skipped question	2

Specified buildings for answers that were "Overly bright" or "Not bright enough"

Building	Overly Bright	Not Bright Enough
MRF	0	0
HCC	1	2
Ruth Gilfry	11	5
Annex	10	0
LEC	10	2
Courthouse	4	0
Lincoln Center	5	0
Highway	0	2
Parks	0	0
Portage House	0	0
Library	0	0

6.

How energy conscious/aware do you consider yourself?		
Answer Options	**Response Percent**	**Response Count**
Extremely	39.0%	94
Somewhat	59.8%	144
Not at all	1.2%	3
answered question		241
skipped question		2

7.

How often do you do things to reduce your own energy use like turning off lights when leaving the room, preventing your vehicle from idling, shutting down your computer, etc.?		
Answer Options	**Response Percent**	**Response Count**
Rarely	0.0%	0
Sometimes	9.1%	22
Most of the time	69.0%	167
All of the time	21.9%	53
answered question		242
skipped question		1

8.

What is your opinion of renewable energy applications such as geothermal heating, solar and wind options, etc.		
Answer Options	**Response Percent**	**Response Count**
Favorable	86.1%	205
No opinion	13.0%	31
Unfavorable	0.8%	2
Additional comments:		28
answered question		238
skipped question		4

9.

Are you willing to make slight behavioral changes such as turning off the lights, reducing vehicle miles traveled, consolidating trips, etc. to help the County reduce its energy use?		
Answer Options	**Response Percent**	**Response Count**
Yes	86.7%	209
Maybe	11.6%	28
No	0.8%	2
Don't know	0.8%	2
answered question		241
skipped question		1

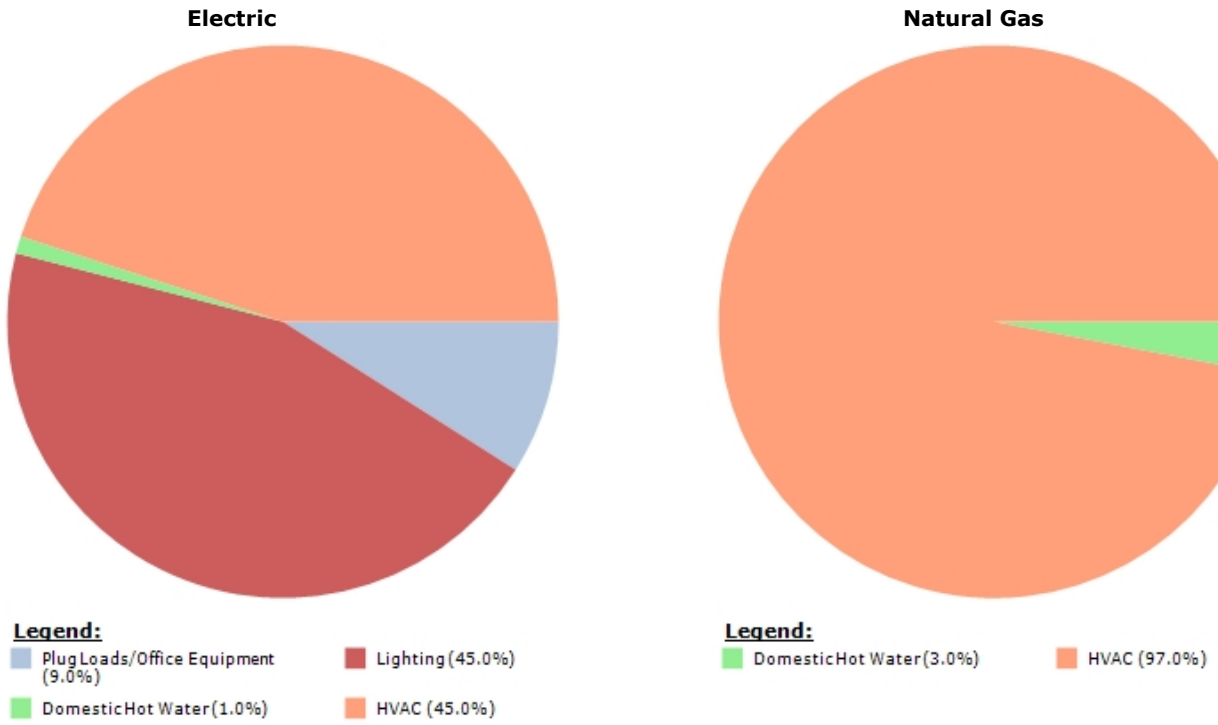
10. What specific things could be done by YOUR department or by County government to conserve and energy and reduce our dependence on fossil fues (defined as heating, cooling, water usage, fuel usage, vehicle miles traveled, etc…)?

1. Shut down PC's at night (26)
2. Better management of thermostats and opening windows for heating/cooling. Consists of facilities managing the thermostats properly, programmable thermostats, setting lower/higher temps and people wearing sweaters (26)
3. Motion lights in restrooms/hallways/conference rooms (19)
4. Turning off lights (18)
5. Courthouse and Lincoln Center upgrades (12)
6. De-lamping some areas of buildings (11)
7. Remove personal appliances in offices (11)
8. 4 day work weeks (9)
9. Consolidate trips at work. Coordination/communication to do this(8)
10. Heavy duty shades for south windows (7)
11. Car pooling program (5)
12. Employee education (4)
13. Eliminate or reduce lawn watering (4)
14. Solar panels, wind, other renewable energies(3)
15. Reduce or eliminate supervisors mileage (3)
16. Energy efficient vending machines (2)
17. Dual flush toilets, low flow sink nozzles (2)
18. Electric hybrid cars
19. Reminder signage for employees
20. Cut mileage re-imbursement in half
21. Develop idling policy
22. Convert landfill to solar farm

Appendix D

Annex

Typical End Use Profile



Typical Facility Annual Energy Usage

	Electric %	Natural Gas %	Electric kWh	Natural Gas Therms	Electric Cost	Natural Gas Cost
Plug Loads/Office Equipment	9.0%	0.0%	45,439	0	$3,817	$0
Lighting	45.0%	0.0%	227,196	0	$19,084	$0
Office Equipment	0.0%	0.0%	0	0	$0	$0
Domestic Hot Water	1.0%	3.0%	5,049	639	$424	$473
HVAC	45.0%	97.0%	227,196	20,646	$19,084	$15,299
Total	100.0%	100.0%	504,880	21,285	$42,410	$15,772

Your facility uses 14.02 kWh/sq. ft./yr and 0.59 therms/sq. ft./yr and 106.99 kBtu/sq. ft./yr

Energy Conservation Opportunities
Estimated Savings Summary

Opportunity Description	Electric Energy (kWh/yr)	Fuel Energy (therms/yr)	Payback (yrs)	Cost savings	Priority
1.0 Lighting - Custom Fluorescent Recommendation	86,000			$7,224	High
2.0 HVAC - Variable Speed Drive for Boiler Hot Water Distribution Pump	14,000			$1,176	High
3.0 HVAC - Preventative Maintenance Program	2,300		1-2	$193	High
4.0 Plug Loads/Office Equipment - Vending Machine - Install Vending Miser or Disconnect Lamps and Ballasts	910		1-2	$76	High
5.0 Domestic Hot Water - Circulation Pump Timeclock on Domestic Hot Water System	280	13	1-2	$33	High
6.0 HVAC - Door Sweeps Installation		31	1-2	$23	High
7.0 HVAC - Boiler Outside Air Temperature Reset Control		3,100	1-3	$2,297	High
8.0 HVAC - Economizer Controls/Free Cooling	23,000		1-5	$1,932	High
9.0 HVAC - Variable Frequency Drive	18,000		1-5	$1,512	High
10.0 HVAC - Reduce Air Infiltration		560	1-5	$415	High
TOTALS	**144,490**	**3,704**		**$14,882**	

The summary list above includes a number of recommended energy conservation measures for your facility. This list may include overlapping conservation measures. For example, replacement of a boiler with a high efficiency boiler would negate the savings of replacing the burner in the current boiler.

The summary list indicates that if all measures are implemented the total kWh savings is 144,490 which equals 29% of the current annual kWh usage of 504,880 kWh, and 3,704 therms which equals 17% of the current annual therm usage of 21,285 therms.

Be aware that the total savings and percentage of savings is an estimate based on average savings for specific measures which may require adjustments based on possible overlapping conservation measures.

UTILITY BILLING HISTORY

Electricity

Billing Month	Account Number	kW	kWh	Total Amount	$/kWh
23-Sep-2010			44,560	$4,061	$0.091
24-Aug-2010			48,080	$4,403	$0.092
26-Jul-2010			57,040	$5,119	$0.090
24-Jun-2010			51,360	$4,652	$0.091
25-May-2010			43,680	$3,637	$0.083
26-Apr-2010			43,440	$2,968	$0.068
25-Mar-2010			36,000	$3,037	$0.084
23-Feb-2010			33,920	$2,643	$0.078
25-Jan-2010			36,720	$2,717	$0.074
23-Dec-2009			33,600	$2,603	$0.077
23-Nov-2009			36,720	$3,055	$0.083
23-Oct-2009			39,760	$3,350	$0.084
TOTAL			504,880	$42,245	

Average Electricity Rate: $0.084

Natural Gas

Billing Month	Account Number	Therm	Total Amount	$/therm
23-Sep-2010		809	$533	$0.66
24-Aug-2010		55	$124	$2.24
26-Jul-2010		392	$338	$0.86
24-Jun-2010		518	$379	$0.73
25-May-2010		1,344	$939	$0.70
26-Apr-2010		1,856	$1,415	$0.76
25-Mar-2010		2,294	$1,889	$0.82
23-Feb-2010		3,183	$2,533	$0.80
25-Jan-2010		3,755	$2,926	$0.78
23-Dec-2009		2,906	$2,098	$0.72
23-Nov-2009		2,245	$1,564	$0.70
23-Oct-2009		1,929	$1,043	$0.54
TOTAL		21,285	$15,782	

Average Gas Rate: $0.74

1. Lighting - Custom Fluorescent Recommendation

Hire a professional lighting designer to evaluate all the office and conference room lighting. Develop a new lighting design that will substantially reduce the energy consumption over the current lighting system. The Whole Building Lighting Program is a perfect program to assist with the cost to complete this retrofit.

EXISTING CONDITIONS		RECOMMENDATION SAVINGS POTENTIAL	
Location		**Location**	
Offices and conference rooms		Offices and conference rooms	
End Use	Lighting	Electric Energy Savings (kWh/yr)	86,000
Type	Fluorescent	Gas Energy Savings (therm/yr)	
Recommendation:		Electric Cost Savings ($/yr)	$7,224
Custom Fluorescent Recommendation		Gas Cost Savings ($/yr)	
% ECM Opportunity	100	Total Cost Savings ($/yr)	$7,224
% savings electric	50.00000	Payback (yrs)	
% savings gas	0.00000	Electric GHG Savings (tons/yr)	72
Priority	High	Gas GHG Savings (tons/yr)	
Priority Rationale:			
	Acceptable Payback Period		
Grants Available?	Yes		

2. HVAC - Variable Speed Drive for Boiler Hot Water Distribution Pump

Install a variable frequency on your hot water distribution pumps. The hot water supply pumps are 5 HP each and their balancing valves are set at 10% and 25% open. Install VFDs on these two pumps and open the balancing valves 100% so the VFD can control pump speed based on differential pressure. Variable frequency drives (VFDs) control the rotational speed of an alternating current (AC) electric motor by controlling the frequency of the electrical power supply to the motor. VFDs offer many benefits to your electric motors, including:

* Reduced operating costs - VFDs offer greater control over the speed of AC motors, enabling the removal of throttling devices, valves and dampers, all of which can waste energy.

* Increased reliability - by regulating speed, VFDs prolong the life and reduce the maintenance costs of motors, driven equipment and switch gears.

* Increased productivity - VFDs give users a finer degree of control, resulting in more precise process operations and improved product quality.

EXISTING CONDITIONS		RECOMMENDATION SAVINGS POTENTIAL	
Location		**Location**	
Boiler Room		Boiler Room	
End Use	HVAC	Electric Energy Savings (kWh/yr)	14,000
Type	Boilers, Burners, and Furnaces	Gas Energy Savings (therm/yr)	
Recommendation:		Electric Cost Savings ($/yr)	$1,176
Variable Speed Drive for Boiler Hot Water Distribution Pump		Gas Cost Savings ($/yr)	
% ECM Opportunity	100	Total Cost Savings ($/yr)	$1,176
% savings electric	6.00000	Payback (yrs)	
% savings gas	0.00000	Electric GHG Savings (tons/yr)	12
Priority	High	Gas GHG Savings (tons/yr)	
Priority Rationale:			
	Efficiency Upgrade		
Grants Available?	Yes		

3. HVAC – Insulate the AC lines on the Liebert Roof-top AC Unit

These lines transfer refrigerant between the roof top condenser and the DX coil in the Liebert internal unit. Insulating them will improve the efficiency of the system.

EXISTING CONDITIONS		RECOMMENDATION SAVINGS POTENTIAL	
Location		**Location**	
Liebert unit on roof		Liebert unit on roof	
End Use	HVAC	Electric Energy Savings (kWh/yr)	2,300
Type	Miscellaneous	Gas Energy Savings (therm/yr)	
Recommendation:		Electric Cost Savings ($/yr)	$193
Preventative Maintenance Program		Gas Cost Savings ($/yr)	
% ECM Opportunity	100	Total Cost Savings ($/yr)	$193
% savings electric	1.00000	Payback (yrs)	1-2
% savings gas	0.00000	Electric GHG Savings (tons/yr)	2
Priority	High	Gas GHG Savings (tons/yr)	
Priority Rationale:			
	Low Cost/No Cost		
Grants Available?	No		

4. Plug Loads/Office Equipment - Vending Machine - Install Vending Miser or Disconnect Lamps and Ballasts

Disconnect the lamps and ballasts in the soda machine or install a vending miser. Vending machines are costly to operate because they require refrigeration as well as lighting. In fact, machines with lighted displays typically operate 24 hours a day, 365 days a year. The lighting alone can cost about $40.00 per year per machine. One way to reduce lighting costs is to disconnect the lights and ballasts in the display and put a note on the machine that says it is still operational. Another option is to install a device called a vending miser. The vending miser uses an occupancy sensor to determine if the area around the soda machine is in use. If there is no activity in the vicinity of the machine, the machine is powered down periodically.

EXISTING CONDITIONS		RECOMMENDATION SAVINGS POTENTIAL	
Location		**Location**	
Break room		Break room	
End Use	Plug Loads/Office Equipment	Electric Energy Savings (kWh/yr)	910
Type		Gas Energy Savings (therm/yr)	
Recommendation:		Electric Cost Savings ($/yr)	$76
Vending Machine - Install Vending Miser or Disconnect Lamps and Ballasts		Gas Cost Savings ($/yr)	
% ECM Opportunity	100	Total Cost Savings ($/yr)	$76
% savings electric	2.00000	Payback (yrs)	1-2
% savings gas	0.00000	Electric GHG Savings (tons/yr)	1
Priority	High	Gas GHG Savings (tons/yr)	
Priority Rationale:			
	Efficiency Upgrade		
Grants Available?	Yes		

5. Domestic Hot Water - Circulation Pump Timeclock on Domestic Hot Water System

Install a time clock on the domestic hot water circulation pump. Circulation pumps ensure that hot water is at the sink or other point of use when needed. However, most buildings do not require hot water 24 hours a day. Installing a simple and inexpensive timeclock on the circulation pumps or controlling through the energy management system will shut them off when buildings are unoccupied.

EXISTING CONDITIONS		RECOMMENDATION SAVINGS POTENTIAL	
Location		**Location**	
End Use	Domestic Hot Water	Electric Energy Savings (kWh/yr)	280
Type		Gas Energy Savings (therm/yr)	13
Recommendation:		Electric Cost Savings ($/yr)	$24
Circulation Pump Timeclock on Domestic Hot Water System		Gas Cost Savings ($/yr)	$10
% ECM Opportunity	100	Total Cost Savings ($/yr)	$33
% savings electric	5.50000	Payback (yrs)	1-2
% savings gas	2.00000	Electric GHG Savings (tons/yr)	
Priority	High	Gas GHG Savings (tons/yr)	
Priority Rationale:			
	Low Cost/No Cost		
Grants Available?	No		

6. HVAC - Door Sweeps Installation

Reduce energy losses by installing door sweeps in the receiving area. Exterior door sweeps reduce air conditioning costs by preventing conditioned air from escaping or unconditioned air from entering spaces. Interior doors should not have door sweeps installed because gaps under doors enable proper ventilation.

EXISTING CONDITIONS		RECOMMENDATION SAVINGS POTENTIAL	
Location		**Location**	
Receiving		Receiving	
End Use	HVAC	Electric Energy Savings (kWh/yr)	
Type	Building Shell	Gas Energy Savings (therm/yr)	31
Recommendation:		Electric Cost Savings ($/yr)	
Door Sweeps Installation		Gas Cost Savings ($/yr)	$23
% ECM Opportunity	100	Total Cost Savings ($/yr)	$23
% savings electric	0.00000	Payback (yrs)	1-2
% savings gas	0.1500	Electric GHG Savings (tons/yr)	
Priority	High	Gas GHG Savings (tons/yr)	
Priority Rationale:			
	Low Cost/No Cost		
Grants Available?	No		

7. HVAC - Boiler Outside Air Temperature Reset Control

Install a hot water reset on the boiler system. These boilers are condensing models capable of producing low water temperatures at very high efficiencies. The boilers were producing 175 degree water on a 55 degree day. The boilers should have been supplying approximately 110 degree water on a day like that. A hot water reset is a control mechanism that senses outdoor temperatures and adjusts boiler water temperatures accordingly. As outdoor temperatures rise, boiler temperatures can be reduced because not as much heat is needed. Typically, installing this control will reduce boiler energy use by 3% to 10%. On your condensing boilers the savings will be much higher. A hot water reset ensures that boilers will operate only as needed, at lower temperatures, and with fewer line losses.

EXISTING CONDITIONS		RECOMMENDATION SAVINGS POTENTIAL	
Location		**Location**	
Boiler Room		Boiler Room	
End Use	HVAC	Electric Energy Savings (kWh/yr)	
Type	Controls	Gas Energy Savings (therm/yr)	3,100
Recommendation:		Electric Cost Savings ($/yr)	
Boiler Outside Air Temperature Reset Control		Gas Cost Savings ($/yr)	$2,297
% ECM Opportunity	100	Total Cost Savings ($/yr)	$2,297
% savings electric	0.00000	Payback (yrs)	1-3
% savings gas	15.00000	Electric GHG Savings (tons/yr)	
Priority	High	Gas GHG Savings (tons/yr)	18
Priority Rationale:			
	Low Cost/No Cost		
Grants Available?	Yes		

8. HVAC - Economizer Controls/Free Cooling

Install an automatic air-conditioning economizer. The roof-top chiller was running on one compressor on a dry 55 degree day. An economizer would have cooled the building with outside air and not used the chiller. An economizer can take advantage of cool outside air (such as during evening hours or cool days) and use this "free" air for cooling. During the air-conditioning season, the heat generated by internal loads such as people, lighting, and electronic equipment will build up in a building. It can be warmer inside than outdoors. Instead of relying on mechanical cooling, an economizer will allow the cooler outside air to enter the building through the outside air intakes and be distributed through the ductwork. The outside air is then tempered with the inside air to allow the temperature to reach the desired level.

EXISTING CONDITIONS		RECOMMENDATION SAVINGS POTENTIAL	
Location		**Location**	
Mechanical room		Mechanical room	
End Use	HVAC	Electric Energy Savings (kWh/yr)	23,000
Type	Controls	Gas Energy Savings (therm/yr)	
Recommendation:		Electric Cost Savings ($/yr)	$1,932
Economizer Controls/Free Cooling		Gas Cost Savings ($/yr)	
% ECM Opportunity	100	Total Cost Savings ($/yr)	$1,932
% savings electric	10.00000	Payback (yrs)	1-5
% savings gas	0.00000	Electric GHG Savings (tons/yr)	19
Priority	High	Gas GHG Savings (tons/yr)	
Priority Rationale:			
	Efficiency Upgrade		
Grants Available?	Yes		

9. HVAC – Chiiled Water Pumps Variable Frequency Drives

Install a variable frequency drives on the chiiled water supply pumps. These two pumps had their balancing valves et at 20% and 30% open. Install VFDs and open the balancing valves to 100% and control their speed based on differential pressure. Variable-frequency drives (VFDs) control the rotational speed of an alternating current (AC) electric motor by controlling the frequency of the electrical power supply to the motor. VFDs offer many benefits to your electric motors, including:

* Reduced operating costs - VFDs offer greater control over the speed of AC motors, enabling the removal of throttling devices, valves and dampers, all of which can waste energy.

* Increased reliability - by regulating speed, VFDs prolong the life and reduce the maintenance costs of motors, driven equipment and switch gears.

* Increased productivity - VFDs give users a finer degree of control, resulting in more precise process operations and improved product quality.

EXISTING CONDITIONS		RECOMMENDATION SAVINGS POTENTIAL	
Location		**Location**	
Mechanical room		Mechanical room	
End Use	HVAC	Electric Energy Savings (kWh/yr)	18,000
Type	Motor	Gas Energy Savings (therm/yr)	
Recommendation:		Electric Cost Savings ($/yr)	$1,512
Variable Frequency Drive		Gas Cost Savings ($/yr)	
% ECM Opportunity	100	Total Cost Savings ($/yr)	$1,512
% savings electric	8.00000	Payback (yrs)	1-5
% savings gas	0.00000	Electric GHG Savings (tons/yr)	15
Priority	High	Gas GHG Savings (tons/yr)	
Priority Rationale:			
	Efficiency Upgrade		
Grants Available?	Yes		

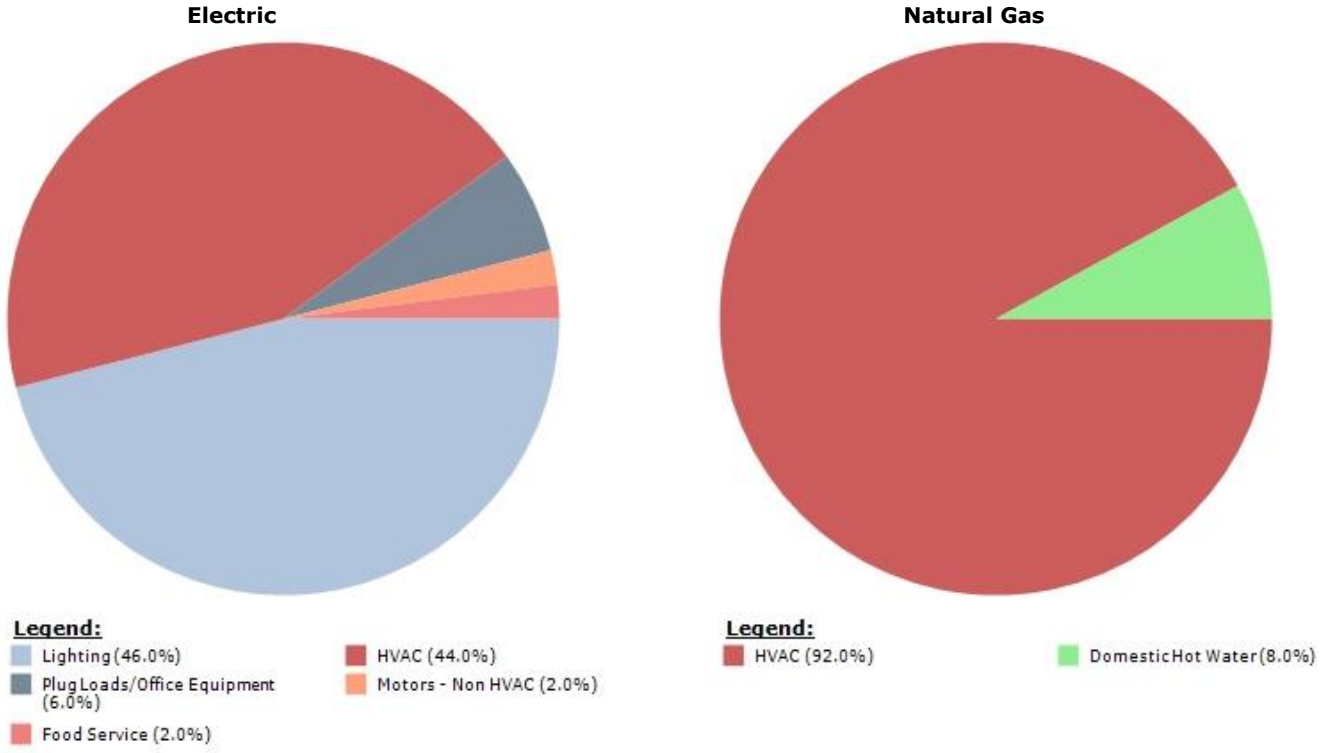
10. HVAC - Reduce Air Infiltration around the receiving overhead doors

Reduce air infiltration and leakage to lower air conditioning and heating costs. There are many low cost, simple ways to reduce air leakage and most are available at the hardware store.

EXISTING CONDITIONS		RECOMMENDATION SAVINGS POTENTIAL	
Location		**Location**	
Receiving		Receiving	
End Use	HVAC	Electric Energy Savings (kWh/yr)	
Type	Building Shell	Gas Energy Savings (therm/yr)	560
Recommendation:		Electric Cost Savings ($/yr)	
Reduce Air Infiltration		Gas Cost Savings ($/yr)	$415
% ECM Opportunity	100	Total Cost Savings ($/yr)	$415
% savings electric	0.00000	Payback (yrs)	1-5
% savings gas	2.70000	Electric GHG Savings (tons/yr)	
Priority	High	Gas GHG Savings (tons/yr)	3
Priority Rationale:			
	Low Cost/No Cost		
Grants Available?	No		

Courthouse

Typical End Use Profile



Typical Facility Annual Energy Usage

	Electric %	Natural Gas %	Electric kWh	Natural Gas Therms	Electric Cost	Natural Gas Cost
Lighting	46.0%	0.0%	311,843	0	$24,947	$0
HVAC	44.0%	92.0%	298,285	40,986	$23,863	$32,584
Plug Loads/Office Equipment	6.0%	0.0%	40,675	0	$3,254	$0
Domestic Hot Water	0.0%	8.0%	0	3,564	$0	$2,833
Motors - Non HVAC	2.0%	0.0%	13,558	0	$1,085	$0
Food Service	2.0%	0.0%	13,558	0	$1,085	$0
Office Equipment	0.0%	0.0%	0	0	$0	$0
Total	100.0%	100.0%	677,920	44,550	$54,234	$35,417

Your facility uses 9.42 kWh/sq. ft./yr and 0.62 therms/sq. ft./yr and 94.08 kBtu/sq. ft./yr

Energy Conservation Opportunities
Estimated Savings Summary

Opportunity Description	Electric Energy (kWh/yr)	Fuel Energy (therms/yr)	Payback (yrs)	Cost savings	Priority
1.0 Lighting - Delamping	22,000		0-1	$1,760	High
2.0 HVAC - Preventative Maintenance Program	3,000		1-2	$240	High
3.0 HVAC - Steam System Leak Repair		2,000	1-5	$1,590	High
4.0 Lighting - Low Wattage Fluorescent Replacement of T-8 Lamps	86,000		3-5	$6,880	High
5.0 HVAC - Boiler - Steam to Hot Water Conversion		14,000	10-15	$11,130	Low
TOTALS	**111,000**	**16,000**		**$21,600**	

The summary list above includes a number of recommended energy conservation measures for your facility. This list may include overlapping conservation measures. For example, replacement of a boiler with a high efficiency boiler would negate the savings of replacing the burner in the current boiler.

The summary list indicates that if all measures are implemented the total kWh savings is 111,000 which equals 16% of the current annual kWh usage of 677,920 kWh, and 16,000 therms which equals 36% of the current annual therm usage of 44,550 therms.

Be aware that the total savings and percentage of savings is an estimate based on average savings for specific measures which may require adjustments based on possible overlapping conservation measures.

UTILITY BILLING HISTORY

Electricity

Billing Month	Account Number	kW	kWh	Total Amount	$/kWh
23-Dec-2009		124	52,480	$3,840	$0.073
23-Nov-2009		139	55,360	$4,101	$0.074
23-Oct-2009		161	54,720	$4,301	$0.079
23-Sep-2009		176	62,400	$5,520	$0.088
24-Aug-2009		193	67,520	$5,905	$0.087
24-Jul-2009		198	68,800	$6,121	$0.089
23-Jun-2009		179	63,360	$5,322	$0.084
22-May-2009		155	52,320	$4,045	$0.077
23-Apr-2009		140	50,080	$3,843	$0.077
24-Mar-2009		140	48,320	$3,738	$0.077
23-Feb-2009		121	51,680	$3,792	$0.073
28-Jan-2009		123	50,880	$3,711	$0.073
TOTAL			677,920	$54,239	

Average Electricity Rate: $0.080

Natural Gas

Billing Month	Account Number	Therm	Total Amount	$/therm
23-Dec-2009		7,528	$5,287	$0.70
23-Nov-2009		4,320	$2,921	$0.68
23-Oct-2009		2,558	$1,353	$0.53
23-Sep-2009		95	$134	$1.41
24-Aug-2009		109	$148	$1.36
24-Jul-2009		107	$150	$1.40
23-Jun-2009		215	$212	$0.98
22-May-2009		600	$371	$0.62
23-Apr-2009		3,421	$2,272	$0.66
24-Mar-2009		6,264	$5,080	$0.81
23-Feb-2009		8,789	$7,664	$0.87
28-Jan-2009		10,544	$9,829	$0.93
TOTAL		44,550	$35,420	

Average Gas Rate: $0.80

1. Lighting - Delamping

Reduce lighting in specified areas by delamping. Delamping refers to the process of removing lamps from existing light fixtures. Often, a light fixture provides more light than is necessary for a given area (such as a hallway or storage room). Combine this effort with the low watt T-8 lamp and ballast replacements so each light fixture only has as many lamps as is needed for the location.

EXISTING CONDITIONS		RECOMMENDATION SAVINGS POTENTIAL	
Location		**Location**	
Retrofit 4 lamp T8 and T12 fixtures to 2 lamp fixtures utilizing 25 watt 5000K lamps and low ballast factor ballasts.		Retrofit 4 lamp T8 and T12 fixtures to 2 lamp fixtures utilizing 25 watt 5000K lamps and low ballast factor ballasts.	
End Use	Lighting	Electric Energy Savings (kWh/yr)	22,000
Type	Fluorescent	Gas Energy Savings (therm/yr)	
Recommendation:		Electric Cost Savings ($/yr)	$1,760
Delamping		Gas Cost Savings ($/yr)	
% ECM Opportunity	20	Total Cost Savings ($/yr)	$1,760
% savings electric	50.00000	Payback (yrs)	0-1
% savings gas	0.00000	Electric GHG Savings (tons/yr)	18
Priority	High	Gas GHG Savings (tons/yr)	
Priority Rationale:			
	Efficiency Upgrade		
Grants Available?	Yes		

2. HVAC - Preventative Maintenance Program

Establish regular preventative HVAC system maintenance. HVAC equipment should be regularly maintained for maximum efficiency as well as to enhance the equipment's life. Often, however, this equipment is addressed only after a problem has been reported. As HVAC equipment ages, it should be maintained more often to ensure temperatures are set and sustained, the proper amount of outside air enters the building, and occupancy comfort levels remain high. This regular maintenance will also reduce energy use and extend equipment life. The DX cooling units did not have insulation on the refrigerant lines going to the DX coils in each air handling unit.

EXISTING CONDITIONS		RECOMMENDATION SAVINGS POTENTIAL	
Location		**Location**	
Insulate the DX lines that are next to each DX unit.		Insulate the DX lines that are next to each DX unit.	
End Use	HVAC	Electric Energy Savings (kWh/yr)	3,000
Type	Miscellaneous	Gas Energy Savings (therm/yr)	
Recommendation:		Electric Cost Savings ($/yr)	$240
Preventative Maintenance Program		Gas Cost Savings ($/yr)	
% ECM Opportunity	10	Total Cost Savings ($/yr)	$240
% savings electric	10.00000	Payback (yrs)	1-2
% savings gas	0.00000	Electric GHG Savings (tons/yr)	3
Priority	High	Gas GHG Savings (tons/yr)	
Priority Rationale:			
	Low Cost/No Cost		
Grants Available?	No		

3. HVAC - Steam System Trap Repair

Repair the steam traps. Steam traps only last about 2 years. Replace or repair all steam traps that are failed. Ones that are failed in the open position waste a great deral of energy by letting steam escape to the condensate return tank where it escapes out the vent to the atmosphere.

EXISTING CONDITIONS		RECOMMENDATION SAVINGS POTENTIAL	
Location		**Location**	
End Use	HVAC	Electric Energy Savings (kWh/yr)	
Type	Boilers, Burners, and Furnaces	Gas Energy Savings (therm/yr)	2,000
Recommendation:		Electric Cost Savings ($/yr)	
Steam System Leak Repair		Gas Cost Savings ($/yr)	$1,590
% ECM Opportunity	100	Total Cost Savings ($/yr)	$1,590
% savings electric	0.00000	Payback (yrs)	1-5
% savings gas	5.00000	Electric GHG Savings (tons/yr)	
Priority	High	Gas GHG Savings (tons/yr)	12
Priority Rationale:			
	Low Cost/No Cost		
Grants Available?	No		

4. Lighting - Low Wattage Fluorescent Replacement of T-8 Lamps

Realize a 25%-40% lighting energy reduction by replacing 32 Watt T-8 lamps and ballasts with 25 or 28 Watt fluorescent lamps and high efficiency low ballast factor ballasts. Low wattage lighting systems are an excellent option for spaces which are overlit and removing entire fixtures is not possible. Hire a lighting design professional to develop a comprehensive lighting design that maximizes efficiency and longevity of the lighting system.

EXISTING CONDITIONS		RECOMMENDATION SAVINGS POTENTIAL	
Location		**Location**	
End Use	Lighting	Electric Energy Savings (kWh/yr)	86,000
Type	Fluorescent	Gas Energy Savings (therm/yr)	
Recommendation:		Electric Cost Savings ($/yr)	$6,880
Low Wattage Fluorescent Replacement of T-8 Lamps		Gas Cost Savings ($/yr)	
% ECM Opportunity	100	Total Cost Savings ($/yr)	$6,880
% savings electric	40.00000	Payback (yrs)	3-5
% savings gas	0.00000	Electric GHG Savings (tons/yr)	72
Priority	High	Gas GHG Savings (tons/yr)	
Priority Rationale:			
	Acceptable Payback Period		
Grants Available?	Yes		

5. HVAC - Boiler - Steam to Hot Water Conversion

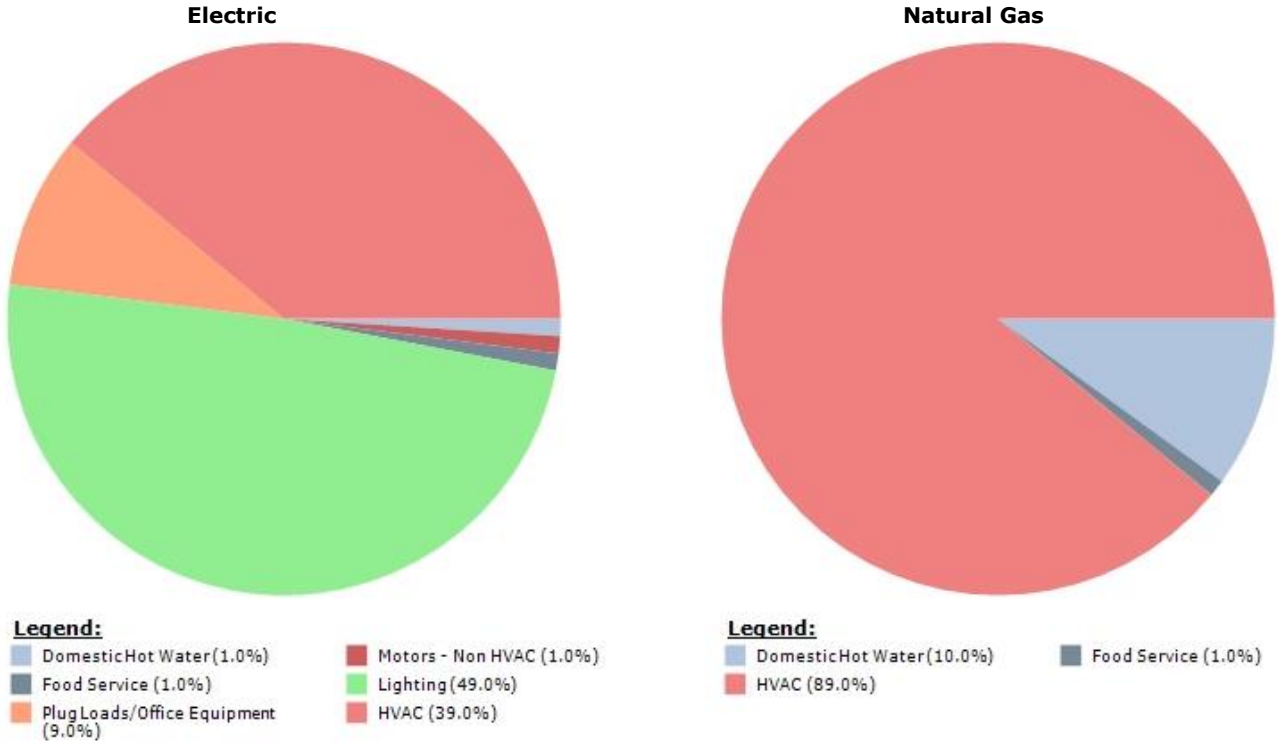
Convert the boiler system to hot water. Hot water boilers are more energy efficient (and have higher AFUE ratings) than steam systems. However, they are costly to replace. So, the most cost-effective time to make this steam-to-hot water conversion is when it is time to replace a steam system's main boiler. A new hot water boiler and connecting piping will cost less than a steam boiler and its piping. These cost savings will balance with the added cost to adapt the system to hot water and probable changes to condensate return piping. Hot water systems offer greater control: they can adjust the water temperature based on the outside air temperature (in steam systems, the heat output is constant whether the outside temperature is 40 degrees or 10 below zero).

EXISTING CONDITIONS	
Location	
Utilize condensing hot water boilers.	
End Use	HVAC
Type	Boilers, Burners, and Furnaces
Recommendation:	
Boiler - Steam to Hot Water Conversion	
% ECM Opportunity	100
% savings electric	0.00000
% savings gas	35.00000
Priority	Low
Priority Rationale:	
	Efficiency Upgrade
Grants Available?	Yes

RECOMMENDATION SAVINGS POTENTIAL	
Location	
Utilize condensing hot water boilers.	
Electric Energy Savings (kWh/yr)	
Gas Energy Savings (therm/yr)	14,000
Electric Cost Savings ($/yr)	
Gas Cost Savings ($/yr)	$11,130
Total Cost Savings ($/yr)	$11,130
Payback (yrs)	10-15
Electric GHG Savings (tons/yr)	
Gas GHG Savings (tons/yr)	82

Lincoln Center

Typical End Use Profile



Typical Facility Annual Energy Usage

	Electric %	Natural Gas %	Electric kWh	Natural Gas Therms	Electric Cost	Natural Gas Cost
Domestic Hot Water	1.0%	10.0%	4,889	2,545	$406	$1,840
Motors - Non HVAC	1.0%	0.0%	4,889	0	$406	$0
Food Service	1.0%	1.0%	4,889	255	$406	$184
Lighting	49.0%	0.0%	239,543	0	$19,882	$0
Plug Loads/Office Equipment	9.0%	0.0%	43,998	0	$3,652	$0
HVAC	39.0%	89.0%	190,657	22,651	$15,825	$16,377
Office Equipment	0.0%	0.0%	0	0	$0	$0
Total	100.0%	100.0%	488,863	25,451	$40,576	$18,401

Your facility uses 29.94 kWh/sq. ft./yr and 1.56 therms/sq. ft./yr and 258.03 kBtu/sq. ft./yr

Energy Conservation Opportunities
Estimated Savings Summary

Opportunity Description	Electric Energy (kWh/yr)	Fuel Energy (therms/yr)	Payback (yrs)	Cost savings	Priority
1.0 Lighting - Reconfigure Lighting Layout for Efficiency and Improvement	90,000			$7,470	High
2.0 HVAC - Ventilation Controls	29,000	4,500	1-5	$5,661	High
3.0 HVAC - Economizer Controls/Free Cooling	19,000		1-5	$1,577	High
4.0 Lighting - T-8 or T-5 - Replaces HID	5,500		3-8	$457	High
5.0 Lighting - Compact Fluorescent Lamp Fixture Replacement	2,900		3-8	$241	High
6.0 Food Service - Refrigeration System Maintenance	730		3-10	$61	High
7.0 Food Service - Refrigeration System Maintenance	370		3-10	$31	High
8.0 HVAC - Boiler Replacement-High Performance		6,800	5-10	$4,916	Medium
TOTALS	**147,500**	**11,300**		**$20,412**	

The summary list above includes a number of recommended energy conservation measures for your facility. This list may include overlapping conservation measures. For example, replacement of a boiler with a high efficiency boiler would negate the savings of replacing the burner in the current boiler.

The summary list indicates that if all measures are implemented the total kWh savings is 147,500 which equals 30% of the current annual kWh usage of 488,863 kWh, and 11,300 therms which equals 44% of the current annual therm usage of 25,451 therms.

Be aware that the total savings and percentage of savings is an estimate based on average savings for specific measures which may require adjustments based on possible overlapping conservation measures.

UTILITY BILLING HISTORY

Electricity

Billing Month	Account Number	kW	kWh	Total Amount	$/kWh
23-Sep-2010			37,944	$3,647	$0.096
24-Aug-2010			48,970	$4,355	$0.089
26-Jul-2010			53,852	$4,404	$0.082
24-Jun-2010			46,973	$4,060	$0.086
25-May-2010			38,971	$3,122	$0.080
26-Apr-2010			39,785	$2,798	$0.070
25-Mar-2010			36,508	$3,002	$0.082
23-Feb-2010			35,468	$2,895	$0.082
25-Jan-2010			38,293	$2,953	$0.077
23-Dec-2009			36,986	$2,975	$0.080
23-Nov-2009			37,955	$3,118	$0.082
23-Oct-2009			37,158	$3,134	$0.084
TOTAL			488,863	$40,463	

Average Electricity Rate: $0.083

Natural Gas

Billing Month	Account Number	Therm	Total Amount	$/therm
23-Sep-2010		827	$542	$0.66
24-Aug-2010		743	$541	$0.73
26-Jul-2010		989	$701	$0.71
24-Jun-2010		1,330	$828	$0.62
25-May-2010		1,856	$1,262	$0.68
26-Apr-2010		2,333	$1,753	$0.75
25-Mar-2010		2,570	$2,105	$0.82
23-Feb-2010		3,286	$2,612	$0.79
25-Jan-2010		3,845	$2,994	$0.78
23-Dec-2009		3,141	$2,261	$0.72
23-Nov-2009		2,404	$1,668	$0.69
23-Oct-2009		2,126	$1,141	$0.54
TOTAL		25,451	$18,408	

Average Gas Rate: $0.72

1. Lighting - Reconfigure Lighting Layout for Efficiency and Improvement

There may be too much light in one area but not enough light in another as a result of installing new lighting equipment and repurposing spaces. Relocate fixtures from overlit areas to underlit areas instead of adding new light fixtures to correct underlit conditions. This will improve lighting system effectiveness and save the energy that would have been used by the new fixture.

EXISTING CONDITIONS		RECOMMENDATION SAVINGS POTENTIAL	
Location		**Location**	
Consider the Whole Building Lighting Program to retrofit at least 70% of the building lighting.		Consider the Whole Building Lighting Program to retrofit at least 70% of the building lighting.	
End Use	Lighting	Electric Energy Savings (kWh/yr)	90,000
Type	Fluorescent	Gas Energy Savings (therm/yr)	
Recommendation:		Electric Cost Savings ($/yr)	$7,470
Reconfigure Lighting Layout for Efficiency and Improvement		Gas Cost Savings ($/yr)	
% ECM Opportunity	100	Total Cost Savings ($/yr)	$7,470
% savings electric	50.00000	Payback (yrs)	
% savings gas	0.00000	Electric GHG Savings (tons/yr)	75
Priority	High	Gas GHG Savings (tons/yr)	
Priority Rationale:			
	Acceptable Payback Period		
Grants Available?	Yes		

2. HVAC - Ventilation Controls

Verify if the outside air dampers are closing when the building is unoccupied and install ventilation controls if needed. Often the amount of ventilation air is based on some maximum design condition, such as occupancy or CO levels. Ventilation controls can measure the interior condition and adjust the actual amount of outside air to match the current school building status. Reducing the amount of outside air will reduce the amount of energy needed to condition (heat or cool) the air.

EXISTING CONDITIONS		RECOMMENDATION SAVINGS POTENTIAL	
Location		**Location**	
Adjust controls to close outside air dampers when the building is in the unoccupied mode. Also verify that ventilation does not exceed code requirements.		Adjust controls to close outside air dampers when the building is in the unoccupied mode. Also verify that ventilation does not exceed code requirements.	
End Use	HVAC	Electric Energy Savings (kWh/yr)	29,000
Type	Controls	Gas Energy Savings (therm/yr)	4,500
Recommendation:		Electric Cost Savings ($/yr)	$2,407
Ventilation Controls		Gas Cost Savings ($/yr)	$3,254
% ECM Opportunity	100	Total Cost Savings ($/yr)	$5,661
% savings electric	15.0000	Payback (yrs)	1-5
% savings gas	20.0000	Electric GHG Savings (tons/yr)	24
Priority	High	Gas GHG Savings (tons/yr)	26
Priority Rationale:			
	Low Cost/No Cost		
Grants Available?	Yes		

3. HVAC - Economizer Controls/Free Cooling

Install an automatic air-conditioning economizer if it does not currently exist. An air conditioning economizer can take advantage of cool outside air (such as during evening hours or cool days) and use this "free" air for cooling. During the air-conditioning season, the heat generated by internal loads such as people, lighting, and electronic equipment will build up in a building. It can be warmer inside than outdoors. Instead of relying on mechanical cooling, an economizer will allow the cooler outside air to enter the building through the outside air intakes and be distributed through the ductwork. The outside air is then tempered with the inside air to allow the temperature to reach the desired level.

EXISTING CONDITIONS	
Location	
Verify that the control system and HVAC system have economizer controls and that they function correctly.	
End Use	HVAC
Type	Controls
Recommendation:	
Economizer Controls/Free Cooling	
% ECM Opportunity	100
% savings electric	10.00000
% savings gas	0.00000
Priority	High
Priority Rationale:	
	Efficiency Upgrade
Grants Available?	Yes

RECOMMENDATION SAVINGS POTENTIAL	
Location	
Verify that the control system and HVAC system have economizer controls and that they function correctly.	
Electric Energy Savings (kWh/yr)	19,000
Gas Energy Savings (therm/yr)	
Electric Cost Savings ($/yr)	$1,577
Gas Cost Savings ($/yr)	
Total Cost Savings ($/yr)	$1,577
Payback (yrs)	1-5
Electric GHG Savings (tons/yr)	16
Gas GHG Savings (tons/yr)	

4. Lighting - T-8 - Replaces HID

Replace HID lamps and fixtures with T-8 fluorescent technology in the store. Replacement fluorescent lamps should be coupled with an enhanced specular aluminum fixture. Fluorescent fixtures are instant-on and eliminate lost work time due to momentary power interruptions. In addition, they lend themselves to better control including occupancy sensors, and dimming where appropriate. Further, T8 lamps have very low lumen-depreciation compared to HID lamps. Over their 20,000 hour projected life T-8's lose 10%. Metal Halide fixtures lose 40-60% of their light output over their life time. Fluorescent lighting provides better light quality with CRI (color rendering index) ratings between 73-85, while Metal Halide only rate from 65 to 70.

EXISTING CONDITIONS	
Location	
Replace the HID lighting in the store with High Performance T8 fluorescent fixtures.	
End Use	Lighting
Type	HID
Recommendation:	
T-8 or T-5 - Replaces HID	
% ECM Opportunity	35
% savings electric	50.00000
% savings gas	0.00000
Priority	High
Priority Rationale:	
	Efficiency Upgrade
Grants Available?	Yes

RECOMMENDATION SAVINGS POTENTIAL	
Location	
Replace the HID lighting in the store with High Performance T8 fluorescent fixtures.	
Electric Energy Savings (kWh/yr)	5,500
Gas Energy Savings (therm/yr)	
Electric Cost Savings ($/yr)	$457
Gas Cost Savings ($/yr)	
Total Cost Savings ($/yr)	$457
Payback (yrs)	3-8
Electric GHG Savings (tons/yr)	5
Gas GHG Savings (tons/yr)	

5. Lighting - Compact Fluorescent Lamp Fixture Replacement

Replace incandescent fixtures with compact fluorescent fixtures. Incandescent fixtures should be replaced with energy-efficient fluorescent fixtures when possible. Some options include fixtures that can accept CFLs and electronic ballasts. Fluorescent lighting in any form is far more energy-efficient than standard incandescent fixtures because the lamps use less energy and last much longer. Many times, lamp and maintenance savings alone will "pay for" the retrofit costs. The energy savings then represent an extra added benefit that is accrued monthly.

EXISTING CONDITIONS	
Location	
Replace the entrance and sunroom incandescent lamps with CFLs. Do the same for all the spot lights and can lights.	
End Use	Lighting
Type	Incandescent
Recommendation:	
Compact Fluorescent Lamp Fixture Replacement	
% ECM Opportunity	25
% savings electric	70.00000
% savings gas	0.00000
Priority	High
Priority Rationale:	
	Low Cost/No Cost
Grants Available?	Yes

RECOMMENDATION SAVINGS POTENTIAL	
Location	
Replace the entrance and sunroom incandescent lamps with CFLs. Do the same for all the spot lights and can lights.	
Electric Energy Savings (kWh/yr)	2,900
Gas Energy Savings (therm/yr)	
Electric Cost Savings ($/yr)	$241
Gas Cost Savings ($/yr)	
Total Cost Savings ($/yr)	$241
Payback (yrs)	3-8
Electric GHG Savings (tons/yr)	2
Gas GHG Savings (tons/yr)	

6. Food Service – Replace the evaporator motors in the walk-in coolers and freezers with ECM type

ECM motors are far more efficient than the older shaded pole or PSC motors.

EXISTING CONDITIONS	
Location	
Replace the evaporator motors on the walk-in coolers and freezers with ECM motors.	
End Use	Food Service
Type	
Recommendation:	
Refrigeration System Maintenance	
% ECM Opportunity	100
% savings electric	15.0000
% savings gas	0.00000
Priority	High
Priority Rationale:	
	Efficiency Upgrade
Grants Available?	Yes

RECOMMENDATION SAVINGS POTENTIAL	
Location	
Replace the evaporator motors on the walk-in coolers and freezers with ECM motors.	
Electric Energy Savings (kWh/yr)	730
Gas Energy Savings (therm/yr)	
Electric Cost Savings ($/yr)	$61
Gas Cost Savings ($/yr)	
Total Cost Savings ($/yr)	$61
Payback (yrs)	3-10
Electric GHG Savings (tons/yr)	1
Gas GHG Savings (tons/yr)	

7. Food Service - Refrigeration System Maintenance

A refrigeration system service increases your system efficiency and performance by repairing and maintaining issues which are adversely affecting performance. A typical service will include filter replacement, valve setting, etc and ensure optimal component life.

EXISTING CONDITIONS		RECOMMENDATION SAVINGS POTENTIAL	
Location		**Location**	
Kitchen		Kitchen	
End Use	Food Service	Electric Energy Savings (kWh/yr)	370
Type		Gas Energy Savings (therm/yr)	
Recommendation:		Electric Cost Savings ($/yr)	$31
Refrigeration System Maintenance		Gas Cost Savings ($/yr)	
% ECM Opportunity	100	Total Cost Savings ($/yr)	$31
% savings electric	7.5000	Payback (yrs)	3-10
% savings gas	0.00000	Electric GHG Savings (tons/yr)	
Priority	High	Gas GHG Savings (tons/yr)	
Priority Rationale:			
	Low Cost/No Cost		
Grants Available?	No		

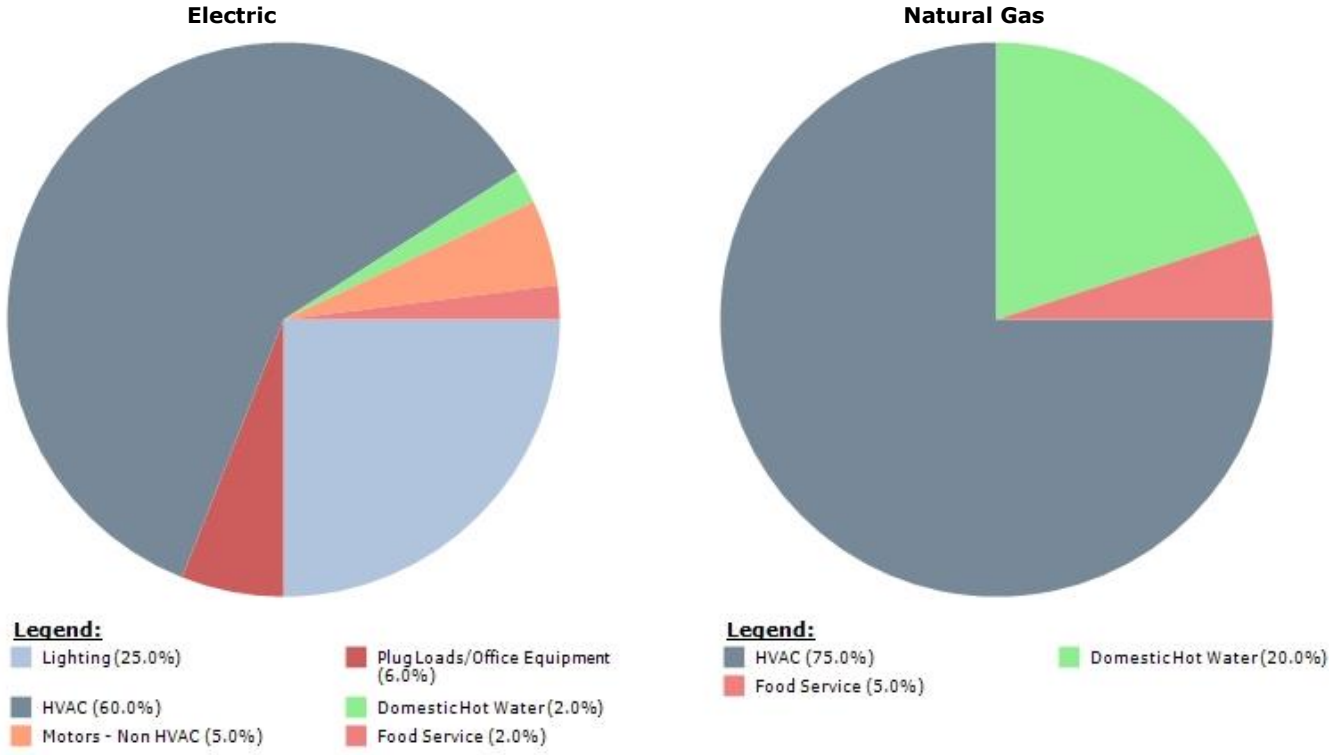
8. HVAC - Boiler Replacement- High Performance

A high-efficiency condensing boiler operates with lower flue-gas temperatures, lower flue-gas emissions and reduced fuel consumption by recovering heat that would otherwise be lost up the flue. High-efficiency boilers operate at efficiencies of 90% and greater, or about 10% to 15% better than new traditional boilers. High-efficiency boilers are called condensing boilers because during the process of recovering heat from the burned fuel, the temperature of the flue gas is reduced to a point where the water vapor that is produced during combustion is condensed out.

EXISTING CONDITIONS		RECOMMENDATION SAVINGS POTENTIAL	
Location		**Location**	
Boiler room		Boiler room	
End Use	HVAC	Electric Energy Savings (kWh/yr)	
Type	Boilers, Burners, and Furnaces	Gas Energy Savings (therm/yr)	6,800
Recommendation:		Electric Cost Savings ($/yr)	
Boiler Replacement- High Performance		Gas Cost Savings ($/yr)	$4,916
% ECM Opportunity	100	Total Cost Savings ($/yr)	$4,916
% savings electric	0.00000	Payback (yrs)	5-10
% savings gas	30.00000	Electric GHG Savings (tons/yr)	
Priority	Medium	Gas GHG Savings (tons/yr)	40
Priority Rationale:			
	Acceptable Payback Period		
Grants Available?	Yes		

Law Enforcement Center

Typical End Use Profile



Typical Facility Annual Energy Usage

	Electric %	Natural Gas %	Electric kWh	Natural Gas Therms	Electric Cost	Natural Gas Cost
Lighting	25.0%	0.0%	192,180	0	$13,837	$0
Plug Loads/Office Equipment	6.0%	0.0%	46,123	0	$3,321	$0
HVAC	60.0%	75.0%	461,232	16,483	$33,209	$12,131
Domestic Hot Water	2.0%	20.0%	15,374	4,395	$1,107	$3,235
Motors - Non HVAC	5.0%	0.0%	38,436	0	$2,767	$0
Food Service	2.0%	5.0%	15,374	1,099	$1,107	$809
Office Equipment	0.0%	0.0%	0	0	$0	$0
Total	100.0%	100.0%	768,720	21,977	$55,348	$16,175

Your facility uses 14.20 kWh/sq. ft./yr and 0.41 therms/sq. ft./yr and 89.09 kBtu/sq. ft./yr

Energy Conservation Opportunities
Estimated Savings Summary

Opportunity Description	Electric Energy (kWh/yr)	Fuel Energy (therms/yr)	Payback (yrs)	Cost savings	Priority
1.0 Lighting - Custom Fluorescent Recommendation	40,000			$2,880	High
2.0 Domestic Hot Water - Custom DHW Recommendation		1,100		$810	High
3.0 Domestic Hot Water - Booster Water Heater Fuel Conversion				$	High
4.0 Plug Loads/Office Equipment - Vending Machine - Install Vending Miser or Disconnect Lamps and Ballasts	920		1-2	$66	High
5.0 HVAC - Economizer Controls/Free Cooling	49,000		1-5	$3,528	High
6.0 Lighting - LED Exit Lighting	1,800		1-5	$130	High
7.0 Lighting - Occupancy Sensor for Lighting	20,000		3-5	$1,440	High
8.0 Lighting - T-8 or T-5 - Replaces HID	11,000		3-8	$792	High
9.0 Food Service - Refrigeration System Maintenance	850		3-10	$61	High
10.0 Food Service - Steamer, Gas ENERGY STAR	1,500	22	5-10	$124	High
11.0 Food Service - Hot Food Holding Cabinet - ENERGY STAR	1,200	22	5-10	$103	High
12.0 HVAC - Boiler Replacement- High Performance		2,500	5-10	$1,840	Low
TOTALS	**126,270**	**3,644**		**$11,773**	

The summary list above includes a number of recommended energy conservation measures for your facility. This list may include overlapping conservation measures. For example, replacement of a boiler with a high efficiency boiler would negate the savings of replacing the burner in the current boiler.

The summary list indicates that if all measures are implemented the total kWh savings is 126,270 which equals 16% of the current annual kWh usage of 768,720 kWh, and 3,644 therms which equals 17% of the current annual therm usage of 21,977 therms.

Be aware that the total savings and percentage of savings is an estimate based on average savings for specific measures which may require adjustments based on possible overlapping conservation measures.

UTILITY BILLING HISTORY

Electricity

Billing Month	Account Number	kW	kWh	Total Amount	$/kWh
24-Aug-2010			81,120	$6,265	$0.077
26-Jul-2010			84,480	$6,490	$0.077
24-Jun-2010			74,560	$5,845	$0.078
25-May-2010			61,760	$4,633	$0.075
26-Apr-2010			60,160	$3,472	$0.058
25-Mar-2010			53,040	$3,705	$0.070
23-Feb-2010			51,360	$3,596	$0.070
25-Jan-2010			58,320	$3,839	$0.066
23-Dec-2009			54,800	$3,746	$0.068
23-Nov-2009			56,720	$3,976	$0.070
23-Oct-2009			58,000	$4,243	$0.073
23-Sep-2009			74,400	$5,530	$0.074
TOTAL			768,720	$55,339	

Average Electricity Rate: $0.072

Natural Gas

Billing Month	Account Number	Therm	Total Amount	$/therm
24-Aug-2010		606	$458	$0.76
26-Jul-2010		489	$397	$0.81
24-Jun-2010		751	$508	$0.68
25-May-2010		1,311	$918	$0.70
26-Apr-2010		1,684	$1,293	$0.77
25-Mar-2010		2,143	$1,771	$0.83
23-Feb-2010		3,402	$2,701	$0.79
25-Jan-2010		4,070	$3,163	$0.78
23-Dec-2009		3,416	$2,450	$0.72
23-Nov-2009		1,711	$1,215	$0.71
23-Oct-2009		1,456	$811	$0.56
23-Sep-2009		937	$489	$0.52
TOTAL		21,977	$16,175	

Average Gas Rate: $0.74

1. Lighting - Custom Fluorescent Recommendation

Retrofit all 4' fluorescent light fixtures with low ballast factor (<=0.78) ballasts and 25 watt 5000K lamps. This will reduce the energy use of all these light fixtures by 40% and improve the visible light levels. Examine all fixture lenses to see if they need replacement as well to improve the efficiency of each light fixture.

EXISTING CONDITIONS		RECOMMENDATION SAVINGS POTENTIAL	
Location		**Location**	
End Use	Lighting	Electric Energy Savings (kWh/yr)	40,000
Type	Fluorescent	Gas Energy Savings (therm/yr)	
Recommendation:		Electric Cost Savings ($/yr)	$2,880
Custom Fluorescent Recommendation		Gas Cost Savings ($/yr)	
% ECM Opportunity	100	Total Cost Savings ($/yr)	$2,880
% savings electric	30.00000	Payback (yrs)	
% savings gas	0.00000	Electric GHG Savings (tons/yr)	34
Priority	High	Gas GHG Savings (tons/yr)	
Priority Rationale:			
	Acceptable Payback Period		
Grants Available?	Yes		

2. Domestic Hot Water - Custom DHW Recommendation

The existing water heaters (3) heat the water to 160 degrees. These are high efficiency water heaters that are most efficient when producing 120 degree water. The higher the water temperature they produce the less efficient they operate. These water heaters supply a large storage tank and from there the water goes through a mixing valve to reduce the water temperature to 105 degrees for showers and sinks. It is unclear what the 160 degree water is needed for. It may be used in the kitchen. It would be best to use one of the water heaters for the 160 degree needs and separate the other two for use at 120 degrees. The mixing valve could probably be eliminated unless 105 degrees is the desired water temperature for those areas. It is best not to reduce water heater output below 120 degrees due to Legionella concerns. Verify how much hot water is needed at each area throughout the facility before deciding how to accomplish this project.

EXISTING CONDITIONS		RECOMMENDATION SAVINGS POTENTIAL	
Location		**Location**	
Mechanical room		Mechanical room	
End Use	Domestic Hot Water	Electric Energy Savings (kWh/yr)	
Type		Gas Energy Savings (therm/yr)	1,100
Recommendation:		Electric Cost Savings ($/yr)	
Custom DHW Recommendation		Gas Cost Savings ($/yr)	$810
% ECM Opportunity	100	Total Cost Savings ($/yr)	$810
% savings electric	0.00000	Payback (yrs)	
% savings gas	25.00000	Electric GHG Savings (tons/yr)	
Priority	High	Gas GHG Savings (tons/yr)	6
Priority Rationale:			
	Acceptable Payback Period		
Grants Available?	Yes		

3. Domestic Hot Water - Booster Water Heater Fuel Conversion

Replace the electric booster heater on the dish washer with a natural gas unit. Electric booster heaters are more expensive to operate than natural gas-powered units. They produce less heat for each energy dollar spent as well as contribute to the electric demand charges assessed each month. When possible, convert these water heaters to high efficiency natural gas units.

EXISTING CONDITIONS		RECOMMENDATION SAVINGS POTENTIAL	
Location		**Location**	
Kitchen		Kitchen	
End Use	Domestic Hot Water	Electric Energy Savings (kWh/yr)	
Type		Gas Energy Savings (therm/yr)	
Recommendation:		Electric Cost Savings ($/yr)	
Booster Water Heater Fuel Conversion		Gas Cost Savings ($/yr)	
% ECM Opportunity	100	Total Cost Savings ($/yr)	
% savings electric	10.00000	Payback (yrs)	
% savings gas	0.00000	Electric GHG Savings (tons/yr)	
Priority	High	Gas GHG Savings (tons/yr)	
Priority Rationale:			
	Acceptable Payback Period		
Grants Available?	Yes		

4. Plug Loads/Office Equipment - Vending Machine - Disconnect Lamps and Ballasts

Disconnect the lamps and ballasts in the soda machine. Vending machines are costly to operate because they require refrigeration as well as lighting. In fact, machines with lighted displays typically operate 24 hours a day, 365 days a year. The lighting alone can cost about $40.00 per year per machine. One way to reduce lighting costs is to disconnect the lights and ballasts in the display and put a note on the machine that says it is still operational. Another option is to install a device called a vending miser. The vending miser uses an occupancy sensor to determine if the area around the soda machine is in use. If there is no activity in the vicinity of the machine, the machine is powered down periodically.

EXISTING CONDITIONS		RECOMMENDATION SAVINGS POTENTIAL	
Location		**Location**	
End Use	Plug Loads/Office Equipment	Electric Energy Savings (kWh/yr)	920
Type		Gas Energy Savings (therm/yr)	
Recommendation:		Electric Cost Savings ($/yr)	$66
Vending Machine - Install Vending Miser or Disconnect Lamps and Ballasts		Gas Cost Savings ($/yr)	
% ECM Opportunity	100	Total Cost Savings ($/yr)	$66
% savings electric	2.00000	Payback (yrs)	1-2
% savings gas	0.00000	Electric GHG Savings (tons/yr)	1
Priority	High	Gas GHG Savings (tons/yr)	
Priority Rationale:			
	Efficiency Upgrade		
Grants Available?	Yes		

5. HVAC - Economizer Controls/Free Cooling

Install an automatic air-conditioning economizer. During my audit the outside air temperature was 55 degrees and it was dry outside. One of the compressors on the Trane two stage water cooled chiller was running. An air conditioning economizer can take advantage of cool outside air (such as during evening hours or cool days) and use this "free" air for cooling. During the air-conditioning season, the heat generated by internal loads such as people, lighting, and electronic equipment will build up in a building. It can be warmer inside than outdoors. Instead of relying on mechanical cooling, an economizer will allow the cooler outside air to enter the building through the outside air intakes and be distributed through the ductwork. The outside air is then tempered with the inside air to allow the temperature to reach the desired level.

EXISTING CONDITIONS		RECOMMENDATION SAVINGS POTENTIAL	
Location		**Location**	
Mechanical room		Mechanical room	
End Use	HVAC	Electric Energy Savings (kWh/yr)	49,000
Type	Controls	Gas Energy Savings (therm/yr)	
Recommendation:		Electric Cost Savings ($/yr)	$3,528
Economizer Controls/Free Cooling		Gas Cost Savings ($/yr)	
% ECM Opportunity	100	Total Cost Savings ($/yr)	$3,528
% savings electric	10.00000	Payback (yrs)	1-5
% savings gas	0.00000	Electric GHG Savings (tons/yr)	41
Priority	High	Gas GHG Savings (tons/yr)	
Priority Rationale:			
	Efficiency Upgrade		
Grants Available?	Yes		

6. Lighting - LED Exit Lighting

Retrofit existing exit lighting with LED units. Exit signs that contain conventional light bulbs should be retrofitted with LED ("light emitting diode") bulbs. LEDs will last approximately 30 years and use a fraction of the energy (1 or 2 watts) of conventional exit signs. Exit signs must remain illuminated 24 hours a day, 365 days a year, so this step will result in substantial long-term energy savings. Maintenance costs will also be reduced because bulb changes will dramatically reduced. A typical LED exit light retrofit will pay for itself within 4 years.

EXISTING CONDITIONS		RECOMMENDATION SAVINGS POTENTIAL	
Location		**Location**	
End Use	Lighting	Electric Energy Savings (kWh/yr)	1,800
Type	Exit	Gas Energy Savings (therm/yr)	
Recommendation:		Electric Cost Savings ($/yr)	$130
LED Exit Lighting		Gas Cost Savings ($/yr)	
% ECM Opportunity	100	Total Cost Savings ($/yr)	$130
% savings electric	95.00000	Payback (yrs)	1-5
% savings gas	0.00000	Electric GHG Savings (tons/yr)	2
Priority	High	Gas GHG Savings (tons/yr)	
Priority Rationale:			
	Low Cost/No Cost		
Grants Available?	No		

7. Lighting - Occupancy Sensor for Lighting

Install occupancy sensors to control the lighting in the basement storage area, locker rooms, evidence room and jail locker rooms. Occupancy sensors reduce lighting energy consumption by about 10% or more where installed. Occupancy sensors can sense occupants' motion or thermal energy and turns lights on or off appropriately. Occupancy sensors must be selected, installed and calibrated properly to assure desired operation. An essential part of a successful installation of occupancy sensors is the final commissioning. Verify that sensors are properly positioned in the room and adjustable features such as sensitivity and time delays have been optimized to the room and occupant needs. Make sure that the maintenance staff and room occupants understand how the controls work and save energy, so that they do not override or bypass the settings.

EXISTING CONDITIONS		RECOMMENDATION SAVINGS POTENTIAL	
Location		**Location**	
End Use	Lighting	Electric Energy Savings (kWh/yr)	20,000
Type	Fluorescent	Gas Energy Savings (therm/yr)	
Recommendation:		Electric Cost Savings ($/yr)	$1,440
Occupancy Sensor for Lighting		Gas Cost Savings ($/yr)	
% ECM Opportunity	100	Total Cost Savings ($/yr)	$1,440
% savings electric	15.00000	Payback (yrs)	3-5
% savings gas	0.00000	Electric GHG Savings (tons/yr)	17
Priority	High	Gas GHG Savings (tons/yr)	
Priority Rationale:			
	Acceptable Payback Period		
Grants Available?	Yes		

8. Lighting - T-8 or T-5 - Replaces HID

Replace the HID lamps and fixtures in the lobby with fluorescent T-8 technology. Replacement fluorescent lamps should be coupled with an enhanced specular aluminum fixture. Fluorescent fixtures are instant-on and eliminate lost work time due to momentary power interruptions. In addition, they lend themselves to better control including occupancy sensors, and dimming where appropriate. Further, T8 lamps have very low lumen-depreciation compared to HID lamps. Fluorescent lighting provides better light quality with CRI (color rendering index) ratings between 73-85, while Metal Halide only rate from 65 to 70.

EXISTING CONDITIONS		RECOMMENDATION SAVINGS POTENTIAL	
Location		**Location**	
End Use	Lighting	Electric Energy Savings (kWh/yr)	11,000
Type	HID	Gas Energy Savings (therm/yr)	
Recommendation:		Electric Cost Savings ($/yr)	$792
T-8 or T-5 - Replaces HID		Gas Cost Savings ($/yr)	
% ECM Opportunity	100	Total Cost Savings ($/yr)	$792
% savings electric	50.00000	Payback (yrs)	3-8
% savings gas	0.00000	Electric GHG Savings (tons/yr)	9
Priority	High	Gas GHG Savings (tons/yr)	
Priority Rationale:			
	Efficiency Upgrade		
Grants Available?	Yes		

9. Food Service – Replace the evaporator motors on the walk-in cooler and freezer with ECM type motors

ECM motors are far more efficient than split capacitor or shaded pole motors which were typically used on older walk-in coolers and freezers. Replace the existing evaporator motors with ECM type.

EXISTING CONDITIONS		RECOMMENDATION SAVINGS POTENTIAL	
Location		**Location**	
Walk-in cooler and freezer ECM motors retrofit		Walk-in cooler and freezer ECM motors retrofit	
End Use	Food Service	Electric Energy Savings (kWh/yr)	850
Type		Gas Energy Savings (therm/yr)	
Recommendation:		Electric Cost Savings ($/yr)	$61
Refrigeration System Maintenance		Gas Cost Savings ($/yr)	
% ECM Opportunity	100	Total Cost Savings ($/yr)	$61
% savings electric	5.50000	Payback (yrs)	3-10
% savings gas	0.00000	Electric GHG Savings (tons/yr)	1
Priority	High	Gas GHG Savings (tons/yr)	
Priority Rationale:			
	Efficiency Upgrade		
Grants Available?	Yes		

10. Food Service - Steamer, Gas ENERGY STAR

Replace your existing electric steamer with a high efficiency natural gas unit to reduce your eletcircal consumption and decrease kitchen temperatures without affecting food preparation. Look for a commercial gas-fueled 6 pan pressureless steamer with a heavy load cooking energy efficiency greater than or equal to 38% using ASTM F1484 test method.

EXISTING CONDITIONS		RECOMMENDATION SAVINGS POTENTIAL	
Location		**Location**	
Kitchen		Kitchen	
End Use	Food Service	Electric Energy Savings (kWh/yr)	1,500
Type		Gas Energy Savings (therm/yr)	22
Recommendation:		Electric Cost Savings ($/yr)	$108
Steamer, Gas ENERGY STAR		Gas Cost Savings ($/yr)	$16
% ECM Opportunity	100	Total Cost Savings ($/yr)	$124
% savings electric	10.00000	Payback (yrs)	5-10
% savings gas	2.00000	Electric GHG Savings (tons/yr)	1
Priority	High	Gas GHG Savings (tons/yr)	
Priority Rationale:			
	Acceptable Payback Period		
Grants Available?	Yes		

11. Food Service - Hot Food Holding Cabinet - ENERGY STAR

Replace your existing hot food steam table with an ENERGY STAR rated unit to reduce electrical consumption and kitchen temperatures while improving food heating.

EXISTING CONDITIONS		RECOMMENDATION SAVINGS POTENTIAL	
Location		**Location**	
Kitchen		Kitchen	
End Use	Food Service	Electric Energy Savings (kWh/yr)	1,200
Type		Gas Energy Savings (therm/yr)	22
Recommendation:		Electric Cost Savings ($/yr)	$86
Hot Food Holding Cabinet - ENERGY STAR		Gas Cost Savings ($/yr)	$16
% ECM Opportunity	100	Total Cost Savings ($/yr)	$103
% savings electric	8.00000	Payback (yrs)	5-10
% savings gas	2.00000	Electric GHG Savings (tons/yr)	1
Priority	High	Gas GHG Savings (tons/yr)	
Priority Rationale:			
	Acceptable Payback Period		
Grants Available?	Yes		

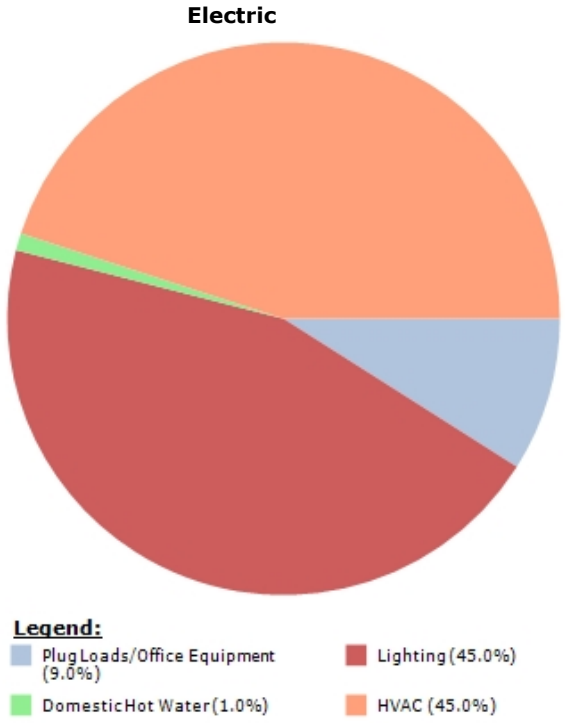
12. HVAC - Boiler Replacement- High Performance

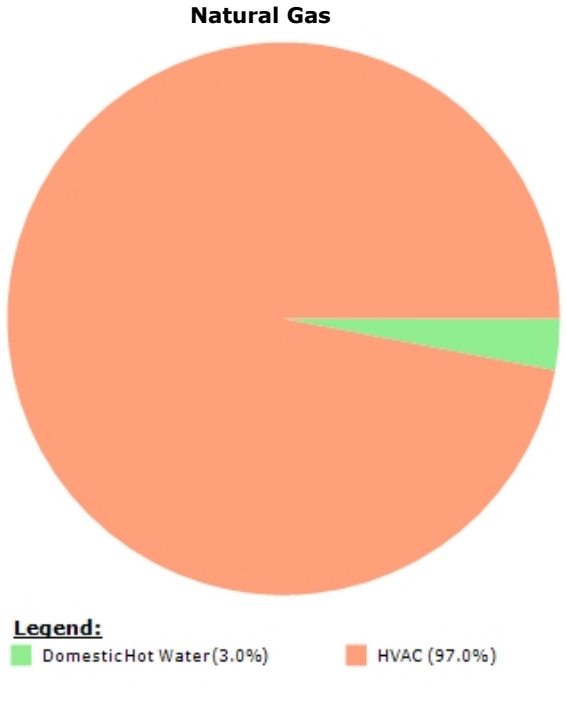
Replace one of the boilers with a high-efficiency condensing boiler. Condensing boilers operate with lower flue-gas temperatures, lower flue-gas emissions and reduced fuel consumption by recovering heat that would otherwise be lost up the flue. High-efficiency boilers operate at efficiencies of 90% and greater, or about 10% to 15% better than traditional boilers. High-efficiency boilers are called condensing boilers because during the process of recovering heat from the burned fuel, the temperature of the flue gas is reduced to a point where the water vapor that is produced during combustion is condensed out.

EXISTING CONDITIONS		RECOMMENDATION SAVINGS POTENTIAL	
Location		**Location**	
Boiler room		Boiler room	
End Use	HVAC	Electric Energy Savings (kWh/yr)	
Type	Boilers, Burners, and Furnaces	Gas Energy Savings (therm/yr)	2,500
Recommendation:		Electric Cost Savings ($/yr)	
Boiler Replacement- High Performance		Gas Cost Savings ($/yr)	$1,840
% ECM Opportunity	100	Total Cost Savings ($/yr)	$1,840
% savings electric	0.00000	Payback (yrs)	5-10
% savings gas	15.00000	Electric GHG Savings (tons/yr)	
Priority	Low	Gas GHG Savings (tons/yr)	15
Priority Rationale:			
	Efficiency Upgrade		
Grants Available?	Yes		

Ruth Gilfry Building

Typical End Use Profile





Typical Facility Annual Energy Usage

	Electric %	Natural Gas %	Electric kWh	Natural Gas Therms	Electric Cost	Natural Gas Cost
Plug Loads/Office Equipment	9.0%	0.0%	63,212	0	$4,931	$0
Lighting	45.0%	0.0%	316,062	0	$24,653	$0
Office Equipment	0.0%	0.0%	0	0	$0	$0
Domestic Hot Water	1.0%	3.0%	7,024	678	$548	$568
HVAC	45.0%	97.0%	316,062	21,936	$24,653	$18,360
Total	100.0%	100.0%	702,360	22,614	$54,784	$18,928

Your facility uses 31.92 kWh/sq. ft./yr and 1.03 therms/sq. ft./yr and 211.73 kBtu/sq. ft./yr

Energy Conservation Opportunities
Estimated Savings Summary

Opportunity Description	Electric Energy (kWh/yr)	Fuel Energy (therms/yr)	Payback (yrs)	Cost savings	Priority
1.0 Lighting - Reconfigure Lighting Layout for Efficiency and Improvement	120,000			$9,360	High
2.0 Plug Loads/Office Equipment - Vending Machine - Install Vending Miser or Disconnect Lamps and Ballasts	950		1-2	$74	High
3.0 Domestic Hot Water - Electric Hot Water Heater Replaced with High Efficient Natural Gas Hot Water Heater	7,000		3-5	$546	High
4.0 Plug Loads/Office Equipment - Replace Refrigerator with High Efficiency Energy Star Refrigerator	6,300		5-10	$491	High
TOTALS	**134,250**			**$10,472**	

The summary list above includes a number of recommended energy conservation measures for your facility. This list may include overlapping conservation measures. For example, replacement of a boiler with a high efficiency boiler would negate the savings of replacing the burner in the current boiler.

The summary list indicates that if all measures are implemented the total kWh savings is 134,250 which equals 19% of the current annual kWh usage of 702,360 kWh, and 0 therms which equals 0% of the current annual therm usage of 22,614 therms.

Be aware that the total savings and percentage of savings is an estimate based on average savings for specific measures which may require adjustments based on possible overlapping conservation measures.

UTILITY BILLING HISTORY

Electricity

Billing Month	Account Number	kW	kWh	Total Amount	$/kWh
23-Sep-2009			62,800	$5,296	$0.084
24-Aug-2009			65,400	$5,452	$0.083
24-Jul-2009			64,600	$5,484	$0.085
23-Jun-2009			63,800	$5,127	$0.080
22-May-2009			63,400	$4,820	$0.076
23-Apr-2009			57,800	$4,389	$0.076
24-Mar-2009			51,800	$3,886	$0.075
23-Feb-2009			58,800	$4,417	$0.075
28-Jan-2009			58,000	$4,131	$0.071
30-Dec-2008			53,480	$3,919	$0.073
26-Nov-2008			51,120	$4,037	$0.079
28-Oct-2008			51,360	$4,125	$0.080
TOTAL			702,360	$55,083	

Average Electricity Rate: $0.078

Natural Gas

Billing Month	Account Number	Therm	Total Amount	$/therm
23-Sep-2009		0	$21	$0.00
24-Aug-2009		0	$21	$0.00
24-Jul-2009		0	$21	$0.00
23-Jun-2009		149	$109	$0.73
22-May-2009		4,486	$2,386	$0.53
23-Apr-2009		1,880	$1,330	$0.71
24-Mar-2009		2,023	$1,752	$0.87
23-Feb-2009		5,314	$4,914	$0.92
28-Jan-2009		5,364	$5,283	$0.98
30-Dec-2008		2,407	$2,221	$0.92
26-Nov-2008		991	$842	$0.85
28-Oct-2008		0	$30	$0.00
TOTAL		22,614	$18,931	

Average Gas Rate: $0.84

1. Lighting - Whole Building Lighting Retrofit

There may be too much light in one area but not enough light in another as a result of installing new lighting equipment and repurposing spaces. Relocate fixtures from overlit areas to underlit areas instead of adding new light fixtures to correct underlit conditions. This will improve lighting system effectiveness and save the energy that would have been used by the new fixture. Hire a professional lighting designer to work with Focus on Energy in the Whole Building Lighting Program to maximize the lighting efficiency of the building.

EXISTING CONDITIONS		RECOMMENDATION SAVINGS POTENTIAL	
Location		**Location**	
Utilize the Whole Building Lighting Program to rework the laighting laayout for the entire buidling.		Utilize the Whole Building Lighting Program to rework the laighting laayout for the entire buidling.	
End Use	Lighting	Electric Energy Savings (kWh/yr)	120,000
Type	Fluorescent	Gas Energy Savings (therm/yr)	
Recommendation:		Electric Cost Savings ($/yr)	$9,360
Reconfigure Lighting Layout for Efficiency and Improvement		Gas Cost Savings ($/yr)	
% ECM Opportunity	100	Total Cost Savings ($/yr)	$9,360
% savings electric	50.00000	Payback (yrs)	
% savings gas	0.00000	Electric GHG Savings (tons/yr)	101
Priority	High	Gas GHG Savings (tons/yr)	
Priority Rationale:			
	Acceptable Payback Period		
Grants Available?	Yes		

2. Plug Loads/Office Equipment - Vending Machine - Install Vending Miser or Disconnect Lamps and Ballasts

Disconnect the lamps and ballasts in the soda machine or install a vending miser. Vending machines are costly to operate because they require refrigeration as well as lighting. In fact, machines with lighted displays typically operate 24 hours a day, 365 days a year. The lighting alone can cost about $40.00 per year per machine. One way to reduce lighting costs is to disconnect the lights and ballasts in the display and put a note on the machine that says it is still operational. Another option is to install a device called a vending miser. The vending miser uses an occupancy sensor to determine if the area around the soda machine is in use. If there is no activity in the vicinity of the machine, the machine is powered down periodically.

EXISTING CONDITIONS		RECOMMENDATION SAVINGS POTENTIAL	
Location		**Location**	
End Use	Plug Loads/Office Equipment	Electric Energy Savings (kWh/yr)	950
Type		Gas Energy Savings (therm/yr)	
Recommendation:		Electric Cost Savings ($/yr)	$74
Vending Machine - Install Vending Miser or Disconnect Lamps and Ballasts		Gas Cost Savings ($/yr)	
% ECM Opportunity	15	Total Cost Savings ($/yr)	$74
% savings electric	10.00000	Payback (yrs)	1-2
% savings gas	0.00000	Electric GHG Savings (tons/yr)	1
Priority	High	Gas GHG Savings (tons/yr)	
Priority Rationale:			
	Acceptable Payback Period		
Grants Available?	Yes		

3. Domestic Hot Water - Electric Hot Water Heater Replaced with High Efficient Natural Gas Hot Water Heater

Install a high efficiency natural gas hot water heating system. Many existing hot water heating systems are standard efficiency (as opposed to high efficiency) units. In recent years, technology advancements have led to the creation of high efficiency units. Sealed combustion hot water systems now offer efficiencies of up to 96%. These units also offer high output and quick recovery. While you will see electric savings you will also see an increase in natural gas usage. This opportunity description does not show the natural gas increase but this should be considered when reviewing this as a possible conservation measure.

EXISTING CONDITIONS		RECOMMENDATION SAVINGS POTENTIAL	
Location		**Location**	
End Use	Domestic Hot Water	Electric Energy Savings (kWh/yr)	7,000
Type		Gas Energy Savings (therm/yr)	
Recommendation:		Electric Cost Savings ($/yr)	$546
Electric Hot Water Heater Replaced with High Efficient Natural Gas Hot Water Heater		Gas Cost Savings ($/yr)	
% ECM Opportunity	100	Total Cost Savings ($/yr)	$546
% savings electric	100.00000	Payback (yrs)	3-5
% savings gas	0.00000	Electric GHG Savings (tons/yr)	6
Priority	High	Gas GHG Savings (tons/yr)	
Priority Rationale:			
	Acceptable Payback Period		
Grants Available?	Yes		

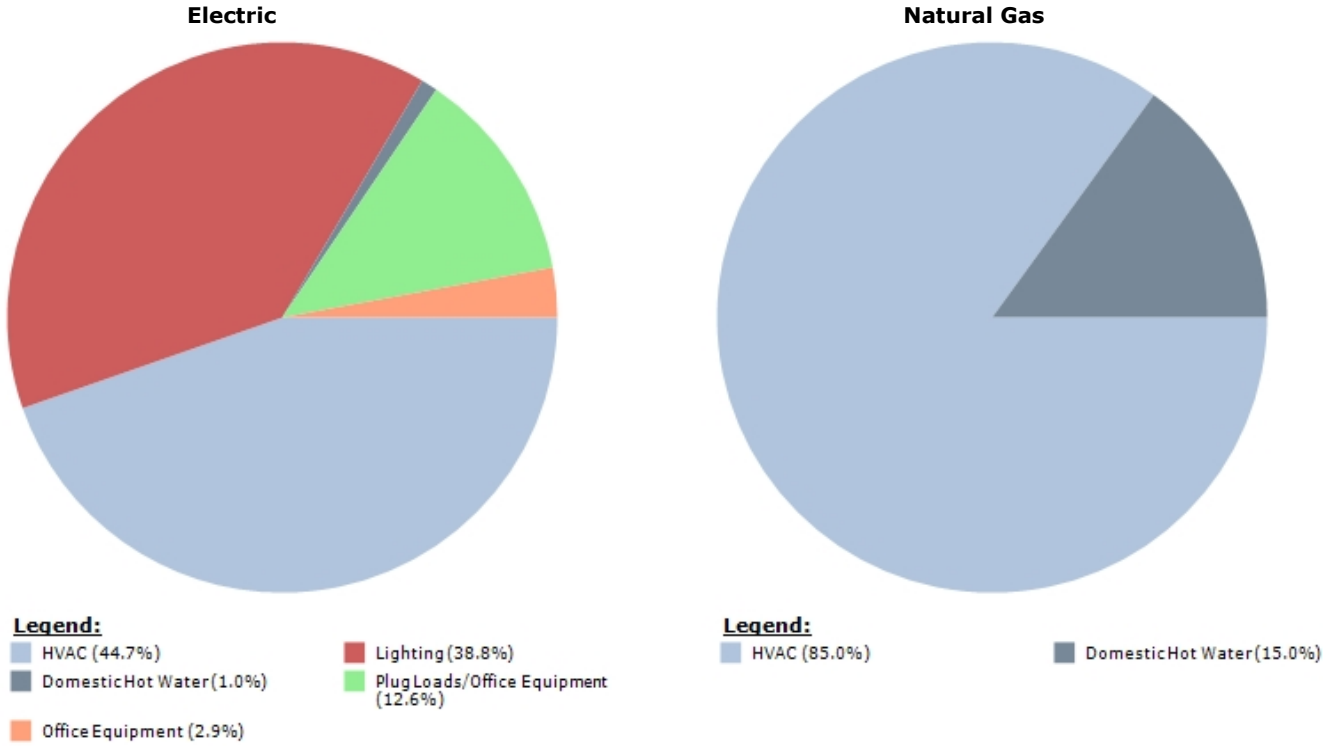
4. Plug Loads/Office Equipment - Replace walk-in Refrigerator with High Efficiency Energy Star Refrigerator

Remove or disconnect the walk-in cooler and install a high efficiency Energy Star refrigerator. ENERGY STAR qualified refrigerators are 20% more energy efficient than the minimum federal standard.

EXISTING CONDITIONS		RECOMMENDATION SAVINGS POTENTIAL	
Location		**Location**	
Remove the walk-in cooler and install an ENERGY STAR stnad alone refrigerator. This unit was almost empty.		Remove the walk-in cooler and install an ENERGY STAR stnad alone refrigerator. This unit was almost empty.	
End Use	Plug Loads/Office Equipment	Electric Energy Savings (kWh/yr)	6,300
Type		Gas Energy Savings (therm/yr)	
Recommendation:		Electric Cost Savings ($/yr)	$491
Replace Refrigerator with High Efficiency Energy Star Refrigerator		Gas Cost Savings ($/yr)	
% ECM Opportunity	100	Total Cost Savings ($/yr)	$491
% savings electric	10.00000	Payback (yrs)	5-10
% savings gas	0.00000	Electric GHG Savings (tons/yr)	5
Priority	High	Gas GHG Savings (tons/yr)	
Priority Rationale:			
	Efficiency Upgrade		
Grants Available?	Yes		

Jefferson House

Typical End Use Profile



Typical Facility Annual Energy Usage

	Electric %	Natural Gas %	Electric kWh	Natural Gas Therms	Electric Cost	Natural Gas Cost
HVAC	46.0%	85.0%	10,566	1,235	$1,162	$1,044
Lighting	40.0%	0.0%	9,188	0	$1,011	$0
Domestic Hot Water	1.0%	15.0%	230	218	$25	$184
Plug Loads/Office Equipment	13.0%	0.0%	2,986	0	$328	$0
Office Equipment	3.0%	0.0%	689	0	$76	$0
Total	100.0%	100.0%	22,969	1,453	$2,527	$1,228

Your facility uses 12.76 kWh/sq. ft./yr and 0.81 therms/sq. ft./yr and 124.27 kBtu/sq. ft./yr

Energy Conservation Opportunities
Estimated Savings Summary

Opportunity Description	Electric Energy (kWh/yr)	Fuel Energy (therms/yr)	Payback (yrs)	Cost savings	Priority
1.0 Lighting - Compact Fluorescent Lamps Replacement	2,200		1-2	$242	
2.0 Lighting - LED Exit Lighting	87		1-5	$10	High
3.0 HVAC - Insulation - Attic	1,100	250	10-20	$332	High
4.0 HVAC - Window Replacement - High Efficiency Units		62	10-30	$52	Medium
TOTALS	**3,387**	**312**		**$636**	

The summary list above includes a number of recommended energy conservation measures for your facility. This list may include overlapping conservation measures. For example, replacement of a boiler with a high efficiency boiler would negate the savings of replacing the burner in the current boiler.

The summary list indicates that if all measures are implemented the total kWh savings is 3,387 which equals 15% of the current annual kWh usage of 22,969 kWh, and 312 therms which equals 21% of the current annual therm usage of 1,453 therms.

Be aware that the total savings and percentage of savings is an estimate based on average savings for specific measures which may require adjustments based on possible overlapping conservation measures.

UTILITY BILLING HISTORY

Electricity

Billing Month	Account Number	kW	kWh	Total Amount	$/kWh
16-Dec-2009			1,942	$235	$0.121
16-Nov-2009			1,699	$205	$0.121
16-Oct-2009			1,877	$226	$0.120
16-Sep-2009			1,894	$228	$0.120
17-Aug-2009			2,230	$268	$0.120
17-Jul-2009			2,494	$299	$0.120
16-Jun-2009			1,810	$218	$0.121
15-May-2009			1,639	$198	$0.121
16-Apr-2009			1,809	$218	$0.120
17-Mar-2009			1,782	$215	$0.120
16-Feb-2009			1,804	$218	$0.121
16-Jan-2009			1,989	$237	$0.119
TOTAL			22,969	$2,763	

Average Electricity Rate: $0.120

Natural Gas

Billing Month	Account Number	Therm	Total Amount	$/therm
16-Dec-2009		212	$195	$0.92
16-Nov-2009		105	$92	$0.87
16-Oct-2009		66	$50	$0.76
16-Sep-2009		33	$28	$0.84
17-Aug-2009		36	$31	$0.86
17-Jul-2009		35	$32	$0.92
16-Jun-2009		53	$43	$0.81
15-May-2009		60	$49	$0.81
16-Apr-2009		147	$135	$0.92
17-Mar-2009		201	$207	$1.03
16-Feb-2009		248	$274	$1.10
16-Jan-2009		257	$288	$1.12
TOTAL		1,453	$1,423	

Average Gas Rate: $0.98

1. Lighting - Compact Fluorescent Lamps Replacement

Replace incandescent lamps with self ballasted screw in CFL (Compact Fluorescent Lamps): Self ballasted compact fluorescent lamps use up to 75% less electric energy than incandescent lamps with comparable light output ratings. A variety of models, sizes, shapes, wattages and capabilities are available for direct replacement of incandescent lamps. Compact fluorescent lamps last up to 10 times longer than a standard life incandescent lamp. Other CFL options include multi-level and dimmable models and some cold cathode (instant on) models. CFLs generally require some time to reach full light output levels, contain small amounts of mercury and require responsible disposal. CFLs also generate up to 75% less heat than the equivalent light output incandescent lamp.

EXISTING CONDITIONS		RECOMMENDATION SAVINGS POTENTIAL	
Location		**Location**	
End Use	Lighting	Electric Energy Savings (kWh/yr)	2,200
Type	Incandescent	Gas Energy Savings (therm/yr)	
Recommendation:		Electric Cost Savings ($/yr)	$242
Compact Fluorescent Lamps Replacement		Gas Cost Savings ($/yr)	
% ECM Opportunity	100	Total Cost Savings ($/yr)	$242
% savings electric	60.00000	Payback (yrs)	1-2
% savings gas	0.00000	Electric GHG Savings (tons/yr)	2
Priority		Gas GHG Savings (tons/yr)	
Priority Rationale:			
	Low Cost/No Cost		
Grants Available?	Yes		

2. Lighting - LED Exit Lighting

Retrofit existing exit lighting with LED units. Exit signs that contain conventional light bulbs should be retrofitted with LED ("light emitting diode") bulbs. LEDs will last approximately 30 years and use a fraction of the energy (1 or 2 watts) of conventional exit signs. Exit signs must remain illuminated 24 hours a day, 365 days a year, so this step will result in substantial long-term energy savings. Maintenance costs will also be reduced because bulb changes will dramatically reduced. A typical LED exit light retrofit will pay for itself within 4 years.

EXISTING CONDITIONS		RECOMMENDATION SAVINGS POTENTIAL	
Location		**Location**	
End Use	Lighting	Electric Energy Savings (kWh/yr)	87
Type	Exit	Gas Energy Savings (therm/yr)	
Recommendation:		Electric Cost Savings ($/yr)	$10
LED Exit Lighting		Gas Cost Savings ($/yr)	
% ECM Opportunity	100	Total Cost Savings ($/yr)	$10
% savings electric	95.00000	Payback (yrs)	1-5
% savings gas	0.00000	Electric GHG Savings (tons/yr)	
Priority	High	Gas GHG Savings (tons/yr)	
Priority Rationale:			
	Low Cost/No Cost		
Grants Available?	No		

3. HVAC - Insulation - Attic

Insulate building attics with additional insulation. Attics often lack proper insulation levels and it is easy to add more. Adding insulation is an inexpensive way to increase a building's energy efficiency and save energy dollars. Depending on the building type, local codes, and location, insulation contractors can add rolls or batts of insulation or they can use machines to blow-in loose insulation.

EXISTING CONDITIONS		RECOMMENDATION SAVINGS POTENTIAL	
Location		**Location**	
End Use	HVAC	Electric Energy Savings (kWh/yr)	1,100
Type	Building Shell	Gas Energy Savings (therm/yr)	250
Recommendation:		Electric Cost Savings ($/yr)	$121
Insulation - Attic		Gas Cost Savings ($/yr)	$211
% ECM Opportunity	100	Total Cost Savings ($/yr)	$332
% savings electric	10.00000	Payback (yrs)	10-20
% savings gas	20.00000	Electric GHG Savings (tons/yr)	1
Priority	High	Gas GHG Savings (tons/yr)	1
Priority Rationale:			
	Acceptable Payback Period		
Grants Available?	Yes		

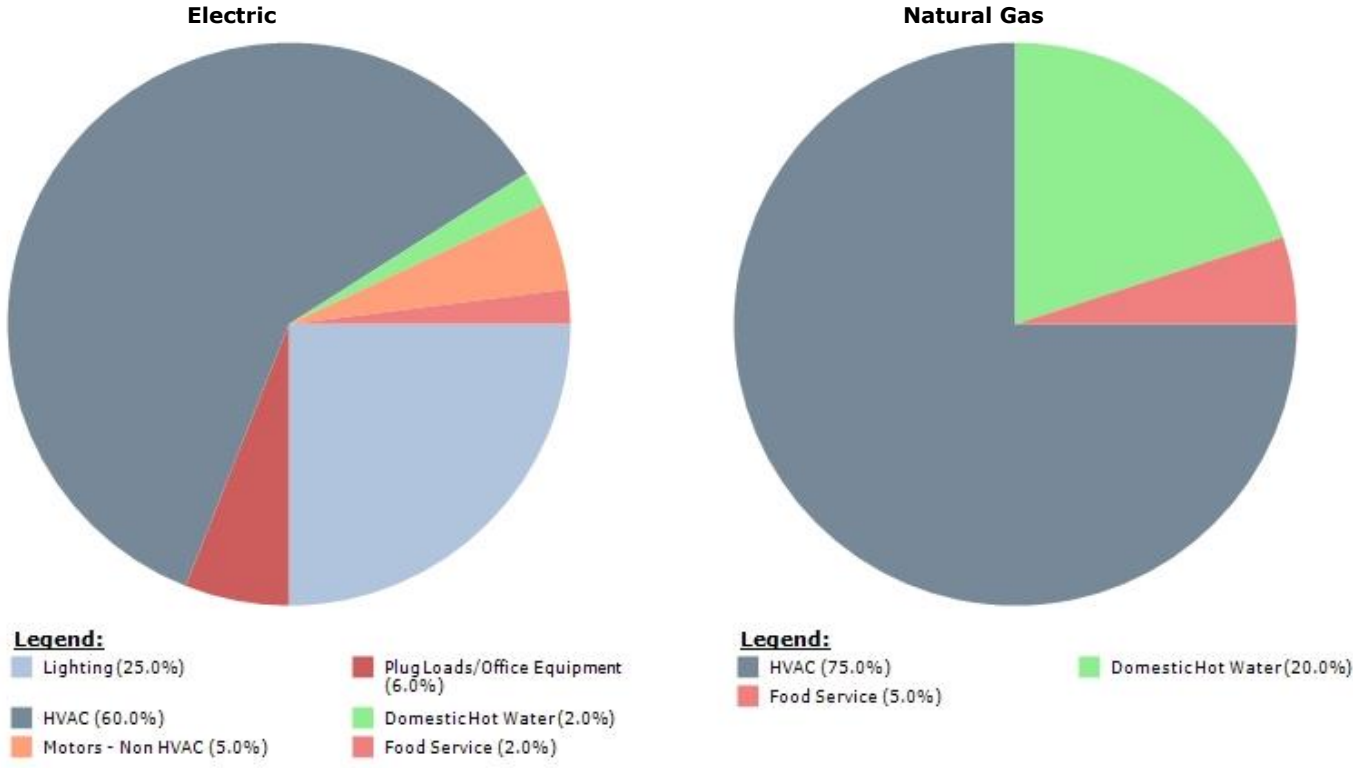
4. HVAC – Install storm windows

There are currently no storm windows. Purchase storm windows to give an extra layer of glass in the winter to minimize heat loss.

EXISTING CONDITIONS		RECOMMENDATION SAVINGS POTENTIAL	
Location		**Location**	
End Use	HVAC	Electric Energy Savings (kWh/yr)	
Type	Building Shell	Gas Energy Savings (therm/yr)	62
Recommendation:		Electric Cost Savings ($/yr)	
Window Replacement - High Efficiency Units		Gas Cost Savings ($/yr)	$52
% ECM Opportunity	100	Total Cost Savings ($/yr)	$52
% savings electric	0.00000	Payback (yrs)	10-30
% savings gas	5.0000	Electric GHG Savings (tons/yr)	
Priority	Medium	Gas GHG Savings (tons/yr)	
Priority Rationale:			
	Efficiency Upgrade		
Grants Available?	No		

Health Care Center

Typical End Use Profile



Typical Facility Annual Energy Usage

	Electric %	Natural Gas %	Electric kWh	Natural Gas Therms	Electric Cost	Natural Gas Cost
Lighting	25.0%	0.0%	211,140	0	$15,836	$0
Plug Loads/Office Equipment	6.0%	0.0%	50,674	0	$3,801	$0
HVAC	60.0%	75.0%	506,736	51,959	$38,005	$35,332
Domestic Hot Water	2.0%	20.0%	16,891	13,856	$1,267	$9,422
Motors - Non HVAC	5.0%	0.0%	42,228	0	$3,167	$0
Food Service	2.0%	5.0%	16,891	3,464	$1,267	$2,355
Office Equipment	0.0%	0.0%	0	0	$0	$0
Total	100.0%	100.0%	844,560	69,278	$63,342	$47,109

Your facility uses 10.29 kWh/sq. ft./yr and 0.84 therms/sq. ft./yr and 119.52 kBtu/sq. ft./yr

Energy Conservation Opportunities
Estimated Savings Summary

Opportunity Description	Electric Energy (kWh/yr)	Fuel Energy (therms/yr)	Payback (yrs)	Cost savings	Priority
1.0 Lighting - Reconfigure Lighting Layout for Efficiency and Improvement	23,000			$1,725	High
2.0 Food Service - Refrigeration Sealing Maintenance Service	2,000			$150	High
3.0 Domestic Hot Water - Booster Water Heater Fuel Conversion	1,700			$128	High
4.0 Domestic Hot Water - Water Temperature Reduction on Water Heater		420	1-2	$286	High
5.0 Plug Loads/Office Equipment - Vending Machine - Install Vending Miser or Disconnect Lamps and Ballasts	1,000		1-2	$75	High
6.0 Domestic Hot Water - Low Flow Faucet Aerators Installation		2,800	1-5	$1,904	High
7.0 Food Service - Kitchen Exhaust Hood Demand Control Ventilation		1,600	1-5	$1,088	High
8.0 Lighting - Low Wattage Fluorescent Replacement of T-8 Lamps	46,000		3-5	$3,450	High
9.0 Food Service - Refrigeration System Maintenance	1,400		3-10	$105	High
10.0 HVAC - Burner Replacement-High Efficiency		1,600	5-7	$1,088	High
11.0 Food Service - Oven, Convection, Gas, High Efficiency		69	5-10	$47	Medium
12.0 Food Service - Steamer, Gas ENERGY STAR		69	5-10	$47	Medium
13.0 HVAC - Boiler - Steam to Hot Water Conversion		16,000	10-15	$10,880	Medium
TOTALS	**75,100**	**22,558**		**$20,972**	

The summary list above includes a number of recommended energy conservation measures for your facility. This list may include overlapping conservation measures. For example, replacement of a boiler with a high efficiency boiler would negate the savings of replacing the burner in the current boiler.

The summary list indicates that if all measures are implemented the total kWh savings is 75,100 which equals 9% of the current annual kWh usage of 844,560 kWh, and 22,558 therms which equals 33% of the current annual therm usage of 69,278 therms.

Be aware that the total savings and percentage of savings is an estimate based on average savings for specific measures which may require adjustments based on possible overlapping conservation measures.

UTILITY BILLING HISTORY

Electricity

Billing Month	Account Number	kW	kWh	Total Amount	$/kWh
28-Sep-2010			86,520	$7,172	$0.083
27-Aug-2010			86,160	$6,903	$0.080
29-Jul-2010			84,480	$6,717	$0.080
29-Jun-2010			70,200	$5,326	$0.076
28-May-2010			64,920	$3,813	$0.059
29-Apr-2010			63,000	$4,532	$0.072
26-Feb-2010			56,760	$4,281	$0.075
28-Jan-2010			57,360	$4,274	$0.075
30-Dec-2009			61,440	$4,454	$0.073
30-Nov-2009			71,880	$5,118	$0.071
28-Oct-2009			65,520	$4,849	$0.074
28-Sep-2009			76,320	$6,245	$0.082
TOTAL			844,560	$63,686	

Average Electricity Rate: $0.075

Natural Gas

Billing Month	Account Number	Therm	Total Amount	$/therm
28-Sep-2010		4,294	$2,391	$0.56
27-Aug-2010		1,623	$1,071	$0.66
29-Jul-2010		1,642	$1,116	$0.68
29-Jun-2010		1,909	$1,136	$0.59
28-May-2010		4,695	$3,021	$0.64
29-Apr-2010		6,689	$4,731	$0.71
26-Feb-2010		10,447	$8,091	$0.77
28-Jan-2010		10,405	$8,112	$0.78
30-Dec-2009		10,039	$6,966	$0.69
30-Nov-2009		8,095	$5,644	$0.70
28-Oct-2009		7,337	$3,852	$0.53
28-Sep-2009		2,103	$973	$0.46
TOTAL		69,278	$47,104	

Average Gas Rate: $0.68

1. Lighting - Reconfigure Lighting Layout for Efficiency and Improvement

There may be too much light in one area but not enough light in another as a result of installing new lighting equipment and repurposing spaces. Relocate fixtures from overlit areas to underlit areas instead of adding new light fixtures to correct underlit conditions. This will improve lighting system effectiveness and save the energy that would have been used by the new fixture. Hire a lighting design professional to develop an optimal lighting design that combines high efficiency with longevity.

EXISTING CONDITIONS		RECOMMENDATION SAVINGS POTENTIAL	
Location		**Location**	
Most areas other than wing hallways and guest rooms.		Most areas other than wing hallways and guest rooms.	
End Use	Lighting	Electric Energy Savings (kWh/yr)	23,000
Type	Fluorescent	Gas Energy Savings (therm/yr)	
Recommendation:		Electric Cost Savings ($/yr)	$1,725
Reconfigure Lighting Layout for Efficiency and Improvement		Gas Cost Savings ($/yr)	
% ECM Opportunity	100	Total Cost Savings ($/yr)	$1,725
% savings electric	15.00000	Payback (yrs)	
% savings gas	0.00000	Electric GHG Savings (tons/yr)	19
Priority	High	Gas GHG Savings (tons/yr)	
Priority Rationale:			
	Acceptable Payback Period		
Grants Available?	Yes		

2. Food Service - Refrigeration Sealing Maintenance Service

Inspecting and treating leaking seals in the refrigeration system will reduce operating times and operating duty. Less energy will be consumed to maintain set temperatures and equipment will last longer. The doors are not sealing well at all.

EXISTING CONDITIONS		RECOMMENDATION SAVINGS POTENTIAL	
Location		**Location**	
Kitchen		Kitchen	
End Use	Food Service	Electric Energy Savings (kWh/yr)	2,000
Type		Gas Energy Savings (therm/yr)	
Recommendation:		Electric Cost Savings ($/yr)	$150
Refrigeration Sealing Maintenance Service		Gas Cost Savings ($/yr)	
% ECM Opportunity	100	Total Cost Savings ($/yr)	$150
% savings electric	12.0000	Payback (yrs)	
% savings gas	0.00000	Electric GHG Savings (tons/yr)	2
Priority	High	Gas GHG Savings (tons/yr)	
Priority Rationale:			
	Acceptable Payback Period		
Grants Available?	No		

3. Domestic Hot Water - Booster Water Heater Fuel Conversion

Replace electric booster heater with gas unit. Electric booster heaters are more expensive to operate than natural gas-powered units. They produce less heat for each energy dollar spent as well as contribute to the electric demand charges assessed each month. When possible, convert these water heaters to high efficiency natural gas units.

EXISTING CONDITIONS		RECOMMENDATION SAVINGS POTENTIAL	
Location		**Location**	
Kitchen		Kitchen	
End Use	Domestic Hot Water	Electric Energy Savings (kWh/yr)	1,700
Type		Gas Energy Savings (therm/yr)	
Recommendation:		Electric Cost Savings ($/yr)	$128
Booster Water Heater Fuel Conversion		Gas Cost Savings ($/yr)	
% ECM Opportunity	100	Total Cost Savings ($/yr)	$128
% savings electric	10.00000	Payback (yrs)	
% savings gas	0.00000	Electric GHG Savings (tons/yr)	1
Priority	High	Gas GHG Savings (tons/yr)	
Priority Rationale:			
	Acceptable Payback Period		
Grants Available?	Yes		

4. Domestic Hot Water - Water Temperature Reduction on Water Heater

Reduce domestic hot water temperature. The water heaters are set at 164 degrees. Reducing hot water temperature is an easy way to reduce energy costs for most non-food service businesses. Tests should be conducted to measure hot water temperature and if water temperatures measure 120 degrees or higher, reduce the temperature.

EXISTING CONDITIONS		RECOMMENDATION SAVINGS POTENTIAL	
Location		**Location**	
Water heaters		Water heaters	
End Use	Domestic Hot Water	Electric Energy Savings (kWh/yr)	
Type		Gas Energy Savings (therm/yr)	420
Recommendation:		Electric Cost Savings ($/yr)	
Water Temperature Reduction on Water Heater		Gas Cost Savings ($/yr)	$286
% ECM Opportunity	100	Total Cost Savings ($/yr)	$286
% savings electric	0.00000	Payback (yrs)	1-2
% savings gas	3.0000	Electric GHG Savings (tons/yr)	
Priority	High	Gas GHG Savings (tons/yr)	2
Priority Rationale:			
	Low Cost/No Cost		
Grants Available?	No		

5. Plug Loads/Office Equipment - Vending Machine - Install Vending Miser or Disconnect Lamps and Ballasts

Disconnect the lamps and ballasts in the soda machine. Vending machines are costly to operate because they require refrigeration as well as lighting. In fact, machines with lighted displays typically operate 24 hours a day, 365 days a year. The lighting alone can cost about $40.00 per year per machine. One way to reduce lighting costs is to disconnect the lights and ballasts in the display and put a note on the machine that says it is still operational. Another option is to install a device called a vending miser. The vending miser uses an occupancy sensor to determine if the area around the soda machine is in use. If there is no activity in the vicinity of the machine, the machine is powered down periodically.

EXISTING CONDITIONS		RECOMMENDATION SAVINGS POTENTIAL	
Location		**Location**	
Basement		Basement	
End Use	Plug Loads/Office Equipment	Electric Energy Savings (kWh/yr)	1,000
Type		Gas Energy Savings (therm/yr)	
Recommendation:		Electric Cost Savings ($/yr)	$75
Vending Machine - Install Vending Miser or Disconnect Lamps and Ballasts		Gas Cost Savings ($/yr)	
% ECM Opportunity	100	Total Cost Savings ($/yr)	$75
% savings electric	2.00000	Payback (yrs)	1-2
% savings gas	0.00000	Electric GHG Savings (tons/yr)	1
Priority	High	Gas GHG Savings (tons/yr)	
Priority Rationale:			
	Low Cost/No Cost		
Grants Available?	No		

6. Replace the old dishwasher with a high efficiency new model.

New dishwashers use far less water per cycle. This reduces the amount of water that needs to be heated to 180 degrees for the rinse cycle. This facility provides 3 meals per day 365 days per year. The savings will be dramatic.

EXISTING CONDITIONS		RECOMMENDATION SAVINGS POTENTIAL	
Location		**Location**	
Replace the old dishwasher with a high efficiency new model.		Replace the old dishwasher with a high efficiency new model.	
End Use	Domestic Hot Water	Electric Energy Savings (kWh/yr)	
Type		Gas Energy Savings (therm/yr)	2,800
Recommendation:		Electric Cost Savings ($/yr)	
Low Flow Faucet Aerators Installation		Gas Cost Savings ($/yr)	$1,904
% ECM Opportunity	100	Total Cost Savings ($/yr)	$1,904
% savings electric	0.00000	Payback (yrs)	1-5
% savings gas	20.0000	Electric GHG Savings (tons/yr)	
Priority	High	Gas GHG Savings (tons/yr)	16
Priority Rationale:			
	Acceptable Payback Period		
Grants Available?	Yes		

7. Food Service - Kitchen Exhaust Hood Demand Control Ventilation

Install and calibrate exhaust speed controls on kitchen fans to match cooking times and demand. Kitchen exhaust fans draw conditioned air out of facilities and necessitate additional outside air intake. Kitchen exhaust controls reduce unnecessary run time and capacity. If kitchen exhaust controls are unfeasible, consider reducing your exhaust fan speed or implementing a manual schedule.

EXISTING CONDITIONS		RECOMMENDATION SAVINGS POTENTIAL	
Location		**Location**	
Kitchen		Kitchen	
End Use	Food Service	Electric Energy Savings (kWh/yr)	
Type		Gas Energy Savings (therm/yr)	1,600
Recommendation:		Electric Cost Savings ($/yr)	
Kitchen Exhaust Hood Demand Control Ventilation		Gas Cost Savings ($/yr)	$1,088
% ECM Opportunity	100	Total Cost Savings ($/yr)	$1,088
% savings electric	0.00000	Payback (yrs)	1-5
% savings gas	45.00000	Electric GHG Savings (tons/yr)	
Priority	High	Gas GHG Savings (tons/yr)	9
Priority Rationale:			
	Acceptable Payback Period		
Grants Available?	Yes		

8. Lighting - Low Wattage Fluorescent Replacement of T-8 Lamps

Realize a 25%-40% lighting energy reduction by replacing 32 Watt T-8 lamps and ballasts with 25 or 28 Watt fluorescent lamps and high efficiency ballasts. Low wattage lighting systems are an excellent option for spaces which are overlit and removing entire fixtures is not possible.

EXISTING CONDITIONS		RECOMMENDATION SAVINGS POTENTIAL	
Location		**Location**	
All areas other than wing halls and guest rooms.		All areas other than wing halls and guest rooms.	
End Use	Lighting	Electric Energy Savings (kWh/yr)	46,000
Type	Fluorescent	Gas Energy Savings (therm/yr)	
Recommendation:		Electric Cost Savings ($/yr)	$3,450
Low Wattage Fluorescent Replacement of T-8 Lamps		Gas Cost Savings ($/yr)	
% ECM Opportunity	100	Total Cost Savings ($/yr)	$3,450
% savings electric	30.00000	Payback (yrs)	3-5
% savings gas	0.00000	Electric GHG Savings (tons/yr)	39
Priority	High	Gas GHG Savings (tons/yr)	
Priority Rationale:			
	Acceptable Payback Period		
Grants Available?	Yes		

9. Food Service - Refrigeration System Maintenance

Replace the evaporator motors on the walk-in cooler and freezer with ECM type motors.

EXISTING CONDITIONS		RECOMMENDATION SAVINGS POTENTIAL	
Location		**Location**	
Walk-in Cooler and Freezer evaporator motors need to be replaced with ECM type motors.		Walk-in Cooler and Freezer evaporator motors need to be replaced with ECM type motors.	
End Use	Food Service	Electric Energy Savings (kWh/yr)	1,400
Type		Gas Energy Savings (therm/yr)	
Recommendation:		Electric Cost Savings ($/yr)	$105
Refrigeration System Maintenance		Gas Cost Savings ($/yr)	
% ECM Opportunity	100	Total Cost Savings ($/yr)	$105
% savings electric	8.50000	Payback (yrs)	3-10
% savings gas	0.00000	Electric GHG Savings (tons/yr)	1
Priority	High	Gas GHG Savings (tons/yr)	
Priority Rationale:			
	Acceptable Payback Period		
Grants Available?	Yes		

10. HVAC - Burner Replacement- High Efficiency

Install new burners on the current boilers. New, high efficiency burners can be installed in existing boiler systems to improve combustion efficiencies. These high efficiency burners mix the air and fuel more effectively and allow for better fuel utilization. Additionally, new burners with a large turndown ratio can increase a boiler system's efficiency over a range of operating conditions.

EXISTING CONDITIONS		RECOMMENDATION SAVINGS POTENTIAL	
Location		**Location**	
Central boiler plant		Central boiler plant	
End Use	HVAC	Electric Energy Savings (kWh/yr)	
Type	Boilers, Burners, and Furnaces	Gas Energy Savings (therm/yr)	1,600
Recommendation:		Electric Cost Savings ($/yr)	
Burner Replacement- High Efficiency		Gas Cost Savings ($/yr)	$1,088
% ECM Opportunity	100	Total Cost Savings ($/yr)	$1,088
% savings electric	0.00000	Payback (yrs)	5-7
% savings gas	3.00000	Electric GHG Savings (tons/yr)	
Priority	High	Gas GHG Savings (tons/yr)	9
Priority Rationale:			
	Acceptable Payback Period		
Grants Available?	Yes		

11. Food Service - Oven, Convection, Gas, High Efficiency

Replace your existing gas convection oven with a high efficiency unit to reduce your natural gas consumption and decrease kitchen temperatures without affecting food preparation. Look for a commercial gas-fueled convection oven with a heavy load cooking energy efficiency greater than or equal to 40% using the ASTM F1496 test method.

EXISTING CONDITIONS		RECOMMENDATION SAVINGS POTENTIAL	
Location		**Location**	
Kitchen		Kitchen	
End Use	Food Service	Electric Energy Savings (kWh/yr)	
Type		Gas Energy Savings (therm/yr)	69
Recommendation:		Electric Cost Savings ($/yr)	
Oven, Convection, Gas, High Efficiency		Gas Cost Savings ($/yr)	$47
% ECM Opportunity	100	Total Cost Savings ($/yr)	$47
% savings electric	0.00000	Payback (yrs)	5-10
% savings gas	2.00000	Electric GHG Savings (tons/yr)	
Priority	Medium	Gas GHG Savings (tons/yr)	
Priority Rationale:			
	Acceptable Payback Period		
Grants Available?	Yes		

12. Food Service - Steamer, Gas ENERGY STAR

Replace your existing gas steamer with a high efficiency unit to reduce your natural gas consumption and decrease kitchen temperatures without affecting food preparation. Look for a commercial gas-fueled 6 pan pressureless steamer with a heavy load cooking energy efficiency greater than or equal to 38% using ASTM F1484 test method.

EXISTING CONDITIONS		RECOMMENDATION SAVINGS POTENTIAL	
Location		**Location**	
Kitchen		Kitchen	
End Use	Food Service	Electric Energy Savings (kWh/yr)	
Type		Gas Energy Savings (therm/yr)	69
Recommendation:		Electric Cost Savings ($/yr)	
Steamer, Gas ENERGY STAR		Gas Cost Savings ($/yr)	$47
% ECM Opportunity	100	Total Cost Savings ($/yr)	$47
% savings electric	0.00000	Payback (yrs)	5-10
% savings gas	2.00000	Electric GHG Savings (tons/yr)	
Priority	Medium	Gas GHG Savings (tons/yr)	
Priority Rationale:			
	Acceptable Payback Period		
Grants Available?	Yes		

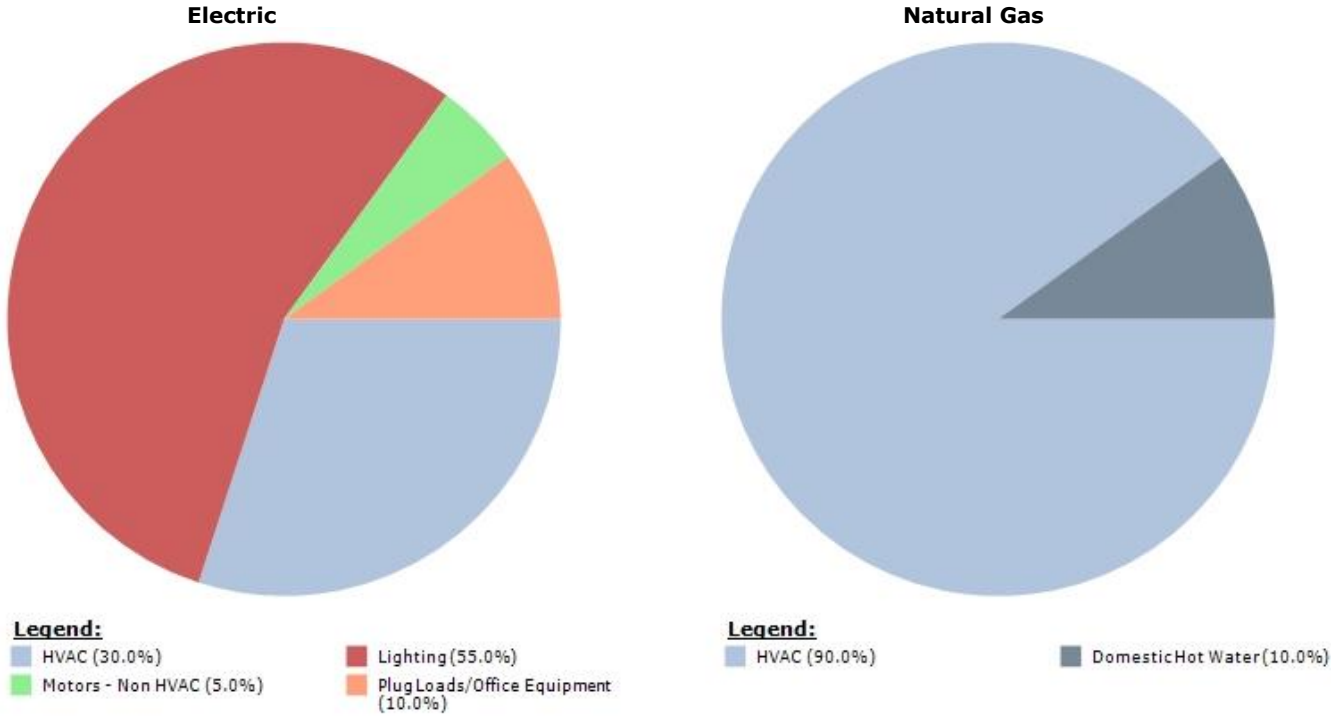
13. HVAC - Boiler - Steam to Hot Water Conversion

Convert the boiler system to hot water. Hot water boilers are more energy efficient (and have higher AFUE ratings) than steam systems. However, they are costly to replace. So, the most cost-effective time to make this steam-to-hot water conversion is when it is time to replace a steam system's main boiler. A new hot water boiler and connecting piping will cost less than a steam boiler and its piping. These cost savings will balance with the added cost to adapt the system to hot water and probable changes to condensate return piping. Hot water systems offer greater control: they can adjust the water temperature based on the outside air temperature (in steam systems, the heat output is constant whether the outside temperature is 40 degrees or 10 below zero).

EXISTING CONDITIONS		RECOMMENDATION SAVINGS POTENTIAL	
Location		**Location**	
Central Boiler Plant		Central Boiler Plant	
End Use	HVAC	Electric Energy Savings (kWh/yr)	
Type	Boilers, Burners, and Furnaces	Gas Energy Savings (therm/yr)	16,000
Recommendation:		Electric Cost Savings ($/yr)	
Boiler - Steam to Hot Water Conversion		Gas Cost Savings ($/yr)	$10,880
% ECM Opportunity	100	Total Cost Savings ($/yr)	$10,880
% savings electric	0.00000	Payback (yrs)	10-15
% savings gas	30.00000	Electric GHG Savings (tons/yr)	
Priority	Medium	Gas GHG Savings (tons/yr)	94
Priority Rationale:			
	Efficiency Upgrade		
Grants Available?	Yes		

Public Library

Typical End Use Profile



Typical Facility Annual Energy Usage

	Electric %	Natural Gas %	Electric kWh	Natural Gas Therms	Electric Cost	Natural Gas Cost
HVAC	30.0%	90.0%	163,680	17,333	$14,076	$13,433
Lighting	55.0%	0.0%	300,080	0	$25,807	$0
Domestic Hot Water	0.0%	10.0%	0	1,926	$0	$1,493
Motors - Non HVAC	5.0%	0.0%	27,280	0	$2,346	$0
Plug Loads/Office Equipment	10.0%	0.0%	54,560	0	$4,692	$0
Office Equipment	0.0%	0.0%	0	0	$0	$0
Total	100.0%	100.0%	545,600	19,259	$46,922	$14,926

Your facility uses 25.53 kWh/sq. ft./yr and 0.90 therms/sq. ft./yr and 177.22 kBtu/sq. ft./yr

Energy Conservation Opportunities
Estimated Savings Summary

Opportunity Description	Electric Energy (kWh/yr)	Fuel Energy (therms/yr)	Payback (yrs)	Cost savings	Priority
1.0 Lighting - Custom Fluorescent Recommendation	33,000			$2,838	High
2.0 HVAC - Variable Speed Drive for Boiler Hot Water Distribution Pump	8,200			$705	High
3.0 HVAC - Economizer Controls/Free Cooling	16,000		1-5	$1,376	High
4.0 HVAC - Variable Frequency Drive	9,800		1-5	$843	High
5.0 HVAC - Chiller System - Replace with High Efficiency Unit	36,000		5-10	$3,096	Medium
6.0 HVAC - Boiler - Steam to Hot Water Conversion		5,200	10-15	$4,030	Medium
7.0 HVAC - Insulation - Roof	8,200	350	10-20	$976	Low
TOTALS	**111,200**	**5,550**		**$13,864**	

The summary list above includes a number of recommended energy conservation measures for your facility. This list may include overlapping conservation measures. For example, replacement of a boiler with a high efficiency boiler would negate the savings of replacing the burner in the current boiler.

The summary list indicates that if all measures are implemented the total kWh savings is 111,200 which equals 20% of the current annual kWh usage of 545,600 kWh, and 5,550 therms which equals 29% of the current annual therm usage of 19,259 therms.

Be aware that the total savings and percentage of savings is an estimate based on average savings for specific measures which may require adjustments based on possible overlapping conservation measures.

UTILITY BILLING HISTORY

Electricity

Billing Month	Account Number	kW	kWh	Total Amount	$/kWh
18-Aug-2010			64,320	$5,787	$0.090
20-Jul-2010			66,240	$5,697	$0.086
21-Jun-2010			53,840	$4,663	$0.087
19-May-2010			43,280	$3,565	$0.082
20-Apr-2010			41,920	$3,174	$0.076
19-Mar-2010			38,080	$3,308	$0.087
17-Feb-2010			33,680	$2,711	$0.080
19-Jan-2010			35,360	$2,706	$0.077
17-Dec-2009			34,640	$3,039	$0.088
17-Nov-2009			39,440	$3,378	$0.086
20-Oct-2009			44,560	$3,855	$0.087
17-Sep-2009			50,240	$4,965	$0.099
TOTAL			545,600	$46,847	

Average Electricity Rate: $0.086

Natural Gas

Billing Month	Account Number	Therm	Total Amount	$/therm
18-Aug-2010		0	$91	$0.00
20-Jul-2010		0	$100	$0.00
21-Jun-2010		17	$103	$6.08
19-May-2010		1,147	$831	$0.72
20-Apr-2010		963	$800	$0.83
19-Mar-2010		2,262	$1,854	$0.82
17-Feb-2010		4,417	$3,491	$0.79
19-Jan-2010		5,078	$3,835	$0.76
17-Dec-2009		3,107	$2,252	$0.72
17-Nov-2009		1,367	$945	$0.69
20-Oct-2009		900	$525	$0.58
17-Sep-2009		0	$94	$0.00
TOTAL		19,259	$14,920	

Average Gas Rate: $0.77

1. Lighting – Retrofit all 3 lamp fluorescent light fixtures in offices and Children's Area

Retrofit all the three lamp fluorescent light fixtures in the offices and Children's Area to two lamps utilizing 25 watt 5000K lamps and low ballast factor (<=0.78) ballasts. Replace the parabolic lenses with prismatic lenses to let more light out to the sides.

EXISTING CONDITIONS		RECOMMENDATION SAVINGS POTENTIAL	
Location		**Location**	
Childrens Section and offices.		Childrens Section and offices.	
End Use	Lighting	Electric Energy Savings (kWh/yr)	33,000
Type	Fluorescent	Gas Energy Savings (therm/yr)	
Recommendation:		Electric Cost Savings ($/yr)	$2,838
Custom Fluorescent Recommendation		Gas Cost Savings ($/yr)	
% ECM Opportunity	100	Total Cost Savings ($/yr)	$2,838
% savings electric	15.00000	Payback (yrs)	
% savings gas	0.00000	Electric GHG Savings (tons/yr)	28
Priority	High	Gas GHG Savings (tons/yr)	
Priority Rationale:			
	Acceptable Payback Period		
Grants Available?	Yes		

2. HVAC - Variable Speed Drive for Boiler Hot Water Distribution Pump

Install a variable frequency on your two – 3 HP hot water distribution pumps. The balancing valves were set at 50% open which makes this a very good candidate for variable-frequency drives. Variable-frequency drives (VFDs) control the rotational speed of an alternating current (AC) electric motor by controlling the frequency of the electrical power supply to the motor. VFDs offer many benefits to your electric motors, including:

* Reduced operating costs - VFDs offer greater control over the speed of AC motors, enabling the removal of throttling devices, valves and dampers, all of which can waste energy.

* Increased reliability - by regulating speed, VFDs prolong the life and reduce the maintenance costs of motors, driven equipment and switch gears.

* Increased productivity - VFDs give users a finer degree of control, resulting in more precise process operations and improved product quality.

EXISTING CONDITIONS		RECOMMENDATION SAVINGS POTENTIAL	
Location		**Location**	
Boiler Room		Boiler Room	
End Use	HVAC	Electric Energy Savings (kWh/yr)	8,200
Type	Boilers, Burners, and Furnaces	Gas Energy Savings (therm/yr)	
Recommendation:		Electric Cost Savings ($/yr)	$705
Variable Speed Drive for Boiler Hot Water Distribution Pump		Gas Cost Savings ($/yr)	
% ECM Opportunity	100	Total Cost Savings ($/yr)	$705
% savings electric	5.00000	Payback (yrs)	
% savings gas	0.00000	Electric GHG Savings (tons/yr)	7
Priority	High	Gas GHG Savings (tons/yr)	
Priority Rationale:			
	Acceptable Payback Period		
Grants Available?	Yes		

3. HVAC - Economizer Controls/Free Cooling

The electrical usage on this building is extremely high. Research the features of each air handling unit to see if an economizer feature exists on the air handling units. If it does, verify it functions properly and install enthalpy controls if that does not currently exist. If no economizers exist install an automatic air-conditioning economizer. An air conditioning economizer can take advantage of cool outside air (such as during evening hours or cool days) and use this "free" air for cooling. During the air-conditioning season, the heat generated by internal loads such as people, lighting, and electronic equipment will build up in a building. It can be warmer inside than outdoors. Instead of relying on mechanical cooling, an economizer will allow the cooler outside air to enter the building through the outside air intakes and be distributed through the ductwork. The outside air is then tempered with the inside air to allow the temperature to reach the desired level.

EXISTING CONDITIONS		RECOMMENDATION SAVINGS POTENTIAL	
Location		**Location**	
End Use	HVAC	Electric Energy Savings (kWh/yr)	16,000
Type	Controls	Gas Energy Savings (therm/yr)	
Recommendation:		Electric Cost Savings ($/yr)	$1,376
Economizer Controls/Free Cooling		Gas Cost Savings ($/yr)	
% ECM Opportunity	100	Total Cost Savings ($/yr)	$1,376
% savings electric	10.00000	Payback (yrs)	1-5
% savings gas	0.00000	Electric GHG Savings (tons/yr)	13
Priority	High	Gas GHG Savings (tons/yr)	
Priority Rationale:			
	Acceptable Payback Period		
Grants Available?	Yes		

4. HVAC – Install a Variable Frequency Drive on the basement AHU

Install a variable frequency drive on the fan motor of the basement air handling unit. Variable-frequency drives (VFDs) control the rotational speed of an alternating current (AC) electric motor by controlling the frequency of the electrical power supply to the motor. VFDs offer many benefits to your electric motors, including:

* Reduced operating costs - VFDs offer greater control over the speed of AC motors, enabling the removal of throttling devices, valves and dampers, all of which can waste energy.

* Increased reliability - by regulating speed, VFDs prolong the life and reduce the maintenance costs of motors, driven equipment and switch gears.

* Increased productivity - VFDs give users a finer degree of control, resulting in more precise process operations and improved product quality.

EXISTING CONDITIONS		RECOMMENDATION SAVINGS POTENTIAL	
Location		**Location**	
End Use	HVAC	Electric Energy Savings (kWh/yr)	9,800
Type	Motor	Gas Energy Savings (therm/yr)	
Recommendation:		Electric Cost Savings ($/yr)	$843
Variable Frequency Drive		Gas Cost Savings ($/yr)	
% ECM Opportunity	100	Total Cost Savings ($/yr)	$843
% savings electric	6.00000	Payback (yrs)	1-5
% savings gas	0.00000	Electric GHG Savings (tons/yr)	8
Priority	High	Gas GHG Savings (tons/yr)	
Priority Rationale:			
	Acceptable Payback Period		
Grants Available?	Yes		

5. HVAC - Chiller System - Replace with High Efficiency Unit

Replace the current chiller system with a new high efficiency unit. Older chiller units are much less efficient than new units. It is worth studying the costs/benefits of replacing these older pieces of equipment before the end of their natural lives. Replacement will reduce long-term energy costs, increase operating efficiencies, and reduce maintenance costs. Importantly, a new high efficiency chiller can be specified to ensure that maximum heating demand is always met.

For more information refer to the Energy Star Web Site, the Heating & Cooling section of the Building Upgrade Manual (http://www.energystar.gov/ia/business/Heating.pdf), pages 4 through 9.

EXISTING CONDITIONS		RECOMMENDATION SAVINGS POTENTIAL	
Location		**Location**	
Roof		Roof	
End Use	HVAC	Electric Energy Savings (kWh/yr)	36,000
Type	Air Conditioning	Gas Energy Savings (therm/yr)	
Recommendation:		Electric Cost Savings ($/yr)	$3,096
Chiller System - Replace with High Efficiency Unit		Gas Cost Savings ($/yr)	
% ECM Opportunity	100	Total Cost Savings ($/yr)	$3,096
% savings electric	22.00000	Payback (yrs)	5-10
% savings gas	0.00000	Electric GHG Savings (tons/yr)	30
Priority	Medium	Gas GHG Savings (tons/yr)	
Priority Rationale:			
	Life Cycle Cost Savings		
Grants Available?	Yes		

6. HVAC - Boiler - Steam to Hot Water Conversion

Convert the boiler system to hot water. Hot water boilers are more energy efficient (and have higher AFUE ratings) than steam systems. Many times they are costly to replace because steam pipes need to be removed and new hot water pipes installed. Your situation is much different. You have a steam to hot water heat exchanger in the boiler room next to the boiler and the building has hot water piping in it already. This project would only require replacing the boilers and then installing a steam generator for the humidification system. Hot water systems offer greater control: they can adjust the water temperature based on the outside air temperature (in steam systems, the heat output is constant whether the outside temperature is 40 degrees or 10 below zero).

EXISTING CONDITIONS		RECOMMENDATION SAVINGS POTENTIAL	
Location		**Location**	
Boiler Room		Boiler Room	
End Use	HVAC	Electric Energy Savings (kWh/yr)	
Type	Boilers, Burners, and Furnaces	Gas Energy Savings (therm/yr)	5,200
Recommendation:		Electric Cost Savings ($/yr)	
Boiler - Steam to Hot Water Conversion		Gas Cost Savings ($/yr)	$4,030
% ECM Opportunity	100	Total Cost Savings ($/yr)	$4,030
% savings electric	0.00000	Payback (yrs)	10-15
% savings gas	30.00000	Electric GHG Savings (tons/yr)	
Priority	Medium	Gas GHG Savings (tons/yr)	30
Priority Rationale:			
	Efficiency Upgrade		
Grants Available?	Yes		

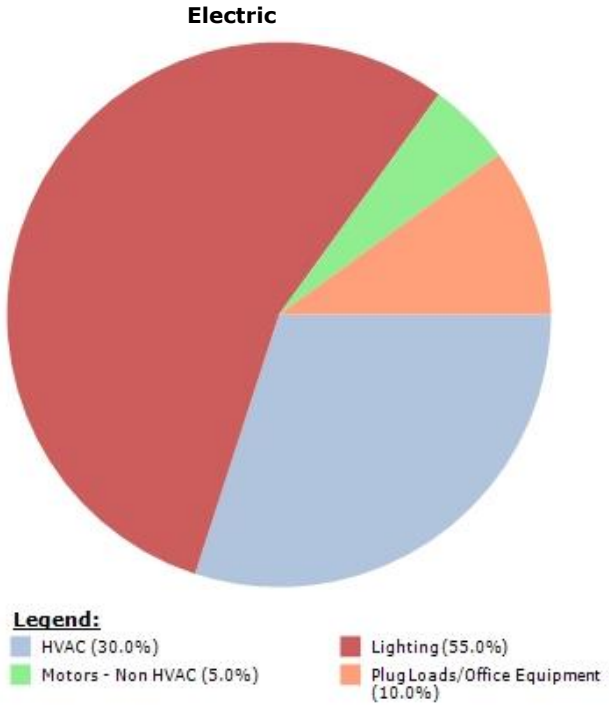
7. HVAC - Insulation - Roof

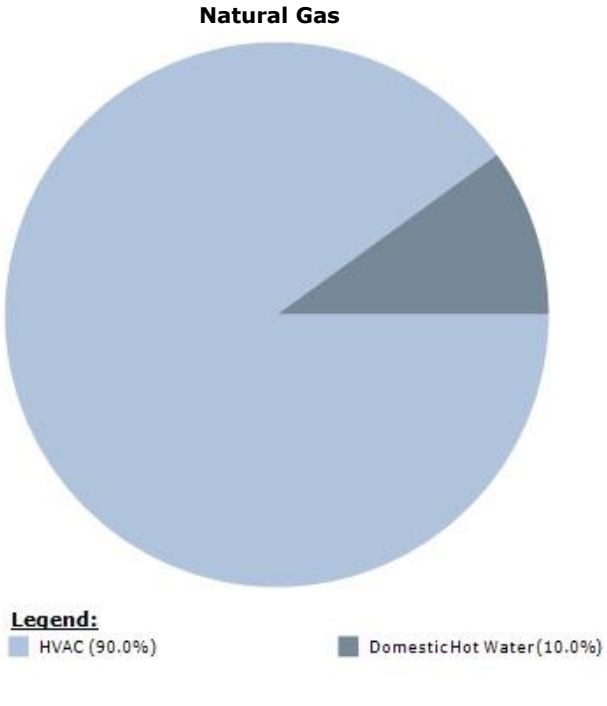
Insulate the roof when re-roofing. When a building needs a new roof, install rigid insulation between the upper membrane and the roof deck at the same time. This additional step in the re-roofing process will reduce heating and cooling costs because it will retain heat inside the building, where it belongs. Add insulation to ensure that the effective R-value of the roof is 25 or greater.

EXISTING CONDITIONS		RECOMMENDATION SAVINGS POTENTIAL	
Location		**Location**	
Roof		Roof	
End Use	HVAC	Electric Energy Savings (kWh/yr)	8,200
Type	Building Shell	Gas Energy Savings (therm/yr)	350
Recommendation:		Electric Cost Savings ($/yr)	$705
Insulation - Roof		Gas Cost Savings ($/yr)	$271
% ECM Opportunity	100	Total Cost Savings ($/yr)	$976
% savings electric	5.00000	Payback (yrs)	10-20
% savings gas	2.00000	Electric GHG Savings (tons/yr)	7
Priority	Low	Gas GHG Savings (tons/yr)	2
Priority Rationale:			
	Efficiency Upgrade		
Grants Available?	Yes		

Plover Branch Public Library

Typical End Use Profile





Typical Facility Annual Energy Usage

	Electric %	Natural Gas %	Electric kWh	Natural Gas Therms	Electric Cost	Natural Gas Cost
HVAC	30.0%	90.0%	8,500	2,525	$1,028	$2,212
Lighting	55.0%	0.0%	15,583	0	$1,885	$0
Domestic Hot Water	0.0%	10.0%	0	281	$0	$246
Motors - Non HVAC	5.0%	0.0%	1,417	0	$171	$0
Plug Loads/Office Equipment	10.0%	0.0%	2,833	0	$343	$0
Office Equipment	0.0%	0.0%	0	0	$0	$0
Total	100.0%	100.0%	28,332	2,806	$3,428	$2,458

Your facility uses 4.66 kWh/sq. ft./yr and 0.46 therms/sq. ft./yr and 62.06 kBtu/sq. ft./yr

Energy Conservation Opportunities
Estimated Savings Summary

Opportunity Description	Electric Energy (kWh/yr)	Fuel Energy (therms/yr)	Payback (yrs)	Cost savings	Priority
1.0 Lighting - 25 watt lamp and low ballast factor ballast retrofit	5,100			$617	High
2.0 HVAC - Setback Thermostat Installation		130	1-2	$114	High
3.0 Lighting - Compact Fluorescent Lamps Replacement	940		1-2	$114	High
4.0 Lighting - LED Exit Lighting	300		1-5	$36	High
5.0 Plug Loads/Office Equipment - Replace Refrigerator with High Efficiency Energy Star Refrigerator	280		5-10	$34	High
6.0 Domestic Hot Water - Pipe Insulation on Domestic Hot Water Lines		22	3-5	$19	Medium
TOTALS	**6,620**	**152**		**$934**	

The summary list above includes a number of recommended energy conservation measures for your facility. This list may include overlapping conservation measures. For example, replacement of a boiler with a high efficiency boiler would negate the savings of replacing the burner in the current boiler.

The summary list indicates that if all measures are implemented the total kWh savings is 6,620 which equals 23% of the current annual kWh usage of 28,332 kWh, and 152 therms which equals 5% of the current annual therm usage of 2,806 therms.

Be aware that the total savings and percentage of savings is an estimate based on average savings for specific measures which may require adjustments based on possible overlapping conservation measures.

UTILITY BILLING HISTORY

Electricity

Billing Month	Account Number	kW	kWh	Total Amount	$/kWh
19-Oct-2010			1,874	$230	$0.123
17-Sep-2010			2,421	$291	$0.120
18-Aug-2010			3,372	$403	$0.119
20-Jul-2010			3,439	$411	$0.120
18-Jun-2010			2,849	$346	$0.121
19-May-2010			2,232	$266	$0.119
20-Apr-2010			2,165	$250	$0.115
19-Mar-2010			2,060	$257	$0.125
17-Feb-2010			2,037	$253	$0.124
19-Jan-2010			2,206	$273	$0.124
17-Dec-2009			1,900	$234	$0.123
17-Nov-2009			1,777	$219	$0.123
TOTAL			28,332	$3,433	

Average Electricity Rate: $0.121

Natural Gas

Billing Month	Account Number	Therm	Total Amount	$/therm
19-Oct-2010		67	$62	$0.92
17-Sep-2010		3	$23	$7.53
18-Aug-2010		4	$23	$5.69
20-Jul-2010		3	$24	$8.02
18-Jun-2010		4	$23	$5.82
19-May-2010		120	$106	$0.88
20-Apr-2010		199	$180	$0.91
19-Mar-2010		370	$333	$0.90
17-Feb-2010		618	$537	$0.87
19-Jan-2010		707	$587	$0.83
17-Dec-2009		472	$377	$0.80
17-Nov-2009		239	$184	$0.77
TOTAL		2,806	$2,459	

Average Gas Rate: $0.88

1. Lighting – 25 watt lamp and low ballast factor ballast retrofit

Retrofit all the 4 foot fluorescent light fixtures with 25 watt 5,000K fluorescent lamps and replace their ballasts with low ballast factor (<=0.78) instant start electronic ballasts.

EXISTING CONDITIONS		RECOMMENDATION SAVINGS POTENTIAL	
Location		**Location**	
All areas		All areas	
End Use	Lighting	Electric Energy Savings (kWh/yr)	5,100
Type	Fluorescent	Gas Energy Savings (therm/yr)	
Recommendation:		Electric Cost Savings ($/yr)	$617
Custom Fluorescent Recommendation		Gas Cost Savings ($/yr)	
% ECM Opportunity	100	Total Cost Savings ($/yr)	$617
% savings electric	45.00000	Payback (yrs)	
% savings gas	0.00000	Electric GHG Savings (tons/yr)	4
Priority	High	Gas GHG Savings (tons/yr)	
Priority Rationale:			
	Acceptable Payback Period		
Grants Available?	Yes		

2. HVAC - Setback Thermostat Installation

Install a setback thermostat to control the temperature schedule of your building. A programmable setback thermostat will allow you to automatically turn down the set-point of your heating system in areas that are unoccupied (such as areas during nights and weekends). These thermostats are programmable; allowing you to create a temperature set-point schedule that will fit your buildings occupants needs. Most setback thermostats can be installed directly in place of your existing thermostat with no additional modification to your HVAC system.

EXISTING CONDITIONS		RECOMMENDATION SAVINGS POTENTIAL	
Location		**Location**	
End Use	HVAC	Electric Energy Savings (kWh/yr)	
Type	Controls	Gas Energy Savings (therm/yr)	130
Recommendation:		Electric Cost Savings ($/yr)	
Setback Thermostat Installation		Gas Cost Savings ($/yr)	$114
% ECM Opportunity	100	Total Cost Savings ($/yr)	$114
% savings electric	0.00000	Payback (yrs)	1-2
% savings gas	5.00000	Electric GHG Savings (tons/yr)	
Priority	High	Gas GHG Savings (tons/yr)	1
Priority Rationale:			
	Low Cost/No Cost		
Grants Available?	No		

3. Lighting - Compact Fluorescent Lamps Replacement

Replace incandescent lamps with self ballasted screw in CFL (Compact Fluorescent Lamps): Self ballasted compact fluorescent lamps use up to 75% less electric energy than incandescent lamps with comparable light output ratings. A variety of models, sizes, shapes, wattages and capabilities are available for direct replacement of incandescent lamps. Compact fluorescent lamps last up to 10 times longer than a standard life incandescent lamp. Other CFL options include multi-level and dimmable models and some cold cathode (instant on) models. CFLs generally require some time to reach full light output levels, contain small amounts of mercury and require responsible disposal. CFLs also generate up to 75% less heat than the equivalent light output incandescent lamp.

EXISTING CONDITIONS		RECOMMENDATION SAVINGS POTENTIAL	
Location		**Location**	
Entrance/desk area		Entrance/desk area	
End Use	Lighting	Electric Energy Savings (kWh/yr)	940
Type	Incandescent	Gas Energy Savings (therm/yr)	
Recommendation:		Electric Cost Savings ($/yr)	$114
Compact Fluorescent Lamps Replacement		Gas Cost Savings ($/yr)	
% ECM Opportunity	100	Total Cost Savings ($/yr)	$114
% savings electric	60.00000	Payback (yrs)	1-2
% savings gas	0.00000	Electric GHG Savings (tons/yr)	1
Priority	High	Gas GHG Savings (tons/yr)	
Priority Rationale:			
	Low Cost/No Cost		
Grants Available?	Yes		

4. Lighting - LED Exit Lighting

Retrofit existing exit lighting with LED units. Exit signs that contain conventional light bulbs should be retrofitted with LED ("light emitting diode") bulbs. LEDs will last approximately 30 years and use a fraction of the energy (1 or 2 watts) of conventional exit signs. Exit signs must remain illuminated 24 hours a day, 365 days a year, so this step will result in substantial long-term energy savings. Maintenance costs will also be reduced because bulb changes will dramatically reduced. A typical LED exit light retrofit will pay for itself within 4 years.

EXISTING CONDITIONS		RECOMMENDATION SAVINGS POTENTIAL	
Location		**Location**	
End Use	Lighting	Electric Energy Savings (kWh/yr)	300
Type	Exit	Gas Energy Savings (therm/yr)	
Recommendation:		Electric Cost Savings ($/yr)	$36
LED Exit Lighting		Gas Cost Savings ($/yr)	
% ECM Opportunity	100	Total Cost Savings ($/yr)	$36
% savings electric	95.00000	Payback (yrs)	1-5
% savings gas	0.00000	Electric GHG Savings (tons/yr)	
Priority	High	Gas GHG Savings (tons/yr)	
Priority Rationale:			
	Low Cost/No Cost		
Grants Available?	No		

5. Plug Loads/Office Equipment - Replace Refrigerator with High Efficiency Energy Star Refrigerator

Replace the old refrigerator in the basement children's room with a high efficient Energy Star refrigerator. ENERGY STAR qualified refrigerators are 20% more energy efficient than the minimum federal standard.

EXISTING CONDITIONS		RECOMMENDATION SAVINGS POTENTIAL	
Location		**Location**	
Basement children's room		Basement childrens room	
End Use	Plug Loads/Office Equipment	Electric Energy Savings (kWh/yr)	280
Type		Gas Energy Savings (therm/yr)	
Recommendation:		Electric Cost Savings ($/yr)	$34
Replace Refrigerator with High Efficiency Energy Star Refrigerator		Gas Cost Savings ($/yr)	
% ECM Opportunity	100	Total Cost Savings ($/yr)	$34
% savings electric	10.00000	Payback (yrs)	5-10
% savings gas	0.00000	Electric GHG Savings (tons/yr)	
Priority	High	Gas GHG Savings (tons/yr)	
Priority Rationale:			
	Acceptable Payback Period		
Grants Available?	No		

6. Domestic Hot Water - Pipe Insulation on Domestic Hot Water Lines

Insulate the domestic hot water lines and install check valves on the water heater. The domestic hot water system, including all piping, should be insulated to minimize heat loss as the water travels from the holding tank throughout the system. Uninsulated piping not only causes the water heater to run more often, but it can also overheat the space through which it travels, causing the ventilation and cooling systems to work harder.

EXISTING CONDITIONS		RECOMMENDATION SAVINGS POTENTIAL	
Location		**Location**	
End Use	Domestic Hot Water	Electric Energy Savings (kWh/yr)	
Type		Gas Energy Savings (therm/yr)	22
Recommendation:		Electric Cost Savings ($/yr)	
Pipe Insulation on Domestic Hot Water Lines		Gas Cost Savings ($/yr)	$19
% ECM Opportunity	100	Total Cost Savings ($/yr)	$19
% savings electric	0.00000	Payback (yrs)	3-5
% savings gas	8.00000	Electric GHG Savings (tons/yr)	
Priority	Medium	Gas GHG Savings (tons/yr)	
Priority Rationale:			
	Long Payback Period		
Grants Available?	No		

Appendix E

Watts-Up Computer Study

PC power management and energy savings

Test Week A 1 week leaving computer on after work day (07/12 to 07/19)
(monitor enters power save after 10 minutes)
Test Week B 1 week turning computer off after work day (07/19 to 07/26)

Methodology: A 'Watts up? PRO' electric usage meter was used to measure the amount of electricity consumption for a PC on a week long basis. A computer and monitor were plugged into the meter and readings were started on the Monday of each test week at 9:00am and stopped at 9:00am the following Monday. The computer was used like it would be in a typical work week (powered on with on/off use through 8 hours of the day). After completing the readings for the test week, the meter was connected to the PC, data was downloaded and analyzed.

Equipment: 1 Watts Up? PRO
1 Dell Optiplex 745 PC
This model is common within the County but not the only model. There are different models from a spread of 5 years that are used in County operations. Energy use for all models is similar but may vary slightly. A white paper report called Review of Computer Energy Consumption and Potential Savings (Bray, 2006) found that the way in which a computer is used is a far more significant factor in determining the total energy consumption than is the efficiency of the computer.
1 Dell 14" monitor

Settings: Price per Kilowatt Hour $.10
This was determined from the 2010 commercial Wisconsin electricity rate average that the U.S. Energy Information Administration published. This is also the rate that Focus on Energy and North Wind Renewable Energy uses to calculate payback periods for commercial customers.

Duty Cycle Setting 70
This was set so when the computer is on it will be recorded as "on duty" because it uses more than 70 watts, whether it's active or not. By doing this we can tell what percent of time the computer was powered on.

Chart:

	Min Watts	Max Watts	Min Volts	Max Volts	Min Amps	Max Amps	Power Factor	kWh	Monthly Avg kWh	Cost	Monthly Avg Cost	Time	Duty Cycle
Test Week A	72.3	175.9	101.6	121.9	0.008	1.919	0.76	13.6	57.9	$1.63	$6.94	7 days	99
Test Week B	1	175.9	115.5	121.9	0.008	1.921	0.76	4.11	17.64	$0.49	$2.12	7 days	24

Significant Findings:

72.3 was the minimum amount of watts the computer used during Test Week A. 1 watt was the minimum amount used during Test Week B. In Test Week A, after the work day, the computer was continually using 70-80 watts but in Test Week B it was using around 1 watt after the work day. The computer was on >99% of the time in Test Week A and 24% of the time in Test Week B. The kWh use, calculated kWh savings, costs and calculated cost savings for the two computer management strategies are below.

Costs and Savings:

Portage County has 457 computer workstations in regular use. Out of these, 20 must remain powered ON at all times because they are used 24 hours a day. These include Sheriff's Department dispatch and night duty offices as well as the Portage County Health Care Facility. For our purposes, the total current expenditures were calculated then calculations were made with the number of computers that are able to be turned off in the evenings; 437.

*Note: NOT all computers are used everyday so calculations may be slightly higher than actual.

Current Use & Expenditures (**457 PC's**)

57.9 kWh/month/PC	X 12 months X 457 PC's =	317,523.6 kWh/year
$5.79 /month/PC	X 12 months X 457 PC's =	$31,752.36 /year

Power ON (**437 PC's**)

57.9 kWh/month/PC	X 12 months X 437 PC's =	303,627.6 kWh/year
$5.79 /month/PC	X 12 months X 437 PC's =	$30,362.76/year

Power OFF (**437 PC's**)

17.64 kWh/month/PC	X 12 months X 437 PC's =	92,504.2 kWh/year
$1.76/month/PC	X 12 months X 437 PC's =	$9,229.44/year

Total Savings: PC Power OFF vs. PC Power ON (**437 computers**)

kWh Savings	=	211,123.4 kWh/year
Cost Savings	=	$21,133/year

When all applicable computers are turned off after the work day compared to left on after the work day, there could be near a 69.6% energy savings or $21,133/year realized.

Index

Watt	Measure of power. Volts * amps = watts.
Volt	SI unit of potential difference and electromotive force.
Amp	The base SI unit of electrical current.
Power Factor	Number from 0 to 1 that represents the phase angleshift between the voltage and current. Watts / volts * amps = power factor.
Duty Cycle	Percent of time the appliance is above a threshold level.

Appendix F

Annual Energy Report Procedure

To be completed in January of each year by the Facilities Administrative Assistant

Wisconsin Public Service Accounts (WPS) – Electric & Natural Gas

Example account number: 0402563444-00001

Contact: Mike Resch (715) 345-7519 or mpresch@wisconsinpublicservice.com

WPS has a very helpful online billing service that can be used to view and electronically transfer County account data into Excel. This online service includes billing data for the previous two years. All Portage County accounts with WPS are registered online and available to view, export into an Excel document, and/or print. To access accounts use the following username and passwords.

Username:	streetlights	Username:	parksdept
Password:	portage2	Password:	portage3
Username:	irrigation	Username:	buildings
Password:	portage2	Password:	portage4

Once you've accessed the accounts online, click "view bill history" to see detailed account information. Then you are able to download to a spreadsheet, sum for the specified time period (one year), and enter the product into the respective cell located on the County Baseline Year'xxxx' spreadsheet, determinant upon what account you are working with.

Alliant Energy – Electric

Example account number: 665858-001

Contact: Customer Service 1-800-862-6222

Alliant Energy will need to be contacted. Upon request they will run reports and send to you in paper copy for the specified time period (one year). The usage and costs should then be totaled for each account number and entered into the respective cell located on the County Baseline Year'xxxx' spreadsheet, determinant upon what account you are working with.

Central Wisconsin Electric Cooperative – Electric

Example account number: 1765025

Contact: Office Phone (715) 445-2211

Central Wisconsin Electric Cooperative will need to be contacted. Upon request they will run reports and send to you in paper copy for the specified time period (one year). The usage and costs should then be totaled for each account number and entered into the respective cell located on the County Baseline Year'xxxx' spreadsheet, determinant upon what account you are working with.

All graphs and summary tables will automatically update themselves for the County Baseline 2010 spreadsheet because the equations will be set up. County Baseline Year'xxxx' spreadsheets will need to have equations updated for this to happen in subsequent year's baseline spreadsheets.

Appendix G

Portage County Strategic Energy Plan Recommendations Prioritization

The following list is a set of recommendations from the building energy audits done by the Focus on Energy Advisor. They are a combination of capital improvements and energy management suggestions that may be implemented to increase the efficiency of energy use in County buildings. Some recommendations from the audits are not included in this list because they are either part of the 2010 projects that are to be completed or they are combined with another recommendation in this document. The full energy audits that include all recommendations are located in the plan under Appendix D.

A. Ease of Installation

Hard – 0	Medium – 2	Easy – 4
40+ hrs maintenance time	10-40 hrs maintenance time	< 10 hrs maintenance time
$10,000+ installation cost	$1,000-$10,000 installation cost	< $1,000 installation cost

B. Recommendation Cost

Expensive – 0	Less Expensive – 2	Least Expensive – 4	No Cost - 6
$5,000 +	$1,000 - $5,000	Less than $1,000	$0

C. Estimated Energy Savings

Low – 0	Medium – 2	High – 4	Very High – 6
$0 - $100 annually	$100 - $200 annually	$200 - $1,000 annually	$1,000 + annually

D. Feasibility (Based on Sustainability Specialists evaluation of available funding & physical restrictions)

Not very feasible - 0	Feasible -2	Very Feasible -4

E. Change in Employee Comfort (Based on Energy Survey and employee comments)

No Change – 0	Change for the better – 2	Large Change for the better – 4
No employees benefit	Some (1-10) employees benefit	Large number (20+) of employees benefit

Annex	A	B	C	D	E	Total
Lighting – Custom Fluorescent Recommendation	0	0	6	2	2	10
HVAC – VFD for boiler hot water pump	2	0	4	4	0	10
Insulate the AC lines on the Liebert roof-top AC unit	4	4	0	4	0	12
DHW – Circulation pump Timelock on domestic hot water system	4	4	0	4	0	12
HVAC – Door sweep Installation	4	4	0	4	2	14
HVAC – Chilled water pumps variable frequency drives	2	2	4	4	0	12
HVAC – Adjust boiler outside air temperature reset control	*4*	*6*	*4*	*4*	*0*	*18*
HVAC – Adjust economizer controls	*4*	*6*	*4*	*4*	*0*	*18*
HVAC – Reduce air infiltration on receiving doors	*4*	*4*	*0*	*4*	*0*	*12*

Courthouse	A	B	C	D	E	Total
Lighting – Custom fluorescent recommendation	0	0	6	2	2	10
HVAC – Preventative maintenance program. Insulate AC lines & steam trap replacement	4	2	4	4	0	14
HVAC – Boiler steam to hot water conversion	0	0	6	0	4	10

Lincoln Center	A	B	C	D	E	Total
Lighting – Custom fluorescent recommendation	0	0	6	2	2	10
HVAC – ventilation controls	2	2	4	2	2	12
HVAC – Boiler replacement to high performance	2	0	6	4	0	12
Food Service – Refrigeration system maintenance	4	4	0	4	0	12
HVAC – Adjust economizer controls	*4*	*6*	*4*	*4*	*0*	*18*

Law Enforcement Center	A	B	C	D	E	Total
Lighting – Custom fluorescent recommendation	0	0	6	2	2	10
Lighting – T8 or T5 replaces HID (inside and out)	2	2	4	4	0	12
Food Service – Gas ENERGY STAR steamer	2	2	2	4	0	10
Food Service – ENERGY STAR hot food holder	2	2	2	4	0	10
HVAC – boiler replacement high performance	2	0	6	4	0	12
DHW – Hot water temperature study and adjustments	*4*	*6*	*2*	*4*	*0*	*16*
DHW – Electric to gas conversion of booster water heater	*4*	*4*	*2*	*4*	*0*	*14*
HVAC – Adjust economizer controls	*4*	*6*	*6*	*4*	*0*	*20*

Ruth Gilfry Building	A	B	C	D	E	Total
Lighting – Custom fluorescent Recommendation	0	0	6	2	2	10
DHW – Replace hot water heater w/Gas ENERGY STAR	2	0	6	4	0	12

Plug Loads – Disconnect walk-in refrigerator reaplace w/ ENERGY STAR	4	2	6	4	0	16

Jefferson House	A	B	C	D	E	Total

Focus on Energy recommendations #1 and #2 will be done with the 2010 energy projects.

The other two recommendations were discarded at an Energy Team meeting when it was brought to the Focus on Energy Advisor's attention that the gas bills were for a different use than the building has now. He could not make the recommendations any more since he doesn't know if the current gas bills are more appropriate for the current use in the building.

Health Care Center	A	B	C	D	E	Total
Lighting – Reconfigure lighting layout	0	4	6	2	2	14
Lighting – low wattage fluorescents Replacements	0	0	6	2	2	10
HVAC – replace burners on boilers w/ high efficiency	0	2	6	2	0	10
HVAC – Boiler steam to hot Water conversion	0	0	6	0	2	8
Food Service – Refrigerator sealing maintenance	4	4	2	4	0	14
Food Service – Replace dishwasher with High efficiency model	2	0	6	4	0	12
Food Service – replace convection oven with gas ENERGY STAR	2	2	0	4	2	10
Food Service – replace steamer w/ gas ENERGY STAR	2	2	0	4	0	8
DHW – Booster water heater	2	2	2	2	0	8
Food Service – Hood fan controls	2	0	6	4	2	14
DHW –Reduce water temp on heater	*4*	*6*	*4*	*4*	*0*	*18*

Library	A	B	C	D	E	Total
Lighting – Retrofit all 3 lamp fixtures in offices and children's library	0	0	6	2	2	10
HVAC – VFD for boiler hot water pump	2	2	4	4	0	12
HVAC – Install VFD on Basement AHU	2	2	4	4	0	12
HVAC – Replace chiller system w/ high efficiency unit	0	0	6	2	0	8

HVAC – Boiler steam to hot water conversion	0	0	6	0	2	8
HVAC – Insulation on roof when it's re-roofed	0	0	6	2	0	8
HVAC – Adjust economizer controls	*4*	*6*	*4*	*4*	*0*	*18*

Plover Branch Library	A	B	C	D	E	Total
Lighting – Retrofit all 4 foot lamps With 25w low ballast factor ballasts	0	0	6	2	2	10
Lighting – Install compact Fluorescent lamps	4	4	2	4	0	14
HVAC – Install programmable Thermostat	4	4	2	4	0	14
Plug Loads – Replace refrigerator with high efficiency ENERGY STAR refrigerator	4	4	0	4	2	14
DHW – Pipe insulation on DHW lines	4	4	0	4	0	12

Appendix H Potential Non-County Funding Sources

Energy Efficiency and Conservation Block Grant (EECBG)
The Energy Efficiency and Conservation Block Grant (EECBG) program was created as part of the American Recovery and Reinvestment Act of 2009. The EECBG funds may or may not be available in the future but they are definitely something to keep an eye on as well as other programs of the same type that may be available in the future.

EPA Climate Showcase Communities Grant
In 2009, EPA launched this competitive grant program to assist local and tribal governments in establishing and implementing climate change initiatives. The goal is to create replicable models of sustainable community action that generate cost-effective and persistent greenhouse gas reductions while improving the environmental, economic, public health, or social conditions in a community. Applications are due every year in July for consideration.

UWSP Foundations & Grants Database
UWSP offers an online database of foundations and grants available around the country. A search was done for dollars available to implement energy efficiency and renewable energy projects in municipalities such as Portage County. The list compiled below is potential opportunities for funding that were found through the search.

Note: the asterisked foundations and grants have the most potential.

Note: the opportunities below may not be available for government entities because the listings on the database do not always specify this or not; it is only a list of potential opportunities that need to be looked into further. Some may only be available to non-profit organizations.

Name	Application Instructions	Deadlines (if provided)
Alliant Energy Foundation, Inc.	www.alliantenergy.com/community/charitablefoundation/index.htm	January 15th, May 17th, and September 15th
*Community Foundation of Central Wisconsin	www.cfpcwi.org	Due March 1st of every year
*Derse Foundation	Letter of interest to: jderse@wi.rr.com	
Dudley Foundation	Contact: Ann Dudley Shannon 500 First Street, Suite 2 Wasuau, WI 54403 Phone: (715) 849-5729	March, June, September, and December board meetings
Everett Smith Group Foundation	Letter of interest to: 800 North Marshall St Milwaukee, WI 53202-3911	
Mid-Wisconsin Foundation	Submit application to: 132 West State Street Medford, WI 54451	April 15th and October 15th
Thomas J. Rolfs Foundation, Inc.	Letter of interest with financial audit	
Wisconsin Energy Corporation Funding	www.wec-foundation.com Fill out online application	January 31st, April 30th, July 31st, and October 31st
Wisconsin Public Service Foundation	www.wisconsinpublicservice.com/company/wpsfoundation.aspx Fill out online application any time	

Appendix I

RESOLUTION NO. _____

RE: APPROVING AND ENDORSING THE STRATEGIC ENERGY MANAGEMENT PLAN (PHASE ONE ELECTRICITY & NATURAL GAS)

TO THE HONORABLE CHAIRMAN AND MEMBERS OF THE PORTAGE COUNTY BOARD OF SUPERVISORS

WHEREAS, the Portage County Board of Supervisors commissioned a comprehensive study to be produced by the PORTAGE COUNTY SMART ENERGY TEAM; and

WHEREAS, the PORTAGE COUNTY SMART ENERGY TEAM has conducted its study and presented the proposed results to all county departments, agencies, and committees, as well as input and review from the public; and

WHEREAS, it is anticipated that the Strategic Energy Management Plan will be a cornerstone for strategic management and planning for Portage County facilities and programs for the future;

WHEREAS, the following summary represents the overall strategy goals of the Plan:

> This goal set forth in this plan is for Portage County to reduce its electricity and natural gas consumption 10% for the calendar year of 2015 compared to the calendar year of 2009 (base year). At the goal of a 10% reduction in electricity and natural gas use, savings of nearly $70,000 annually would be realized. Implementing all of the recommendations in this plan, at an estimated capital expense of $2.2 to $3.4 million dollars, could produce significantly more savings, potentially $100,000+ annually. Capital investment is required to implement some recommendations, while others require no investment; and

WHEREAS, the Plan also provides a list of energy management and efficiency recommendations for each facility; and

WHEREAS, the Plan also provides a set of goals, objectives, and actions that establishes a framework to implement an aggressive energy management program.

FISCAL NOTE: This resolution adopts and approves the Strategic Energy Management Plan as the formal template of the county for future investment in energy saving projects, designs and infrastructure. It does not however by itself approve or appropriate the funding for such projects which remain subject to the county's future budgeting and capital projects process and procedures. The Strategic Energy Management Plan makes non-binding but aspirational budgetary and monetary recommendations for long term energy efficient investments in the future consistent with the goals of set forth in this resolution.

NOW, THEREFORE, BE IT RESOLVED by the Portage County Board of Supervisors hereby adopts, endorses and ratifies the final STRATEGIC ENERGY MANAGEMENT PLAN (PHASE ONE ELECTRICITY & NATURAL GAS) as presented by the PORTAGE COUNTY SMART ENERGY TEAM, with the plan being attached to the minutes of this proceeding and incorporated in all respects herein by reference, with the terms and limitations as set forth in the FISCAL NOTE.

Dated: April 19, 2011.

Respectfully submitted,

EXECUTIVE/OPERATIONS COMMITTEE

By: _____ _____
O. Philip Idsvoog, Chair Lonnie Krogwold, First Vice-Chair

_____ _____
David Medin, Second Vice-Chair Perry Pazdernik

_____
Don Butkowski

PORTAGE COUNTY SPACE AND PROPERTIES COMMITTEE

By: _____ _____
Jeanne Dodge, Chair Tom Mallison

_____ _____
Don Jankowski, Vice-Chair David Medin

_____
Lonnie Krogwold

References

U.S. Energy Information Administration,
http://www.eia.doe.gov/state/state_energy_profiles.cfm?sid=WI

U.S. Department of Energy, "Heat Distribution Systems"
http://www.energysavers.gov/your_home/space_heating_cooling/index.cfm/mytopic=12580

Chippewa County Comprehensive Energy Conservation Plan, October 2009