

Chippewa County Comprehensive Energy Conservation Plan

SAVING MONEY AND REDUCING POLLUTION



County Administrator's Ad Hoc Energy Committee

Final Report to Chippewa County Administrator and County Board – October 2009

Chippewa County Comprehensive Energy Conservation Plan

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Acknowledgements

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Executive Summary

Reducing 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 of 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 programs and people.

Chippewa County used 88,844 million BTUs of energy in 2008 at a conservative cost of \$1,824,022 dollars. This plan provides a roadmap for Chippewa County, WI, to reduce its energy consumption by 10% by 2010 and by 20% by 2011 using 2008 as a baseline figure.

The Energy Conservation Plan analyzes Chippewa County’s relationship with energy. It describes what types of energy the County uses; for what purpose that energy is used; and what the economic and environmental costs of energy consumption are for the County.

The Energy Conservation Plan outlines a strategy for the County to reduce its annual energy consumption to 79,960 million BTUs in 2010 and 71,075 million BTUs in 2011. It describes how an on-going energy management system can be put in place to provide plan consistency and follow through in order to achieve highly ambitious targeted energy savings.

Specific roles and responsibilities are provided for the County Board, the County Administrator, and the County Department Heads. These roles and responsibilities will institutionalize the organizational framework and decision making for carrying out on-going energy conservation measures over time.

The plan calls for technology improvements to enhance energy tracking capabilities, the inclusion of energy conservation measures into a capital improvement plan, and improvements in fleet vehicle efficiencies. Immediate and high priority energy conservation measures at County facilities, the development and adoption of energy related policies, and the formation of a County green team are also called for in the plan.

The plan provides a budget that includes funding for hybrid vehicles, energy conservation measures, and a part time senior maintenance technician.

The Chippewa County Energy Conservation Plan provides a solid framework for the County to begin implementing an aggressive energy policy. It includes recommendations that will result in lower energy consumption and costs, a greater degree of energy independence, and more predictability in terms of future energy needs.

Finally, the Chippewa County Energy Conservation Plan provides an opportunity for the County to position itself as a statewide leader in sustainable energy management, by demonstrating a firm commitment to energy efficiency, conservation, and renewable energy development.

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Introduction

Counties across the United States are working hard to become more energy efficient and reduce energy consumption. In Chippewa County, recently completed and current efforts to gain energy efficiencies include the following:

- Lighting upgrades at the County Courthouse
- Lighting and Heating/Cooling Efficiency improvements at the Highway Department
- A Comprehensive Energy Audit of County Facilities
- Technology upgrades to power down idle computer equipment
- A Chiller upgrade at the Main Campus

These investments are already showing impressive results. At the courthouse, **electricity consumption for June-July 2009 was down 18.1%** compared with 2008. This resulted in a **\$2,323 dollar savings** for the month period. See Appendix H – Energy Use & Costs for 2006-2009.

Yet despite these impressive gains, **Chippewa County does not currently have a comprehensive strategy for energy conservation.** This plan will accelerate the types of energy conservation measures that will put Chippewa County on a path to a more sustainable energy future and position the County as a statewide leader in energy policy.

The County plans to aggressively pursue energy conservation through better design, behavioral changes, and technology in order to reduce energy consumption over the next several years.

[Aiken to improve energy efficiency in County buildings](#)

Aiken Standard

[County to conserve energy](#)

Loudoun Times

[County to save energy](#)

The Evening Sun

[Garfield County looking into a fund for energy efficiency improvements](#)

Glenwood Springs Post Independent

[County to be honored for energy-saving efforts](#)

Manhattan Mercury

[Stimulus could fund County energy program](#)

Cookeville Herald Citizen

[Courthouse to go green with solar panels](#)

The Coloradoan

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The following figures underscore why Chippewa County needs a Strategic Energy Plan:

- Chippewa County spent over 1.8 million dollars on energy in 2008.
- Chippewa County consumed over 433,000 gallons of gas and diesel in 2008
- Chippewa County used over 3.7 Million Kilowatt Hours of electricity in 2008
- The American Council for an Energy Efficient Economy (ACEEE) estimates a potential energy efficiency improvement of 33% for electricity and 40% for natural gas across the U.S. economy
- Chippewa County is responsible for over 8,200 tons of CO2 emissions annually
- According to a July 29, 2009 McKinsey & Company report, the U.S. could reduce its non-transportation energy use by 23 percent by 2020 by investing in energy efficiencies, eliminating more than \$1.2 trillion in waste

As is the case across the entire U.S. economy, there are ample opportunities for Chippewa County to become more energy efficient. As fiscal constraints continue to eat away at revenue for County government, operating as efficiently as possible is an imperative. **Each energy dollar saved is a dollar available for programs that serve Chippewa County Citizens.**

Energy efficiency is the science of using less energy to do the same amount of work. Using a 25 watt compact fluorescent light bulb to produce the light level of a 100 watt incandescent bulb is energy efficient. Remembering to turn the light off when you leave the room is called **Energy Conservation**.¹

In this plan we use the terms energy efficiency and conservation interchangeably to refer to general efforts to reduce overall energy consumption. Besides energy efficiency and conservation, this plan also includes some discussion on renewable energy.

Renewable energy by itself does not reduce energy consumption. However, renewable energy does insulate the County from growing energy costs, makes the County more energy independent, reduces fossil fuel related pollution, and provides economic opportunity for local contractors, manufacturers, and related businesses. Therefore, this plan contains a few recommendations related to renewable energy as well. By simultaneously addressing energy efficiency, conservation, and renewable energy the County can take advantage of the synergies created between the three strategies to achieve a more sustainable energy future.

Figure 1 below describes the relationship between energy efficiency improvements and economic and community development. On the left of the figure is “Energy Efficiency Improvements.” Energy efficiency investments do three things: 1) They reduce fossil fuel use; 2) They reduce energy costs over the long haul; and 3) They increase demand for energy efficiency businesses. Below is a discussion of each energy efficiency benefit.

¹ Example taken from Energy in America: A Tour of Our Fossil Fuel Culture and Beyond by Ingrid Kelley

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Energy efficiency investments lead to less fossil fuel use because the demand for energy is reduced. This in turn leads to a reduction in pollution which a) results in a cleaner environment and b) strengthens the overall economy by reducing the “cost” of cleaning up a polluted environment.

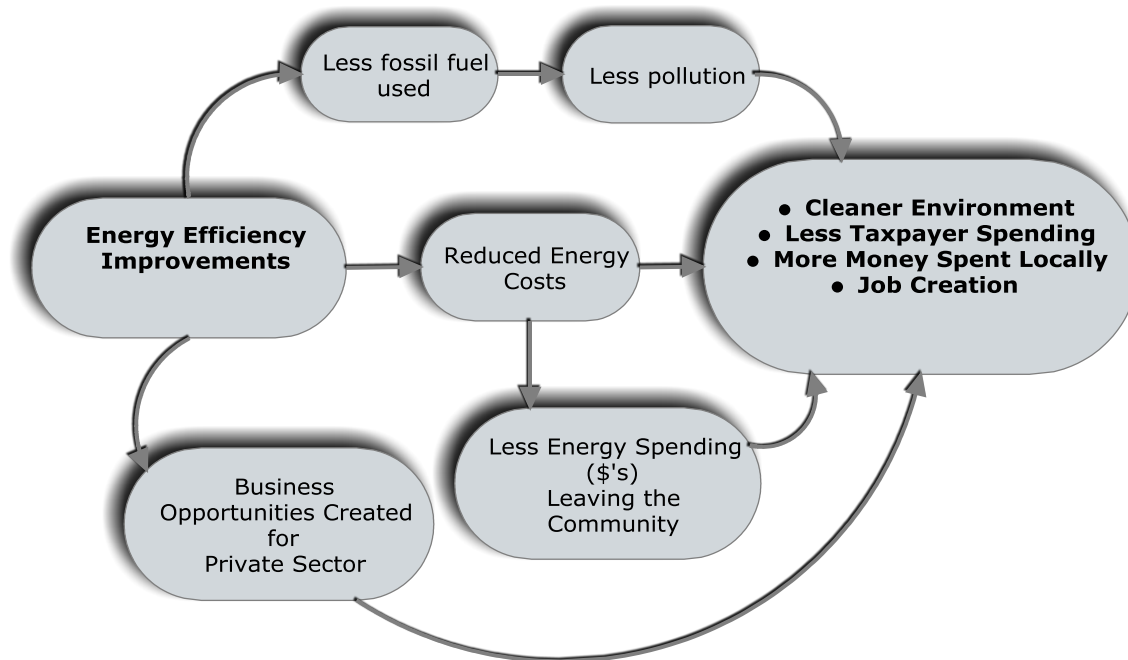


Figure 1 The Multiple Benefits of Energy Efficiency

Energy efficiency investments reduce the amount of money that local government must spend on energy. **When local governments reduce energy costs then that money can be returned to taxpayers or invested in other critical programs and services.** Those taxpayer dollars are then re-circulated within the local economy instead of sent out of State as is the case with purchasing imported fossil fuels.

Finally, energy efficiency measures put taxpayer dollars in the hands of local businesses which provide energy efficiency and renewable energy services. These businesses include engineers, planners, architects, other consultants, suppliers, contractors, and manufacturers. Investments in energy efficiency therefore support local job creation and expansion of local businesses. Taxpayer spending on energy efficiency projects is put in the pockets of local companies during project implementation. These same companies or others may also be involved in servicing these energy saving technologies over time.

Beyond these logical connections between energy efficiency, environmental benefits, and economic development there are other reasons for local governments to actively pursue energy efficiency policies and programs, including quality of life, and worker productivity. For example;

- A demonstrated commitment to energy efficiency and renewable energy investments may attract entrepreneurs and existing companies. Local government can stimulate demand for those companies engaged in energy efficiency and renewable energy.

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- Communities that demonstrate their vision for a more sustainable community may in fact attract other creative individuals and entrepreneurs who are looking to settle down and start to grow a company in an attractive community with a high quality of life and with a commitment to clean energy and community sustainability.
- Energy efficiency and green buildings increase worker productivity thereby increasing business profitability. How? Because buildings that are more energy efficiency tend to be more comfortable, have better air circulation, and better lighting, creating an improved working environment.

Purpose of the Plan

The purpose of this plan is to inventory existing energy use across Chippewa County government operations and to develop an energy conservation strategy to meet the County's energy conservation goals.

The plan provides a strategic pathway forward for Chippewa County to successfully achieve its goal of 10% energy reduction by 2010 and 20% energy reduction by 2011 using 2008 as a baseline.

In addition, this plan contains several medium and long-term recommendations focused on improving energy efficiency and deploying more renewable energy beyond the year 2010. It also provides a framework to drive continuous quality improvement for energy management.

Planning Method

The County Administrator appointed an ad hoc committee with a specific charge to develop a plan for the County to reduce its energy consumption. See Appendix A for committee charge.

The energy committee followed a five step process to develop this strategic energy plan.

Step 1 *Developed a 2008 baseline figure for County energy usage including vehicles, facilities, and equipment.*

The committee developed an inventory of every County electric meter to create a baseline (2008) for electrical usage. The committee also gathered data for all County fleet vehicles in order to document fuel use in the year 2008. Finally, natural gas and propane consumption by the County was documented.

Step 2 *Researched and developed an energy audit evaluation framework.*

The committee researched various options for doing a County facilities energy audit. Members of the committee developed the energy audit Statement of Qualifications SOQ. The audit was completed July 1st, 2009. See Appendix B for information on the MEP energy audit.

Step 3 *Researched & prioritized potential energy efficiency strategies for County operations.*

The committee researched other County initiatives and brainstormed a list of potential energy savings measures appropriate for Chippewa County.

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Step 4 *Developed a survey to gather implementation ideas and suggestions from County employees.*

A County employee energy survey was used to solicit additional ideas from across the organization.

Step 5 *Drafted an energy conservation plan with an implementation plan and budget.*

The plan incorporates recommendations by the committee, results of the employee survey, Focus on Energy reports, and the MEP energy audit report.

Inventory of Current Energy Usage

Current Energy Sources

Energy consumed by the County is purchased from several different providers. Understanding who provides energy to which facility is critical in determining grant eligibility for future energy conservation projects. As of August 7th, 2009, Xcel, Eau Claire Energy Cooperative, Cornell Municipal Light Department, and WE energies participate in the statewide Focus on Energy program. Chippewa Valley Electric Cooperative does not.

Electricity is provided by Xcel Energy for all of the County-owned Chippewa Falls facilities and by Cornell Municipal Utilities for the County highway facilities and Parks and Recreation facilities located in Cornell. Chippewa Valley Electric Cooperative provides electricity to the Morris-Erickson, Otter, and Pine Point parks. Chippewa Valley Electric Cooperative also provides electricity to the Shooting Range in Bloomer. Eau Claire Energy Cooperative provides service to the Highway Department's Lake Hallie salt shed.

Natural Gas is provided by Xcel Energy for the facilities in Chippewa Falls. WE energies provide natural gas for the Highway facility in Boyd.

LP Gas is provided by Quality Propane for the Highway facilities in Cornell and Bloomer.

Gasoline and Diesel is provided through bulk purchases at the County highway building in Chippewa Falls and by several retail gas stations servicing the region.

Table 1 on the following page summarizes energy purchases by facility for all County-owned facilities. The key for each utility is provided below.

Utility Key

EC – Eau Claire Electric Cooperative; XC – Xcel Energy; CE – Chippewa Valley Electric Cooperative; CN – Cornell Municipal Utilities; WE – We Energy; QP – Quality Propane

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Table 1 Energy Purchases by County-Owned Facility

Facility Description	Location	Electricity Provider	Natural Gas Provider	LP Provider
CRI Building	Chippewa Falls	XC	XC	NA
Forest & Parks - Cornell Municipal Utilities	Cornell	CN	NA	NA
Forest & Parks - Morris Erickson Park	Town of Sampson	CV	NA	NA
Forest & Parks - Otter Lake Campground	Colburn	CV	NA	NA
Forest & Parks - Pine Point Park 1	Lake Holcombe	CV	NA	NA
Forest & Parks - Pine Point Park 2	Birch Creek	CV	NA	NA
Forest & Parks - Pine Point Park 3	Birch Creek	CV	NA	NA
Forest & Parks - Pine Point Park 4	Birch Creek	CV	NA	NA
Forest & Parks - Round Lake Park	Sampson	CV	NA	NA
Highway - Bloomer Facility	Bloomer	CV	NA	QP
Highway - Boyd Facility	Boyd	CV	WE	NA
Highway - Building "G" Sheriff Storage	Chippewa Falls	XC	NA	NA
Highway – Cornell Facility	Cornell	CV	NA	QP
Highway - Hallie Salt Shed	Chippewa Falls	EC	NA	NA
Highway - Shop/Office, Building "B", Building "D", County Salt Shed, State Salt Shed	Chippewa Falls	XC	XC	NA
Highway Radio Tower (Hwy Y)	Chippewa Falls	XC	NA	NA
Human Services - Transit Building C	Chippewa Falls	XC	XC	NA
Hwy - Building "E" & "F" Storage	Chippewa Falls	XC	NA	NA
Maintenance - Jail	Chippewa Falls	XC	XC	NA
Maintenance – Courthouse	Chippewa Falls	XC	XC	NA
Maintenance – Kitchen	Chippewa Falls	NA	XC	NA
Maintenance – Garage	Chippewa Falls	XC	XC	NA
Maintenance - Parking Lot North	Chippewa Falls	XC	NA	NA
Maintenance – Parking Lot West	Chippewa Falls	XC	NA	NA
Maintenance - Shooting Range	Bloomer	CV	NA	NA
Sheriff Department Boyd Tower	Boyd	XC	NA	NA
Sheriff Department Main Tower	Chippewa Falls	CV	NA	NA
Sheriff Department New Auburn Tower	New Auburn	CV	NA	NA

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Current Energy Use

The County uses energy primarily for facilities, transportation, and road construction. This plan does not address energy used for road construction. Table 2 summarizes current energy use by energy type for all County facilities and vehicles. This data includes all County owned facilities and all County owned vehicles including both the Highway and Sheriff fleets as well as the County shared fleet vehicles. Gas consumption includes gas consumed by County employees using personal vehicles while on County business. More explanation is provided on how these figures were derived in the transportation section below.

In order to better understand energy consumption, all data has been converted to million BTU equivalents. This allows for a true comparison of how much energy is consumed in the form of propane, natural gas, electricity, gasoline, diesel, and oil.

Overall, Chippewa County consumed 88,844 Million BTUs of energy in 2008.

Table 2 Energy Use by Type of Energy (2008)

End Use	Type of Energy Consumed	Unit Type	Annual Consumption	MM BTU equivalent
Facilities	Propane	Gallons	28,448	2,560
	Natural Gas	CCF (hundred cubic feet)	149,112	15,105
	Electricity	kWh (kilowatt hours)	3,707,826	12,651
		Sub-Total	NA	30,317
Transportation	Gasoline	Gallons	112,394	14,049
	Diesel	Gallons	316,731	43,931
	Oil	Gallons	4,055	547
		Sub-Total	433,180	58,527
		Total		88,844

Figure 2 on the following page uses the data from the table above to show percent contribution to total energy consumption by end use (as measured in BTUs). In other words, of the total energy consumed by the County in 2008, 34% was used for County facilities and the remaining 66% was used to meet County transportation needs.

Percent Contribution to Total Energy Consumption by End Use (BTUs)

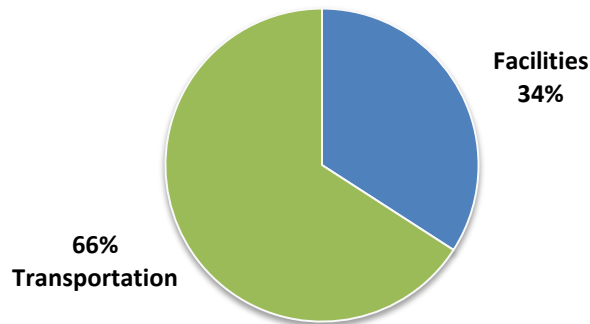


Figure 2 Percent Contribution to Total Energy Consumption by End Use (2008)

Figure 3 below shows the relative energy consumed by type of energy. Roughly half the total energy consumed by the County was diesel fuel (49%), followed by natural gas (17%), gasoline (16%), electricity (14%), propane (3%), and oil (1%).

Percent Contribution to Total Energy Consumption by Energy Type (BTUs)

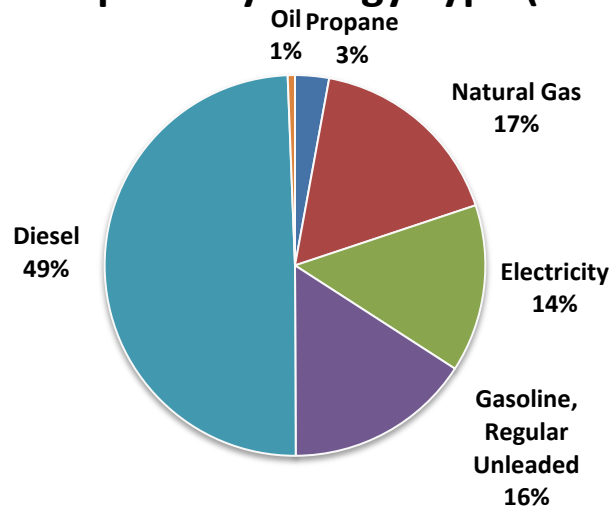


Figure 3 Percent Contribution to Total Energy Consumption by Energy Type (2008)

Facility Energy Use

Chippewa County owns dozens of facilities across the County and each facility has its own energy requirements. County owned facilities consume electricity, natural gas, and propane or LP gas. Figure 4 below shows the relative contribution of each to the total energy demand for facilities. One half of the County's total facility energy demand is from natural gas, followed by 42% from electricity, and 8% from propane.

Percent Contribution to Total Facility Energy Use by Energy Type (BTUs)

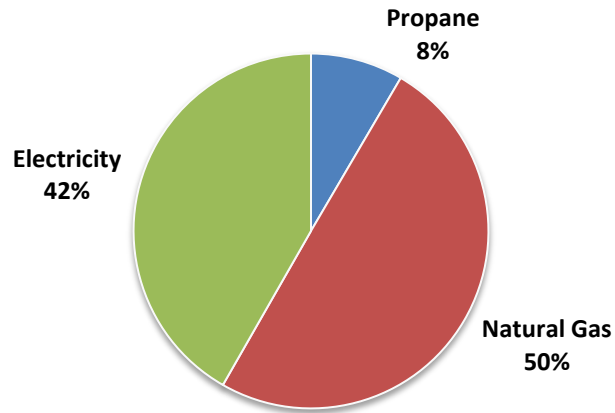


Figure 4 Percent Contribution to Total Facility Energy Use by Energy Type (2008)

Natural Gas comprises half the County's energy demand and is used for heating, cooling, and hot water at several facilities around the County.

Natural Gas Consumption by Meter (CCF)

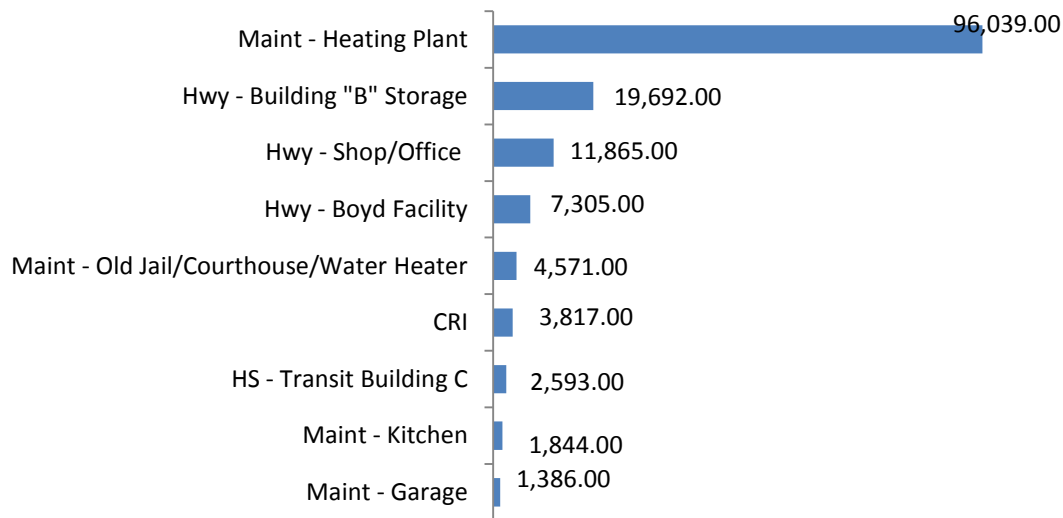


Figure 5 2008 Natural Gas Consumption by Meter (CCF)

Figure 5 above provides a breakdown of natural gas consumption by meter

(Note: 1 therm = 100,000 Btu, which is the heat content of about 100 cubic feet of gas or 1 CCF)

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The maintenance heating plant is by far the largest consumer of natural gas using over 96,000 therms in 2008 alone. Three - 2 million BTU boilers consume a large quantity of natural gas throughout the year. Through energy conservation, potential renewable energy projects, and other means, the County Maintenance Department would like to eliminate the need to run these large, relatively inefficient boilers during the summer months.

Figure 6 below provides a relative breakdown of natural gas consumption by the department responsible for monitoring the meter. The maintenance department monitors 70% of natural gas consumption followed by the highway (26%) and CRI and Human Services (each 2%). This type of breakdown is intended to showcase who is currently responsible for monitoring County energy consumption. It's not intended to show who the largest users of energy are within County government.

2008 Natural Gas Consumption by Dept/Program Responsible for Monitoring Meter (CCF)

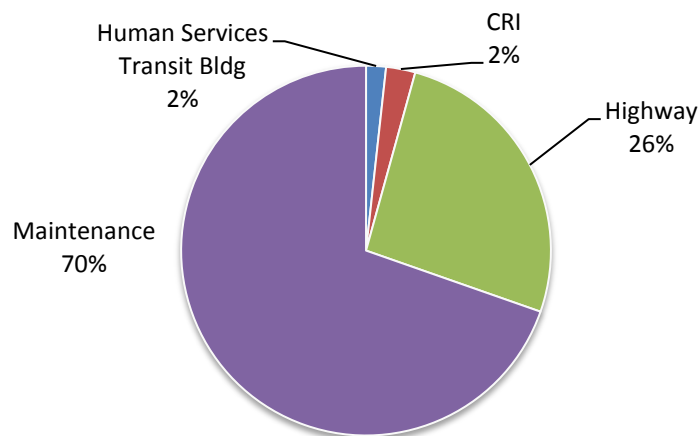


Figure 6 Natural Gas Consumption by Dept/program Responsible for Monitoring Meter

Electricity is used for a variety of purposes including lighting, refrigerators, computers, and other technologies. Figure 7 shows 2008 electricity consumption by metered facility. All figures are in kWh. (Note: A Kilowatt-hour is a measure of electricity defined as a unit of work or energy, measured as 1 kilowatt (1,000 watts) of power expended for 1 hour. One kWh is equivalent to 3,412 BTUs)

The County has 23 electric meters at its various facilities, serving the main campus, the jail, several highway facilities, communication towers, and several parks facilities.

The top four electric users are the courthouse, the jail, the main highway shop, and CRI. Together, they use 3,395,081 kWh of electricity, which represents over 92% of the County's electricity consumption.

2008 Electricity Consumption by Meter (kWh)

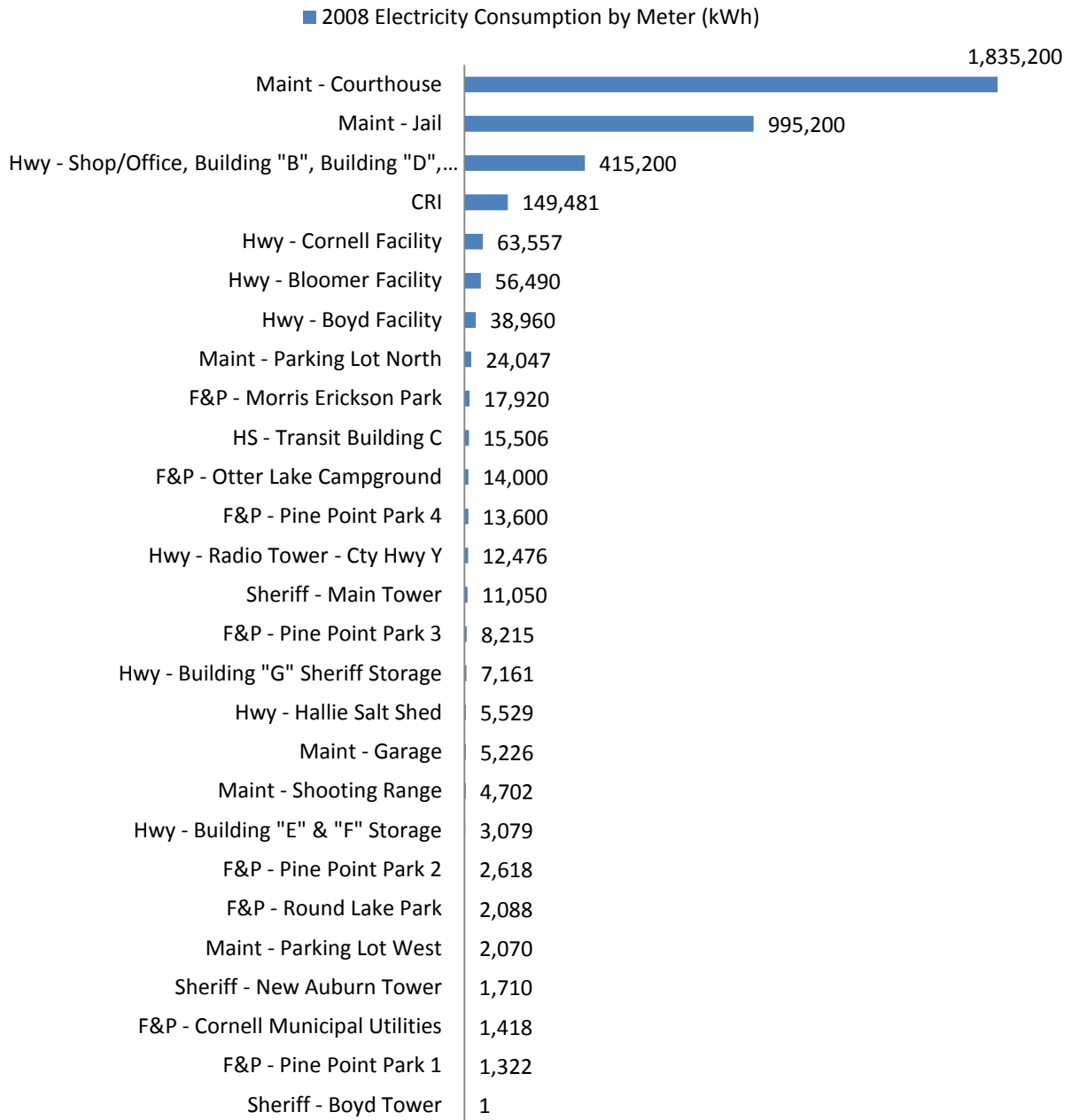


Figure 7 2008 Electricity Consumption by Meter (kWh)

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Figure 8 below shows which department is responsible for tracking electrical energy consumption and how much electricity their metered facilities consume. The maintenance department tracks 78% of electricity consumption. The highway tracks 15% of electricity consumption followed by CRI (4%), Forests and Parks (2%), Human Services (1%), and the Sheriff (<1%).

2008 Electricity Consumption by Department Responsible for Monitoring Meter (kWh)

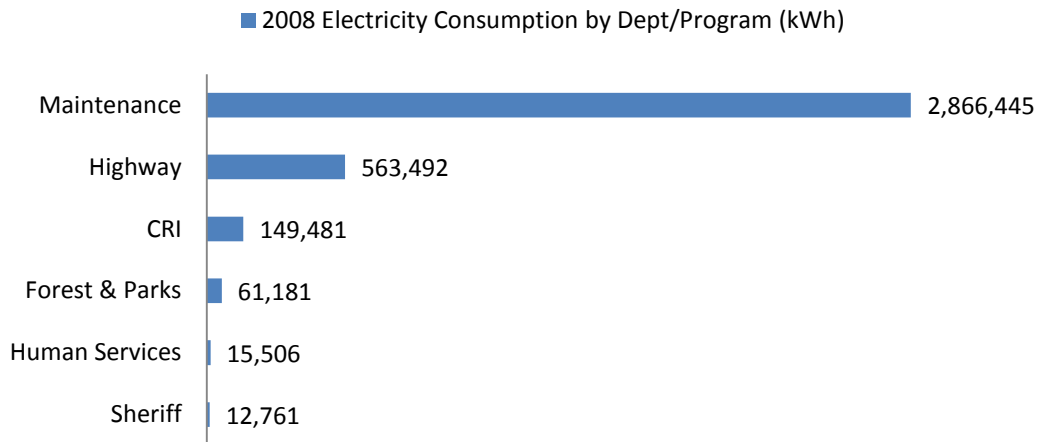


Figure 8 2008 Electricity Consumption by Department Responsible for Monitoring Meter

The County Courthouse and the Jail are the two largest consumers of electricity. The Courthouse consumed over 1.8 million kilowatt hours (kWh) per year in 2008 while the Jail consumed 995,000 kWh. Figures 9 and 10 below show the historical electricity consumption patterns for both facilities tracked on a monthly basis through the calendar year. This data provides an excellent baseline for projecting future energy growth, identifying appropriate energy conservation measures and measuring their impact.

In addition to providing baseline benchmarks for all County facilities, two national ratings benchmarks were developed as part of this plan.

According to the MEP study, the jail and the courthouse together consume 12.5 kWh per square foot of facility. The average kWh consumption of an office building in the United States is 17 kWh per square foot, according to the study.

The second national ratings benchmark was developed using EPA's Portfolio Manager. A "Statement of Energy Performance" was completed for electricity consumption at the County courthouse. **The Chippewa County Courthouse currently scores 88 out of 100, with 1 being the least efficient and 100 being the most efficient.** These national ratings compare courthouses only and factor in # of employees, # of computers, square feet, hours of operation, and heating and cooling patterns. A score of 88 qualifies the courthouse for the Energy Star program and signifies that the Courthouse is currently outperforming 87% of courthouses across the United States when it comes to electrical energy efficiency.

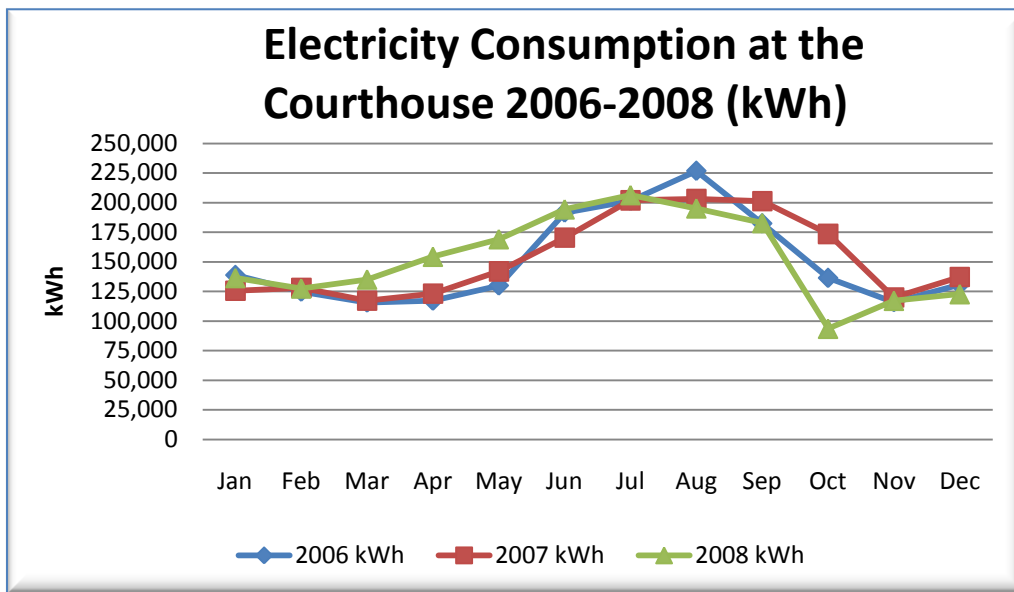


Figure 9 Electricity Consumption at the Courthouse (2006-2008)

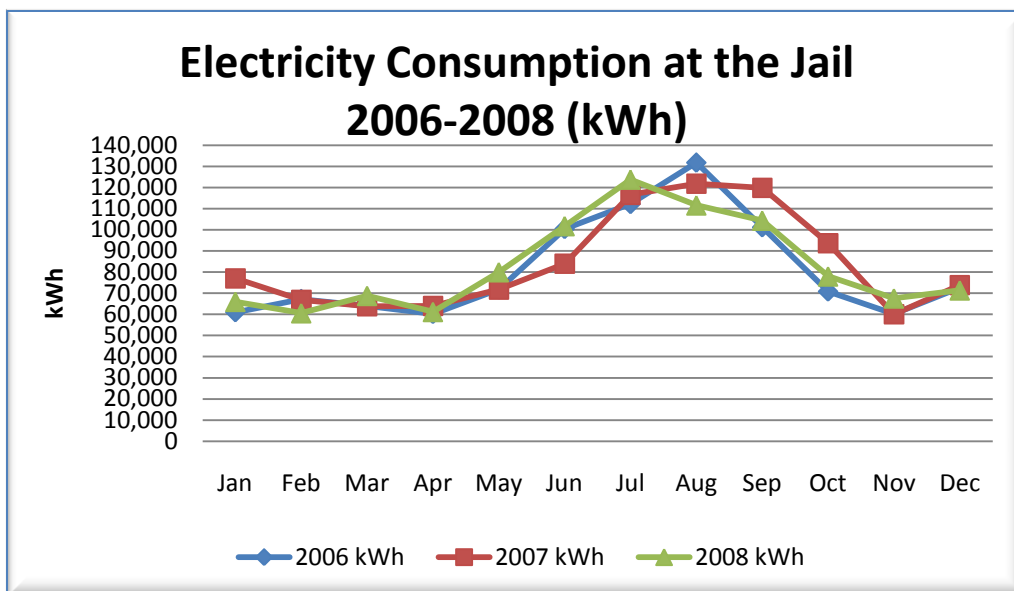


Figure 10 Electricity Consumption at the Jail (2006-2008)

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LP Gas is used by the Highway Department for heating at two County-owned facilities: the Bloomer storage and salt sheds facility and the Cornell storage and salt sheds facility. Figure 11 provides a breakdown of LP consumption at each facility.

2008 LP Gas Consumption by Facility (gallons)

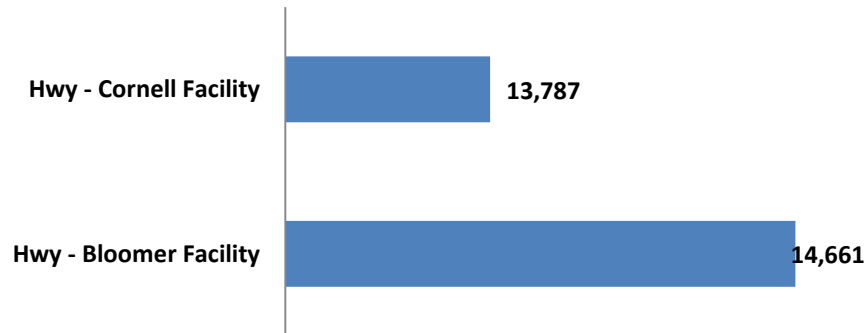


Figure 11 2008 LP Consumption by Facility

Transportation Energy Use

Transportation energy consumption comprises gasoline, diesel, and oil fuels. Figure 12 below shows the relative contribution of each to the total demand for transportation energy.

Percent Contribution to Total Transportation Energy Use by Energy Type (BTUs)

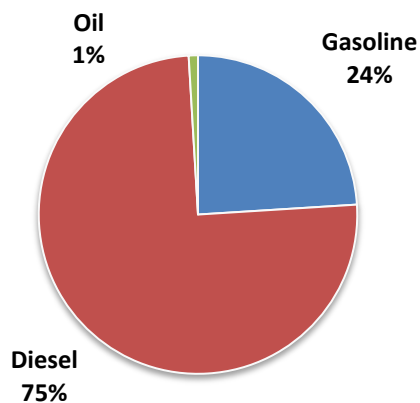


Figure 12 Percent Contribution to Total Transportation Energy Use by Energy Type

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In 2008, Chippewa County consumed 433,180 gallons of transportation fuel. The County consumed 316,731 gallons of diesel, 112,394 gallons of regular unleaded, and 4,055 gallons of oil (Figure 13). These figures include all transportation fuels used to conduct County business.

The data therefore includes not only fleet vehicle fuel consumption from Highway, Sheriff, and other County departments, but also transportation fuels used by employees conducting business using their own personal vehicles.

2008 Transportation Fuel Consumed (gallons)

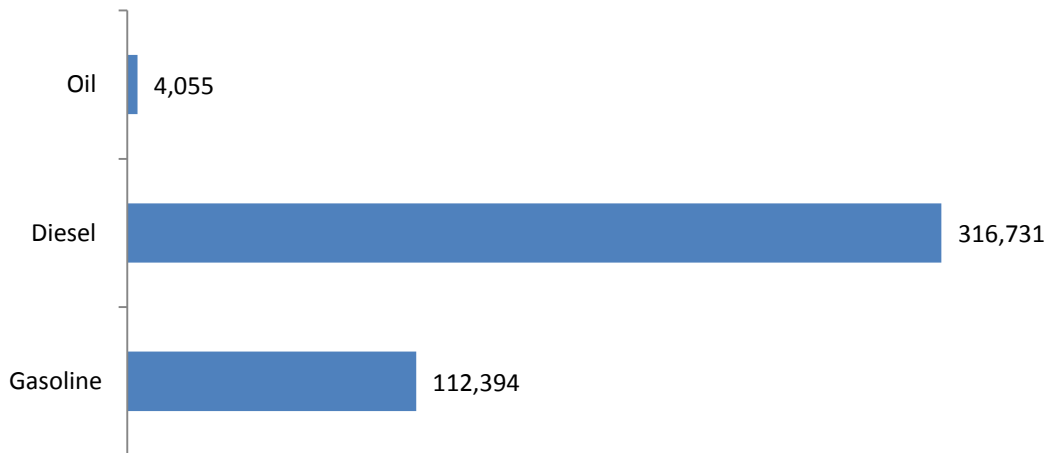


Figure 13 2008 Transportation Fuel Consumed (gallons)

Of the 433,180 gallons of fuel used in 2008, 417,702 gallons were provided by the Highway shop while 15,478 gallons were purchased outside the Highway shop.

Calculating transportation fuel use by department is a challenge. The current fuel tracking system makes it difficult to assemble this data in an efficient manner.

There are three different types of vehicles used to conduct County business: a) dedicated fleet vehicles; b) shared (or pooled) fleet vehicles, and c) personal vehicles. Fuel is purchased from the Highway department or if not within range of the key department from outside gas stations according to County policy.

In order to calculate transportation fuel use by Department, data was collected from the Highway Shop and the County Clerk's office. To calculate personal vehicle fuel consumption an estimate of 15 mpg was applied to all personal vehicle miles. As is the case for personal vehicle miles traveled, there are a few caveats to the fuel consumption data which currently makes estimating fuel consumption by department a challenge:

- UW-Extension fuel consumption is underreported because UW-Extension personal vehicle miles are not currently being collected and tracked to a central location. This situation is being addressed and the UW-Extension department will soon be able to submit its mileage figures to a central location as the other departments currently do.

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- County Board member fuel consumption is underreported because personal vehicle miles for County Board members attending to County business was not gathered during preparation of this report.
- Fuel consumption data is largely based on fuel purchase records for the year 2008. The Highway Department suggests that the 2008 fuel purchase record is very close to the overall 2008 fuel consumption record with some minor deviance.
- Highway Department fuel consumption is an estimate. The Highway Department does not track fuel consumption for Highway vehicles. Highway Department fuel consumption was estimated by taking total Highway Department fuel sales made to other departments and subtracting that figure from total Highway fuel purchases for 2008. This is believed to be the most accurate method currently available for estimating Highway Department fuel consumption.²

In terms of diesel consumption, it is believed that the Highway is responsible for all 316,731 gallons consumed in 2008. The 4,055 gallons of oil used in County vehicles in 2008 was not allocated across departments rather the figure is presented as a lump sum.

² Jan Schirmacher, Chippewa County Highway Department (Personal Correspondence via email, 8/5/09)

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Figure 14 below shows 2008 gasoline fuel consumption by department and program. Non-department data was included to illustrate the full spectrum of programs which contribute to the County's energy consumption pattern.

2008 Gasoline Fuel Consumption by Dept/Program (gallons)

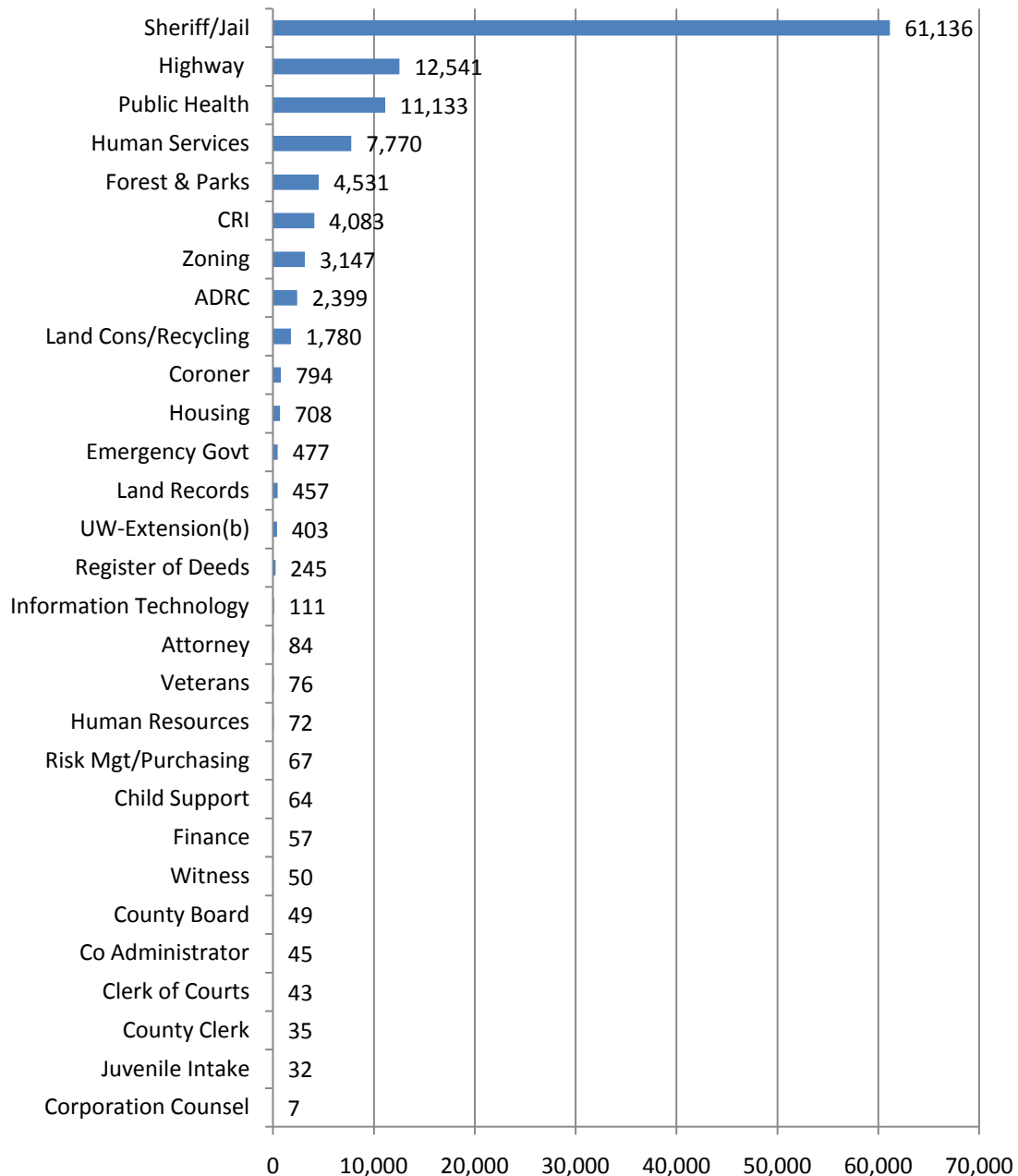


Figure 14 2008 Gasoline Fuel Consumption by Dept/Program (gallons)

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Another way to baseline transportation energy use is by examining Vehicle Miles Traveled or VMTs. For most departments, VMTs will likely be a more useful tool than fuel consumption as a way to manage their overall energy use.

Total Vehicle Miles Traveled for all County operations was 1,522,517 in 2008. This figure excludes Highway VMTs. The Highway department does not track its VMTs at this time.³

Figure 15 below shows a breakdown of the total VMTs by personal vehicle and by fleet for 2008. Of the 1,522,517 VMTs, 199,770 were made using personal vehicles while 1,322,746 were made using fleet vehicles. Due to technology limitations and a change in the way the County tracks vehicle usage which was implemented in 2008, the VMTs provided in the figure below should be considered estimates only.

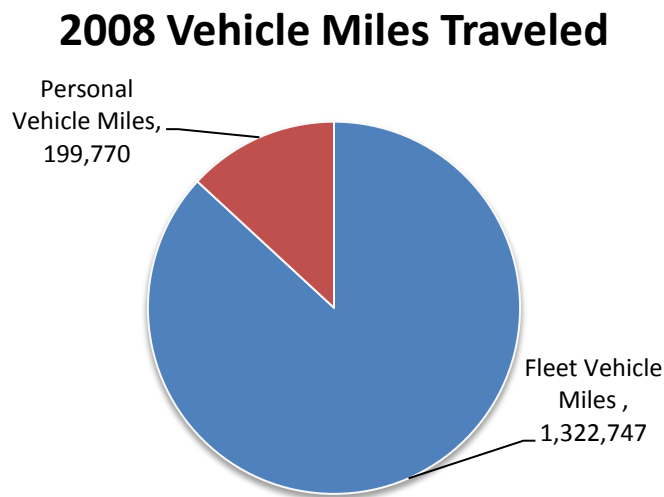


Figure 15 VMTs (2008)

³ Jan Schirmacher, Chippewa County Highway Department (Personal Correspondence via email, 8/5/09)

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Figure 16 presents VMTs by department. As in the case of personal fleet VMTs above, technology and a change in the tracking systems dictate the consideration of VMTs below as estimates only.

Vehicle Miles Traveled by Department (2008)

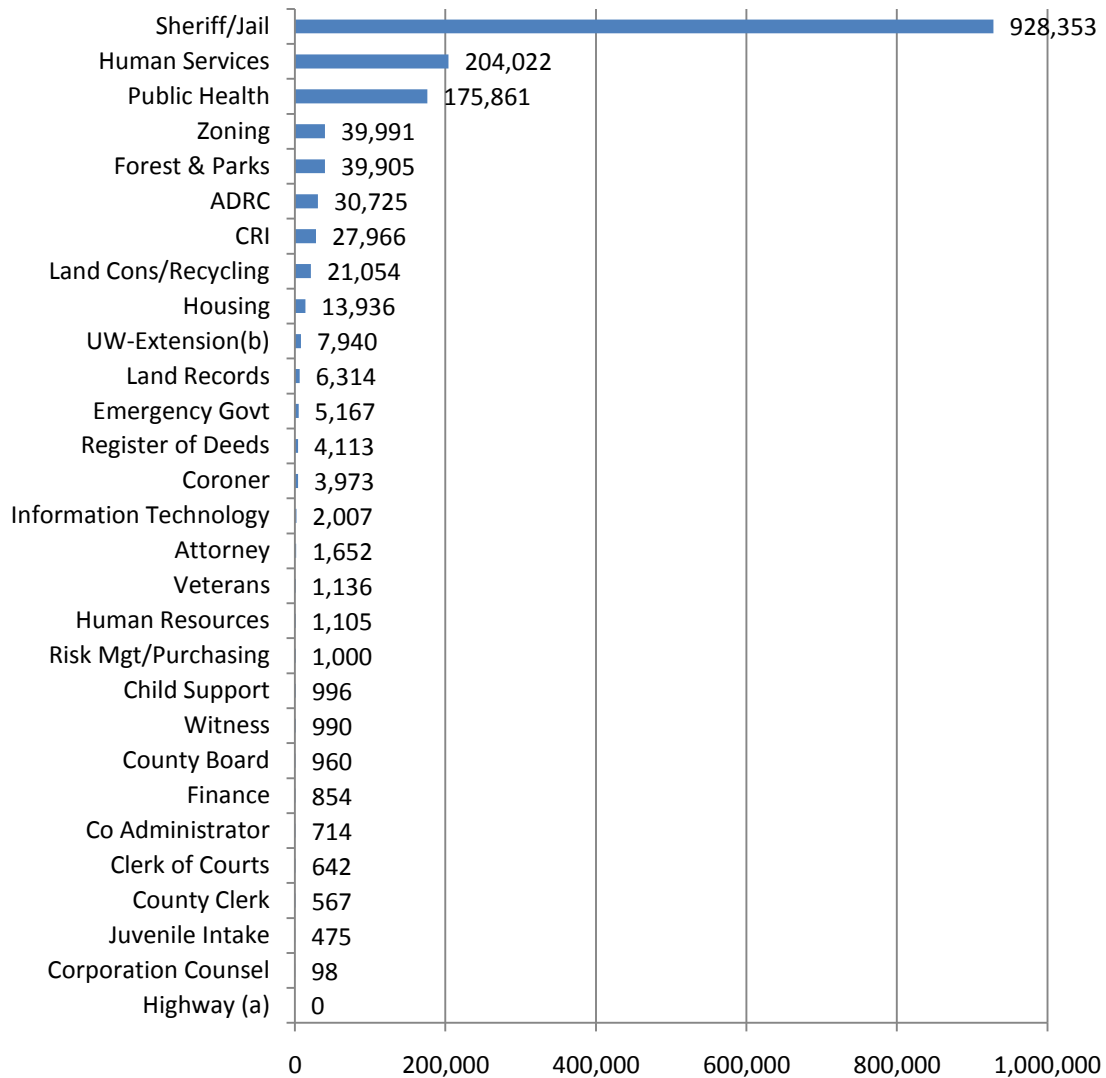


Figure 16 VMTs by Department/Program (2008)

(a) One significant caveat to figure 13 is that the Highway department does not currently track vehicle mileage rendering data unavailable. Based on fuel consumption data it is likely that the Highway Department has more VMTs than any other department in County government.

(b) UW-Extension VMTs are under reported because the current tracking system does not account for personal VMTs by UW-Extension employees. The UW-Extension VMT data reflects use of the shared fleet only for 2008. This situation is being addressed as part of improved financial tracking software.

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Due to a lack of appropriate data, fuel efficiency was not estimated for any of the vehicle fleets the County maintains. It's clear that improving the overall fuel efficiency of the County fleet will need to be a main priority in order to meet the County's energy reduction goals.

Current Energy Expenditures

The County spent a total of \$1,824,022 dollars on energy in 2008 (Table 3). The largest single category of expense was for diesel fuel (\$963,843), followed by electricity (\$323,448), gasoline (\$254,683), natural gas (\$208,469), propane (\$43,347) and oil (\$30,329).

Table 3 Energy Expenditures by Fuel Type (2008)

End Use	Type of Energy Consumed	Unit Type	Annual Consumption	Annual Expenditure
Facilities	Propane	Gallons	28,448	\$43,347
	Natural Gas	CCF (hundred cubic feet)	149,112	\$208,469
	Electricity	kWh (kilowatt hours)	3,707,826	\$323,351
		Sub-Total	NA	\$575,167
Transportation	Gasoline, Regular Unleaded	Gallons	112,394	\$254,683
	Diesel	Gallons	316,731	\$963,843
	Oil	Gallons	4,055	\$30,329
		Sub-Total	433,180	\$1,248,855
		Total		\$1,824,022

Transportation contributed 69% to the County's total energy bill in 2008 while facilities contributed 31%. (Figure 17). Transportation represented 66% of the County's energy consumption in 2008 while facilities represented 34%, suggesting that at least for 2008 the cost per BTU was less for facility related energy needs than for transportation related energy needs.

2008 Percent Contribution to Total Energy Expenditures by End Use

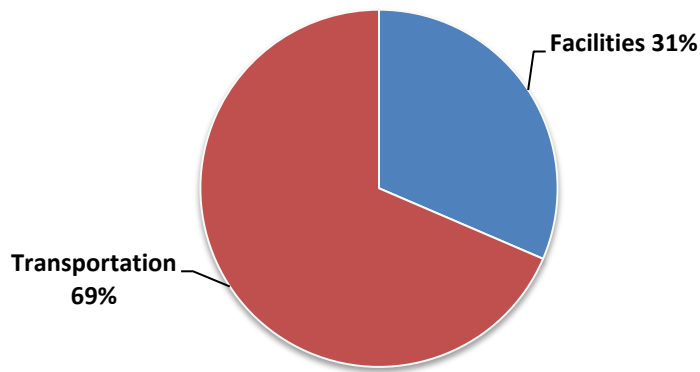


Figure 17 Percent Contribution to Total Energy Expenditures by End Use (2008)

2008 Percent Contribution to Total Expenditure by Energy Type

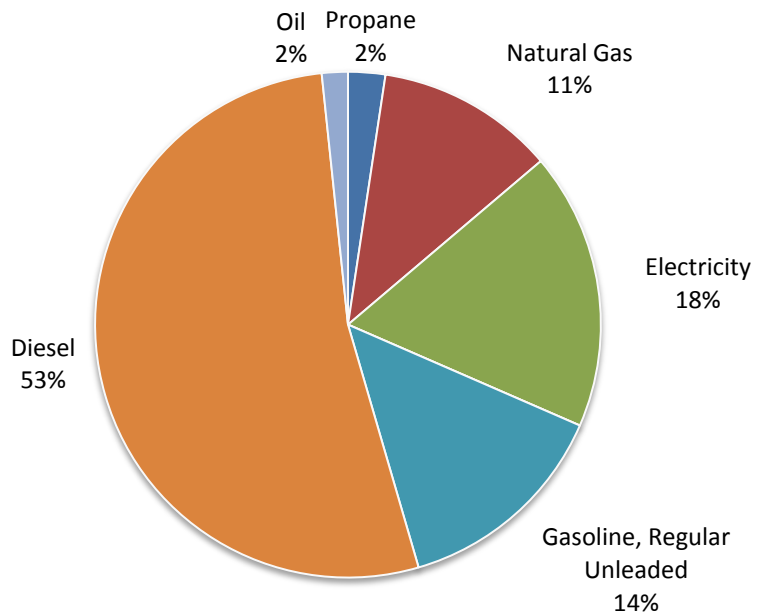


Figure 18 Percent Contribution to Total Energy Expenditure by Energy Type (2008)

Figure 18 above shows the relative contribution to the County's total energy expenditure by type of energy purchased. Diesel fuel represented just over half (53%) of the County's total expenditures on energy in 2008.

Facility Energy Expenditures

The County spent \$573,264 total on energy for facilities in 2008. Of that total, it spent \$323,351 dollars purchasing electricity, \$208,469 on natural gas, and \$43,347 dollars on propane (Figure 19)

2008 Facility Expenditures by Fuel Type

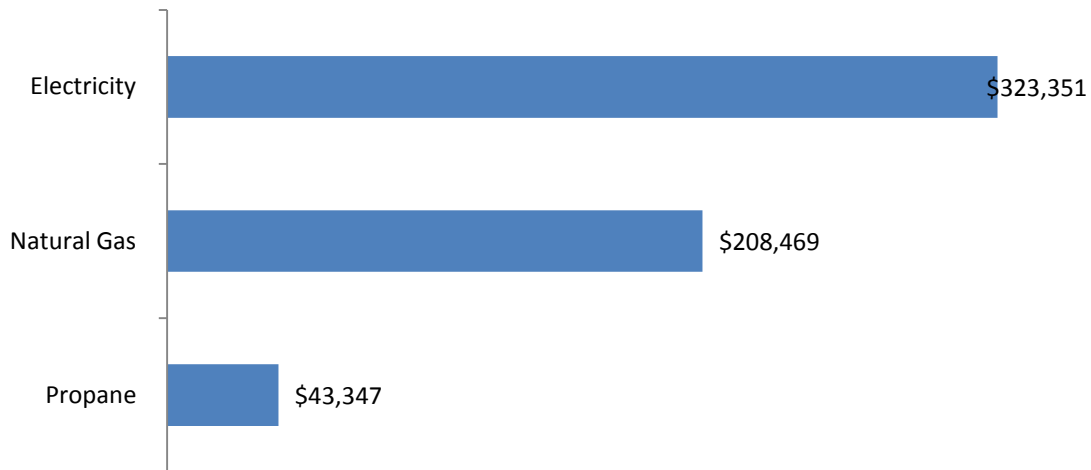


Figure 19 Facility Expenditures by Fuel Type (2008)

A breakdown of the \$323,351 in electric energy costs is provided in figure 20. The courthouse and the jail combined for 73% of all the County's expenditures on electricity in 2008. According to the MEP study, the electrical cost of the courthouse is \$1.01 per square foot per year while the sheriff's office is \$1.06 per square foot per year. The average cost of an office building in the U.S. is \$1.38 per square foot per year.

2008 Electricity Expenditures by Metered Facility

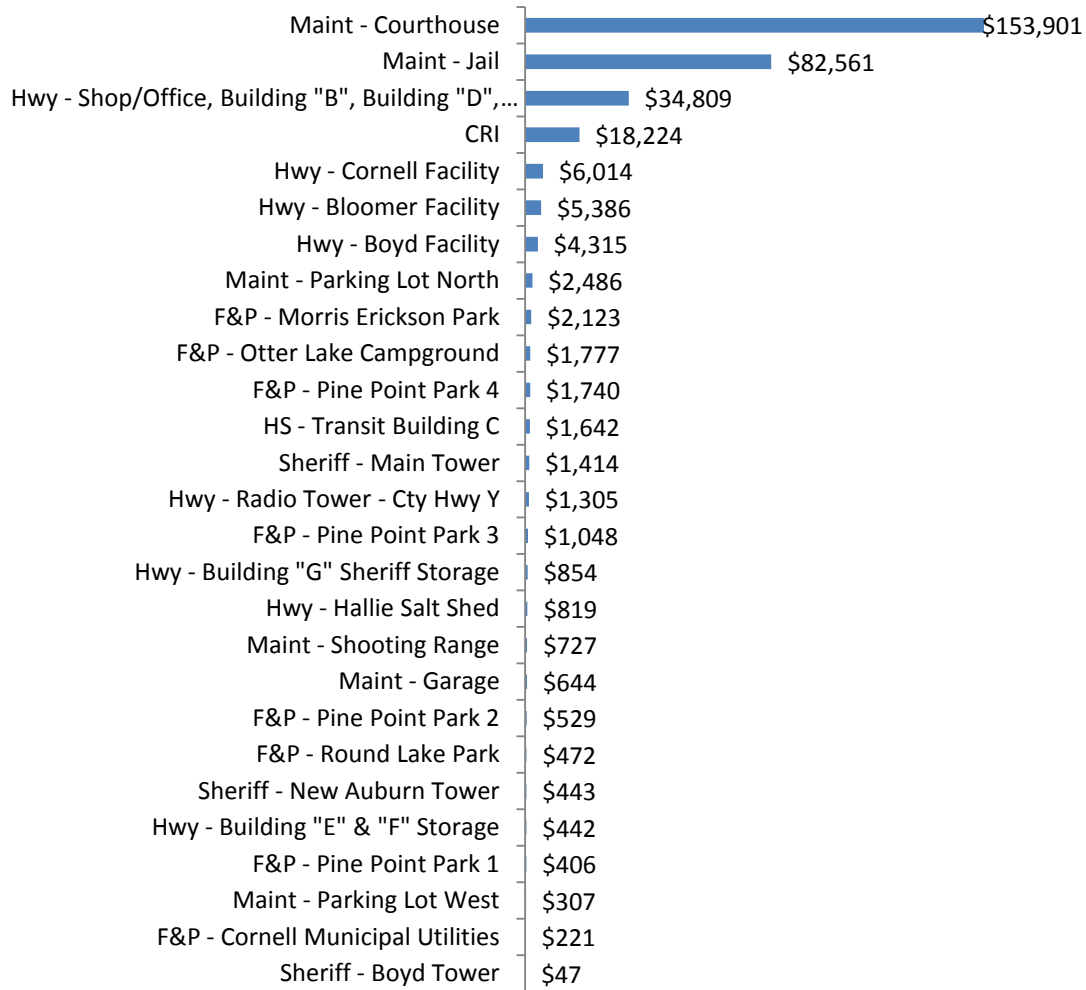


Figure 20 Electricity Expenditures by Metered Facility (2008)

Chippewa County spent \$208,469 on natural gas in 2008. Figure 21 provides a breakdown of costs by facility. 72% of natural gas expenditures were related to the heating plant in the jail which serves the County's main campus. An additional 22% of natural gas expenditure were associated with highway facilities.

2008 Natural Gas Expenditures by Facility

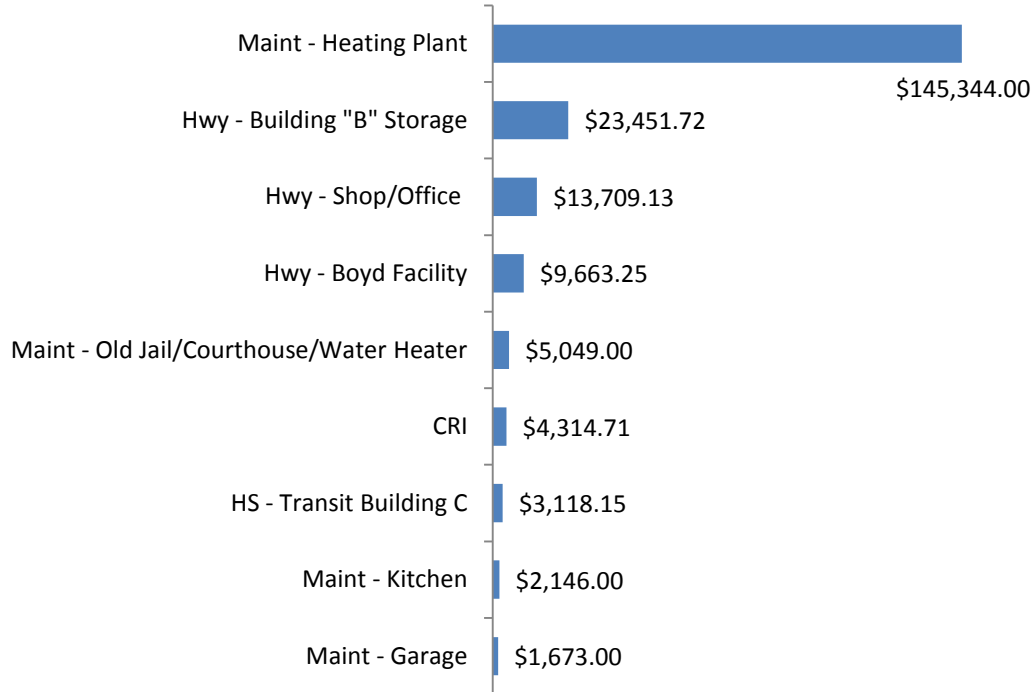


Figure 21 Natural Gas Expenditures by Facility (2008)

Propane expenditures were split evenly between the two highway facilities which use propane (Figure 22)

2008 LP Gas Expenditure by Facility

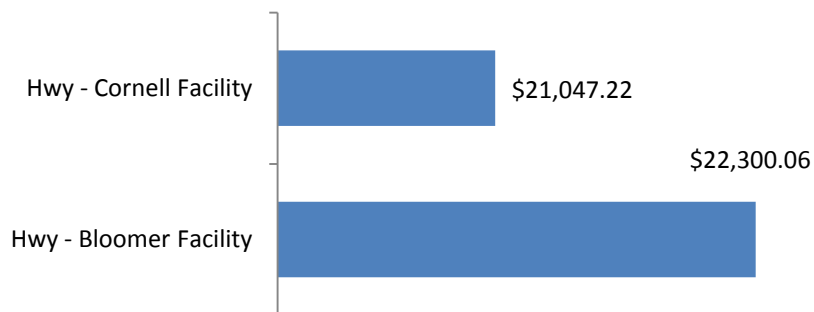


Figure 22 LP Gas Expenditure by Facility (2008)

Transportation Energy Expenditures

The County spent \$1,248,855 dollars total on energy for transportation in 2008. This figure does not include energy used in the production of road and highway construction. Of that total, \$963,843 was spent on diesel, \$254,683 was spent on gasoline, and \$30,329 was spent on oil (Figure 23).

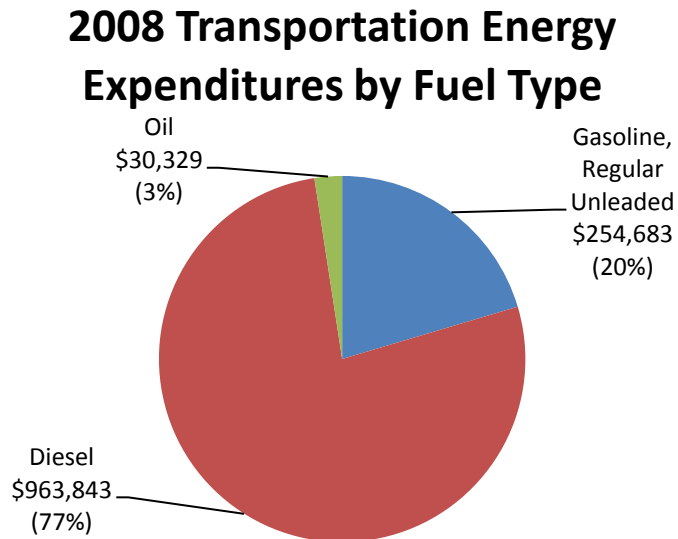


Figure 23 Transportation Energy Expenditures by Fuel Type (2008)

Transportation expenditures were not broken down by department for this report.

Environmental Impacts of Current Energy Use

In addition to costing money, energy use has other costs as well. The following data is intended to highlight the environmental cost of Chippewa County government operations related to facility and transportation energy use. This inventory is an estimate and is not intended to be used as the County's official carbon footprint.

In 2008, the combined total carbon dioxide (**CO₂**) emissions for County facility and transportation operations was **16.43 million pounds (lbs.) or 8,217 U.S. tons**. Facilities and Transportation were each responsible for roughly half the County's total emissions (Figure 24).

2008 CO2 Emissions from County Operations

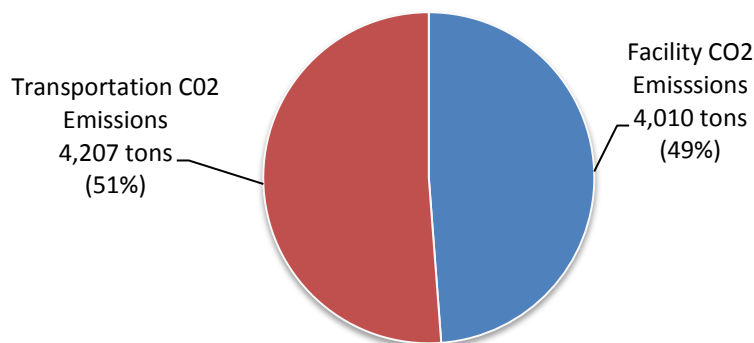


Figure 24 CO2 Emissions from County Operations (2008)

Table 4 below provides a breakdown of environmental impacts and energy equivalency data associated with Facility Energy use including electricity and natural gas. It does not include impacts associated with the County's propane use.

In 2008 Facility energy use generated 8,019,446 lbs. or 4,010 tons of CO₂. The energy used by facilities also generated 13,728 lbs. or Sulfur Dioxide and 8,536 lbs. of Nitrous Oxide, both leading contributors to acid rain.

The amount of energy consumed by facilities is equivalent to the energy embedded in 9,589 barrels of oil, 1,854 tons of coal, or 19 coal cars. Facility energy use is equivalent to the energy requirements of 526 Wisconsin homes or 725 typical Wisconsin cars.

Table 4 Environmental Impacts and Energy Equivalents of Facility Energy Use

Equivalent Metric Description	Total Equivalent Metric Consumed: Annual <u>Facility</u> Operations ⁴
CO2 (lbs.) (1)	8,019,446
SO2 (lbs.)	13,728
Barrels of Oil (7)	9,859
NOx (lbs.)	8,536
Tons of Coal (4)	1,854
Cars	725
No. of Homes (2)	526
Coal Cars (5)	19

(1) CO₂, Sox, Nox conversion factors are based on research by PA Government Services for Focus Programs.

(2) Assumes 9,960 kWh to power an average single family home in Wisconsin for one year.

(4) Assume one pound of coal to generate one kWh.

(5) Assume 100 tons per coal car.

(7) Assumes one barrel of crude oil (42 gallons) is 5,800,000 Btus at 138,095 Btu/gal and 1 kWh = 3,413 Btus.

⁴ Facility estimates were made using Focus on Energy Energy Savings Estimating Guidelines Xcel Worksheet available at <http://energyindependence.wi.gov>

Chippewa County Comprehensive Energy Conservation Plan

Table 5 shows the environmental impacts and energy equivalent data related to County transportation energy usage in 2008. Transportation energy consumption generated 8,413,536 lbs. or 4,207 tons of CO₂ emissions in 2008. Those CO₂ emissions were equivalent to the CO₂ emissions generated by the annual operation of 699 cars, the burning of 8,875 barrels of oil, or the emissions generated by the combustion of 20 rail cars of coal.

Equivalent Metric Description: Transportation	Total Equivalent Metric Consumed: CO ₂ from <u>Transportation Operations</u> ⁵
CO ₂	8,413,536
Cars	699
Barrels of Oil	8,875
Coal Cars	20

Another way to consider the environmental impacts of the County's energy consumption is to look at what it would take to offset or mitigate the greenhouse gas emissions which the County is responsible for.

Chippewa County's 2008 total CO₂ emissions related to facility and transportation operations was 8,217 tons. That amount of CO₂ emissions is equal to:

- The amount of CO₂ sequestered by 191,125 tree seedlings grown for 10 years.
- The amount of CO₂ sequestered annually by 1,694 acres of pine or fir forests

The data presented above provides a rough inventory of the County's 2008 carbon dioxide and other emissions. This inventory provides a starting point for the County to begin quantifying the environmental impact of its operations. Such an inventory should assist the County to:

- Identify its greatest sources of greenhouse gas emissions (GHG)
- Understand and track emissions trends over time
- Quantify the benefits of activities that reduce GHG emissions
- Track progress at reducing emissions
- Set goals and targets for future emissions

Readily available tools including the EPA's Portfolio Manager allow the County to record, monitor, and track energy and water consumption and their environmental impacts.

⁵ Transportation estimates were made using EPA's Greenhouse Gas Equivalencies Calculator <http://www.epa.gov/cleanenergy/energy-resources/calculator.html>

Chippewa County Comprehensive Energy Conservation Plan

Current Energy Conservation Projects

Chippewa County has recently implemented and is currently implementing a number of energy conservation measures. The following is a *partial* list of facility related energy conservation measures recently undertaken by the Maintenance Department. Over \$60,447 worth of Focus on Energy grants are being applied to these projects. For the period June-July 2009, electricity consumption decreased 18% when compared to June-July 2008 due to courthouse lighting upgrades. Documented annual energy savings from the other projects listed below should show additional impact once the 2009 energy data has been analyzed.

- Installation of a new chiller for the main campus, new motor, and variable frequency drives (2009)
- Installation of a power factor corrector to improve power efficiency at the jail (2008)
- Chiller service spring tune up (2009)
- AC service (2009)
- Installation of motion sensor switches on numerous lights (2008)
- 3,000 fluorescent lamps upgraded (2008-2009)
- Additional lighting upgrades at the County Courthouse (2008-2009)
- A Comprehensive Energy Audit of County Facilities – MEP (2009)
- Technology upgrades to power down idle computer equipment (2009)
- Boiler tune up (2008)
- Steam trap service (2008)

The following is a *partial* list of transportation, highway facility related energy conservation, and renewable energy measures recently undertaken. See Appendix C for a summary of Highway Department energy conservation projects identified through a focus on energy report. The lighting upgrades alone are projected to save the County over 30,000 kWh per year.

- Application for an ethanol fuel station (2009)
- Purchase of a hybrid vehicle for the fleet (2009)
- Investigation into alternative fuel vehicles (2008-2009)
- T-8 lamp fixture upgrades at Highway Shops and Storage facilities (2009)
- Purchase of energy efficient light bulbs (2009)
- Door controls (2009)
- Switch from diesel generated power at the hot mix plant to three phase power. This was estimated to have a payback of less than two years
- Investigation of programmable thermostats (2009)

Energy Conservation Goals and Objectives

Goal:

Chippewa County will become a statewide leader in energy efficiency and reduce its energy consumption 10% by 2010 and 20% by 2011

Chippewa County used 88,844 million BTUs of energy in 2008 at a cost of over \$1,824,022 to taxpayers. To meet the stated goal above, the County will need to reduce its annual energy consumption to 79,960 million BTUs in 2010 and then to 71,075 million BTUs in 2011. These are very ambitious targets and achieving them will require a substantial investment in time and money, however the anticipated savings to the county in both energy and costs will offset long-term expense. The seven objectives below compose the overall strategy to achieve the stated goal for energy reduction, but to achieve the long term benefits will require investment.

Objectives:

- 1) **Institute an ongoing energy conservation program to systematically record, monitor, and manage the energy used in conducting County operations.**
- 2) **Evaluate and upgrade the existing Countywide energy data collection system to more accurately track facility and transportation energy use, billing services, and cost savings**
- 3) **Develop and implement a capital improvement plan which incorporates facility energy efficiency, conservation, and renewable energy upgrades for each County-owned facility.**
- 4) **Develop a transportation energy management plan that establishes specific energy savings improvements for all County owned vehicles and transportation related operations.**
- 5) **Develop and adopt policies which maximize energy conservation potential related to County facilities and operations; and consider developing policies which will boost energy efficiency and conservation in the community.**
- 6) **Develop an educational program to support the County's Energy Conservation Plan**
- 7) **Implement immediate low cost energy conservation projects**

The strategy for reducing energy consumption is to continue to focus on all aspects of County operations, building off of and increasing existing energy efficiency improvements. Table 5 shows the targeted energy savings by fuel type. The scenario below would require significant investments in both transportation and facilities over the next several budget cycles.

Chippewa County Comprehensive Energy Conservation Plan

Table 5 Energy Conservation Targets by Fuel Type

Type of Energy Consumed	Annual Consumption	Targeted 2010 Energy Consumption (10% Goal)	Cumulative Energy Reduction Required to meet 2010 Goal (2008 baseline)	Targeted 2011 Energy Consumption (20% Goal)	Cumulative Energy Reduction Required to meet 2011 Goal (2008 baseline)
Propane	28,448 (gals)	25,603 (gals)	2,845(gals)	22,758 (gals)	5,690 (gals)
Natural Gas	149,112 (ccf)	134,200 (ccf)	14,912(ccf)	119,290 (ccf)	29,822 (ccf)
Electricity	3,707,826 (kWh)	3,337,043 (kWh)	370,078(kWh)	2,966,261 (kWh)	741,565 (kWh)
Gasoline	112,394 (gals)	101,155 (gals)	11,239 (gals)	89,915 (gals)	22,479 (gals)
Diesel	316,731 (gals)	285,058 (gals)	31,673 (gals)	253,385 (gals)	63,346 (gals)
Oil	4,055 (gals)	3,650 (gals)	405 (gals)	3,244 (gals)	811 (gals)

Plan Implementation

Action Plan

Objectives:

- 1) **Institute an ongoing energy conservation program to systematically record, monitor, and manage the energy used in conducting County operations.**

Description

A baseline inventory of annual energy use has been established using 2008 as a base year, following methods outlined in the 'Planning Method' section of this report.

In conducting this inventory, a process was developed to systematically compile, record, and report operational energy use, as documented through electrical and gas meters, gasoline and diesel fuel pumps, and fleet and employee vehicle mileage records.

To establish an ongoing energy conservation program, it is recommended that this inventory be systematically maintained and continuously updated through ongoing recordkeeping.

Under this approach, the 2008 inventory would be used as a program "benchmark" for the purpose of establishing and pursuing the County's initial energy conservation goals outlined in the 'Energy Conservation Goals and Objectives' section of this report.

To institute this program, the roles and responsibilities of the County Board, County Administrator, facility managers, and individual departments should be clearly defined and established through formal administrative policy or County ordinance.

Chippewa County Comprehensive Energy Conservation Plan

The proposed responsibilities for each group, including individual responsibilities for periodic goal setting, continuous energy monitoring and reporting, ongoing energy conservation program budgeting and implementation, are outlined in the 'Roles and Responsibilities for Plan Implementation' section of this report.

Affected stakeholders

- County Board
- Facility Managers
- County Administrator
- Department Heads

Advantages

Provides clear structure and framework for the County to pursue and document energy conservation over time

Increase likelihood of achieving energy savings

Disadvantages

Additional administration and increased oversight

Cost & Potential Funding Sources

Costs associated with this objective are staff time related. Potential funding sources to cover this objective are the Focus on Energy programs which may provide some administrative funding for plan implementation.

Action Plan (Responsible)	By When	Additional Resources Required	Performance Measure
Draft ordinance to codify roles and responsibilities related to energy conservation program (County Administrator, Corporation Counsel)	10/31/09	20 hrs. staff	Ordinance drafted
Change job descriptions (Human Resources)	12/31/09	30 hrs. staff	Job descriptions changed
Introduce ordinance to Executive committee (County Administrator)	10/31/09	10 hrs. staff	
County Board approves ordinance (County Board)	12/31/09		Ordinance adopted

Chippewa County Comprehensive Energy Conservation Plan

2) **Evaluate and upgrade the existing Countywide energy data collection system to more accurately track facility and transportation energy use, billing services, and cost savings**

Description

To develop this plan, a Microsoft Excel spreadsheet was used to assimilate data related to the County's use of various energy sources. An accurate estimate of baseline energy use was established using three separate tracking systems to record electrical, natural gas, and transportation fuel consumption.

As the County applies this tracking system to monitor energy use, shortcomings will become apparent. Efficiencies will be gained if the inadequacies of the current recordkeeping and monitoring system are documented as part of the 2009 tracking cycle. Potential areas to improve upon the current tracking system include:

- Fuel efficiency by vehicle
- Miles travelled and/or transportation fuel consumption by department
- Overall energy consumption by department
- Energy use by facility broken down by energy type and energy per square foot (SF) of building space
- Benchmarking of energy use per SF compared with other County government facilities in Wisconsin and the U.S.

To improve the utility of the existing system, software upgrades should be evaluated that would allow the County to track energy consumption, flag errors, track consumption patterns to verify the success and/or failure of implementation projects, and create future projections to aid in the development of energy consumption and expenditure forecasts.

A work group or energy consultant should identify an appropriate energy accounting system to meet this objective. The Springbrook software should be evaluated as part of this process for compatibility with energy data collection. There are several low/no-cost software packages available such as EPA's Energy Star Portfolio Manager (<https://www.energystar.gov/istar/pmpam/>)

Affected stakeholders

- Staff currently compiling, tracking energy consumption
- Facility Managers
- County Administrator
- IT Department

Advantages

Increase efficiency of data collecting and use, provide better use of information including benchmarking energy use compared with other counties

Disadvantages

Cost associated with developing custom software or purchasing software and training; additional staff time required to identify best option

Chippewa County Comprehensive Energy Conservation Plan

Cost & Potential Funding Sources

Staff time for IT, Administration, and Facility Managers

\$10,000 for Highway Shop Pump Software upgrade to track fuel efficiency

Focus on Energy is a potential funding source

Action Plan (Responsible)	By When	Additional Resources Required	Performance Measure
Change the Hwy Shop pump software system to overcome existing limitations including ability to track fuel efficiency by vehicle (Highway Commissioner)	3/31/10	40 hrs. staff	Software updated or changed
Continue utilizing the current system in place through 2010 in order to maintain consistency (Administration, IT, Facility and Fleet Managers)		10 hrs/wk staff time	
Identify shortcomings of existing system for tracking energy usage, desired attributes of future tracking system; research alternative solutions (Administration, IT, Facility and Fleet Managers)		80 hrs. staff time	
Choose a technology and provide recommendation for future energy tracking system including budget requirement for implementation to County Administrator for inclusion in 2011 budget (Administration, IT, Facility and Fleet Managers)	9/1/10	80 hrs. staff time	County Administrator receives written recommendation for enhanced tracking system

Chippewa County Comprehensive Energy Conservation Plan

3) Develop and implement a capital improvement plan which incorporates facility energy efficiency, conservation, and renewable energy upgrades for each County-owned facility.

Description

Chippewa County has completed a major energy audit for the main campus. The results of the audit, combined with energy savings projects identified by Focus on Energy and the Maintenance Department, will be incorporated into a capital improvement plan. See the Appendix D for a copy of the Energy Conservation Recommendations currently being discussed at the County's Buildings and Grounds committee.

In order to achieve the energy conservation targets by 2010 and 2011 the County will need to invest heavily in energy efficiency and in changing employee behavior.

Energy efficiency investments identified in this plan will achieve 10% energy savings by 2011 at a total cost of roughly \$750,000 assuming the County can take advantage of stimulus funding. These investments are targeted primarily for facility improvements at the main campus. These improvements will decrease the County's energy consumption by 9,148 MM BTU or 10.3%. They will result in annual energy savings of approximately \$120,000.

Changing employee behavior will be critical in order to achieve the other 10% reduction in energy consumption. This reduction will have to come primarily from the transportation sector. These savings will be necessary in order to offset the costs of investing in facility energy efficiency improvements. These savings will also be needed should the County wish to invest in alternative transportation technologies that will allow the County to meet its transportation needs using less and cleaner energy, such as additional electric vehicles or biofuel infrastructure development.

If the County is able to implement the 10% and 20% targets and reap the associated energy cost savings, it should be able to recoup its energy conservation investments by 2013. By that same year the County should realize energy cost savings of \$320,000 annually compared with 2008. By 2015, the forecasted cumulate energy cost savings would reach \$634,869 and by 2020 reach \$2,238,224.

In fall 2009, the County has an unparalleled opportunity to leverage its energy conservation investments by taking advantage of the ARRA Energy Conservation Block Grant program. Up to \$225,000 in cash grants are available to communities for building facility upgrades that reduce energy consumption. The County is extremely well positioned to receive one of these competitive grants by demonstrating its strong commitment to energy conservation in its grant proposal.

The County can demonstrate its commitment to energy cost savings and efficiency by adopting this energy conservation plan. Doing so will allow the County to take advantage of a rare opportunity to double its investment in energy conservation should it receive the ARRA cash grant.

While the upfront costs of energy conservation are significant, the long-term benefits will far outweigh them. If energy conservation measures are implemented using low interest bonds, grants, and other attractive financing options, the County will be able to recoup its energy investments through on-going energy savings over a very short period of time. Once those debts are paid off, then the County will reap on-going annual savings as a result of its investments.

Chippewa County Comprehensive Energy Conservation Plan

The County also recently completed a solar hot water assessment (See Appendix E). While solar hot water is not considered a priority investment at this time, it may be an attractive option in the future. Additional renewable energy assessments should be completed to assess the viability of wind, solar, and bio-energy generation for County use. Results of the renewable energy assessments should also be incorporated into the County's capital improvement plan and funding should be sought through the American Recovery and Reinvestment Act and other sources.

Affected stakeholders

- Facility managers
- Finance director and County Administrator
- County staff
- County Board

Advantages

Provides a long term planning window for energy conservation project implementation; improves fiscal planning by placing energy saving investments into capital improvement plan; high potential for reducing risk exposure to fluctuating energy prices; potential to position County as a leader in clean energy development

Disadvantages

Additional time requirement for Staff to prepare plan; investment in additional staff for effective plan implementation

Cost & Potential Funding Sources

\$80,000 for Senior Maintenance Tech position

Focus on Energy; Potential Cost Savings from Forests and Parks merger

Action Plan (Responsible)	By When	Additional Resources Required	Performance Measure
***Develop a capital improvement plan using results of the MEP energy audit to upgrade existing facilities for energy efficiency, conservation and renewable energy where appropriate. Look into QREBs or CREBs programs as potential funding source (Maintenance Director, Finance Director, County Administrator, Highway Commissioner)	12/31/09	60 hrs. staff	Capital improvement plan updated to include energy conservation investments

Chippewa County Comprehensive Energy Conservation Plan

Create a part-time or full time Maintenance Tech position ⁶ to provide energy management and technical assistance to facility manager(s) and to aid in implementation of energy conservation plan including maintenance management software system and small project implementation (County Administrator)	12/31/10	\$80,000	Position created
Implement high priority/medium cost energy conservation projects identified in the MEP energy audit (Maintenance Director)	12/31/11	\$200,000 Staff time	Projects completed
Implement high priority/high cost energy conservation project Heat Pump Chiller (<i>Appendix D priority ARRA 3</i>)	12/31/10	\$229,000	Project completed
Perform solar, wind, and bio-energy site assessments at targeted County facilities to determine feasibility(Maintenance Director, Highway Commissioner, UW Extension Agent)	12/31/10	\$10,000	Feasibility studies completed; turned into County Administrator

***Several additional energy efficiency options were identified in the MEP study “Energy Assessment for Chippewa County Courthouse Facility” submitted to the County July 1st, 2009. There are two larger, high priority projects which would be good candidates for inclusion in a capital improvement plan if not funded through ARRA grant dollars. These are the Summer Boiler and the Heat Pump Chiller. The cost for the boiler is \$163,300 and the cost for the chiller is \$229,000. The boiler would result in annual savings of \$17,700 and the chiller would result in annual savings of \$62,400. The simple payback period for the boiler is 9.6 years and the simple payback for the chiller is 3.7 years (See Appendix D Priority ARRA 1,3).

4) **Develop a transportation energy management plan that establishes specific energy savings improvements for all County owned vehicles and transportation related operations.**

Description

Transportation services are dramatically changing in the County as a result of restructuring. The ADRC will likely be taking over all transportation contract administration and service coordination from the Department of Human Services and Veterans. The impact of these changes should be looked at as the County prepares a plan to reduce energy consumption.

⁶ The County chose not to seek funding for this position during the last funding cycle because the energy audit was not completed at the time and therefore the County did not have a list of specific projects to implement.

Chippewa County Comprehensive Energy Conservation Plan

This plan suggests that each department develop written strategies to reduce transportation related energy consumption each year in order to meet targeted goals. The compilation of those strategies shall compose the County's transportation energy management plan. However, because transportation energy consumption is concentrated within a few departments, it may make sense to focus on those departments first.

The transportation energy management plan will document how the County will pursue its energy conservation goals through transportation and associated operations. The plan should include strategies to conserve energy by 1) reducing Vehicle Miles Traveled and 2) optimizing fuel efficiency (See Appendix F Transportation Energy Efficiency Outline for an overview of these two strategies).

The County also plans to continue looking at vehicle fleet usage in the near future to determine if it has the correct number of vehicles for existing needs. The fleet manager will continue to develop a vehicular capital improvement plan based on the correct number of vehicles needed as well as a maintenance program to maximize the fuel efficiency of County fleet vehicles.

Affected stakeholders

- Highway Shop
- All Departments using Transportation Fuel

Advantages

Significant potential to contribute to County energy conservation goals through use of technology

Disadvantages

Additional time commitment to develop plan; significant investment in more efficient technologies and employee training on how to use them

Cost & Potential Funding Sources

Hwy staff time and Department Head

Action Plan (Responsible)	By When	Additional Resources Required	Performance Measure
Track and monitor effectiveness of new Ford Fusion hybrid electric vehicle	6/30/10		
Each department develops a written strategy to reduce 2010 transportation related energy consumption by 10% using average of 2008 baseline. See Department Head's Roles and Responsibilities section of this plan (All Department Heads)	12/31/09	30 staff hrs. per department	Written Energy Conservation strategies submitted to County Administrator as part of budgeting process

Chippewa County Comprehensive Energy Conservation Plan

Each department share copy of written strategy including fleet related needs and suggestions with hwy department for fleet management (All Department Heads)	12/31/09		Strategies submitted to Hwy Dept
Purchase additional hybrid vehicles for County's fleet (Highway Commissioner)	12/31/10	\$100,000	Vehicles purchased

- 5) **Develop and adopt policies which maximize energy conservation potential related to County facilities and operations; and consider developing policies which will boost energy efficiency and conservation in the community.**

Description

Energy conservation is a complex topic. In order to achieve real savings it is necessary to pursue a long term approach and to understand how energy conservation affects all parts of the organization and its mission. The County recently passed the 25X25 Wisconsin Energy Independent Communities resolution (See Appendix G). The committee recommends that that County Board and the County Administrator consider a wide range of additional energy conservation policies and programs. See Energy Policy Recommendations section of the plan for a list of policies to consider.

Affected stakeholders

- County Board
- County Administrator

Advantages

Reviewing and adopting additional energy conservation related policies beyond this plan will increase the likelihood of this plan being implemented successfully

Disadvantages

Additional time commitment; need for leadership to identify appropriate committees or work groups to research and propose additional policies

Cost & Potential Funding Sources

Cost includes staff time; \$2K budget for expenses to investigate additional energy policies

Action Plan (Responsible)	By When	Additional Resources Required	Performance Measure
Identify potential energy related policies for further consideration and assign a committee or work group to further explore them and bring forward recommendations (County Administrator, County Board)	12/31/09		Committee or work group assigned

Chippewa County Comprehensive Energy Conservation Plan

Work group develops energy policies for administrator and County Board to approve/disapprove	11/31/10	72 hrs. staff time (6 staff @12 hrs. each)	Set of policy recommendations submitted to County Administrator
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6) **Develop an educational program to support the County's Energy Conservation Plan**

Description

Employee behavior is central to the success of long-term energy conservation. Employees who are involved in energy conservation efforts themselves are more likely to be supportive of County goals and objectives related to energy.

Staff support and/or consultant support should be provided to help coordinate and implement educational components of the plan.

A County 'Green Team' should be formed to provide education and information to County employees to assist them in becoming more energy conscious. The Green Team should work with the County's energy managers to provide departments with their energy usage data so they can take the steps necessary to achieve across the board energy savings.

The Green Team should develop a pro-active marketing and communication program to communicate energy and related successes and progress to employees.

Affected stakeholders

- All employees
- County Departments contributing Green Team members
- UW-Extension department

Advantages

Increase likelihood of successful plan implementation; increase staff awareness and knowledge of energy related technologies

Disadvantages

Staff time, cost, need to shift resources from other programs

Cost & Potential Funding Sources

\$3,000 for materials; staff time

Chippewa County Comprehensive Energy Conservation Plan

Action Plan (Responsible)	By When	Additional Resources Required	Performance Measure
Form a "Green Team" comprised of County Staff and formalize mission and 12 month work plan including target audiences and educational outcomes. (UW Extension Agent, Risk Manager)	11/1/09	20 hrs. staff time for coordinator plus 50 hrs total for 8 staff volunteers	Team formed; written mission and work plan submitted to C.A.
Increase department head and employee awareness of purpose and scope of energy conservation plan; provide each department with their "Vehicle Miles Traveled data" for 2009 and other baseline energy consumption data from 2008 (Green Team)	MLK day 2010 & January 10 Dept Head presentation	30 hrs. staff time	Presentations conducted
Organize and conduct training for all County staff on use of teleconferencing and video conferencing technologies. Develop a ridesharing tool. (Green Team, IT department)	3/1/2010	40 hrs staff	Training complete
Post energy conservation fact sheets and informational links on County's intranet and internet. (UW Extension Agent)	4/1/2010	10 hrs. staff	Website updated
Organize at least one energy efficiency, conservation, and renewable energy training for County Employees (UW Extension Agent, Green Team)	6/1/2010	40 hrs. staff	Training complete

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Develop a highly visible system to highlight progress being made to achieve energy conservation targets including \$'s saved, pollution averted, and jobs created (UW Extension Agent, Green Team)	9/1/2010	120 hrs. staff	System in place
Develop recommendations for buildings and grounds committee to consider reducing the number of appliances in the courthouse while maintaining sufficient resources for County staff to eat lunch, take breaks, etc...Include recommendations for purchase of new Energy Efficient appliances where applicable. (Green Team)	10/1/2010	40 hrs. staff	
Make recommendation to continue for one more year or disband (Green Team, Reynolds)	12/31/2010		Decision communicated to County Administrator

7) **Implement immediate low cost energy conservation projects**

Description

Several recently completed energy savings studies and surveys provide opportunities for low cost energy savings projects which the County should pursue. These studies include the Focus on Energy energy audit, the MEP comprehensive energy audit, the Employee energy survey, and projects identified by the Energy committee and Maintenance Department during preparation of this plan. The following *types* of items should be budgeted for completion in the 2010 and 2011 budget cycles.

- Switch out all security lights at County Parks to compact fluorescent or LED technology
- Install light sensors in facility rooms with high electric load
- Purchase and install energy efficient appliances in break room(s)
- Reduce all County vehicle engine oil use by decreasing oil drain intervals within manufacturer's guidelines
- Reduce vehicle and equipment idling time
- Immediately make available video/teleconferencing technology to all County employees
- Reduce amount of mowed turf in and around County Parks and Facilities and consider planting native or low maintenance plants instead

Chippewa County Comprehensive Energy Conservation Plan

- Renegotiate fuel contracts
- Evaluate feasibility of reducing cargo weight in County vehicles
- Reduce Air Conditioning use in County Vehicles
- Evaluate/reduce salt application on roads and parking lots
- Change out refrigerated water fountains where appropriate
- Other relevant immediate energy savings projects

Affected stakeholders

- All employees
- Maintenance, Highway, and Parks & Forests Departments

Advantages

Immediate contribution to energy reduction goals put forth in the plan

Disadvantages

Staff time, cost, may be dependent on availability of additional maintenance tech position being created

Cost & Potential Funding Sources

Staff time; \$20,000

Action Plan (Responsible)	By When	Additional Resources Required	Performance Measure
Identify and prioritize immediate/low cost energy conservation projects using FOE audit, employee survey and facility manager data and develop a timeline for implementing the projects (Maintenance Director, Highway Commissioner, and Other Departments with metered facilities)	12/1/09	40 hrs. staff time	Timeline completed; submitted to C.A.
Implement projects (Maintenance Director, Highway Commissioner, and Other Departments with metered facilities)	12/31/10	PT Maintenance Tech Position	Projects implemented
Compile and update an "Impacts and Achievements" section within the Annual Energy Conservation Report comprising list of all 2008, 2009, 2010 and subsequent energy conservation projects implemented along with associated energy and cost savings over time using 2008 as a baseline. (Maintenance Director, Highway Commissioner, and Other Departments with metered facilities)	Annually by 12/31	40 hrs. staff time	Report submitted to CA

Chippewa County Comprehensive Energy Conservation Plan

Roles and Responsibilities for Plan Implementation

County Board

1. Consider, amend, and adopt Energy Conservation Plan.
2. Set short and mid-term energy conservation goals.
3. Develop and adopt policies, partnerships, and ordinances, as they apply to energy conservation for County operations.
4. Consider and adopt annual budgets and multi-year financing strategies to:
 - A. Pursue operational goals for energy conservation.
 - B. Fund specific energy conservation measures.
5. Receive and review an Annual Energy Conservation Report.

County Administrator

1. Assist the County Board, as necessary, to pursue its responsibilities.
2. Administer and supervise an energy conservation program for County operations:
 - A. Assure that energy use is properly metered, and that records of energy use are systematically maintained to provide the basis for ongoing energy monitoring and energy conservation decisions.
 - B. Receive and compile regular records of energy use.
 - C. Prepare an Annual Energy Conservation Report. The report will be used to report and monitor progress toward meeting energy use and conservation goals. The report will document:
 - i. The preceding year's metered annual energy use (fuel, electricity) in relation to 2008 baseline energy use.
 - ii. The activities implemented to conserve energy in the preceding year.
 - iii. Budgeted Activities as proposed by the Department Heads, the facility managers, and the County Administrator to conserve energy in the upcoming years
 - iv. Environmental and fiscal benefits accrued to date and prior year as result of energy efficiency improvements
 - v. A status report of progress made to date on achieving each of the objectives put forth in this plan – broken out by progress made since plan inception and progress made over past year to date
 - vi. Longitudinal benchmarking data comparing County's energy use with other similar sized County operations.

Chippewa County Comprehensive Energy Conservation Plan

- D. Set and communicate annual energy conservation targets through the annual budget process.
- E. Receive and evaluate annual energy conservation plans proposed by the Department Heads and Facility and Fleet Managers.

Facility and Fleet Managers (Depts. that meter energy use)

- 1. Record, report, and monitor metered energy use, as measured for County facilities by electrical and gas meters, and for County-owned vehicles by County-owned fuel pumps including for oil and other petroleum-based products used for vehicles.
- 2. Develop periodic (annual) energy conservation plans for County-owned facilities and vehicles to meet energy conservation targets and goals, established through the annual budget process.

Department Heads

- 1. Record (monthly) and report fuel energy consumption not metered by facility managers (i.e. vehicle miles traveled (VMT's) through personal use vehicles).
- 2. Develop annual energy conservation strategies for their department operations to meet energy conservation targets and goals, established through the annual budget process.
- 3. Review Annual Energy Conservation Report.

Figure 25 below provides a visual representation of the management cycle for addressing County related energy goals and objectives.

Energy Conservation Management Cycle - Chippewa County Operation

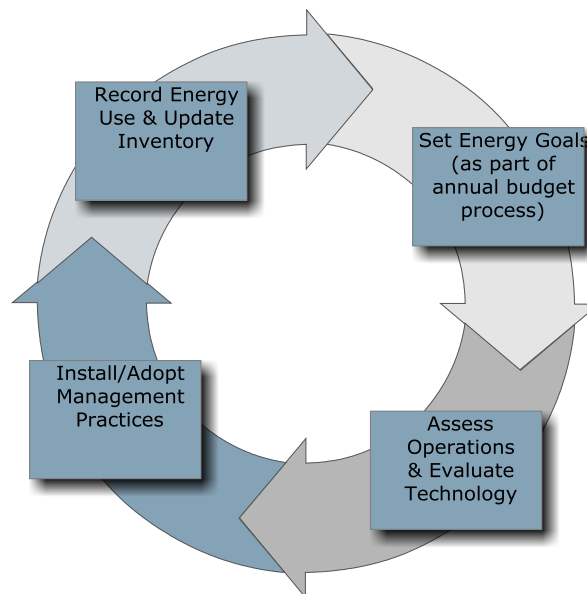
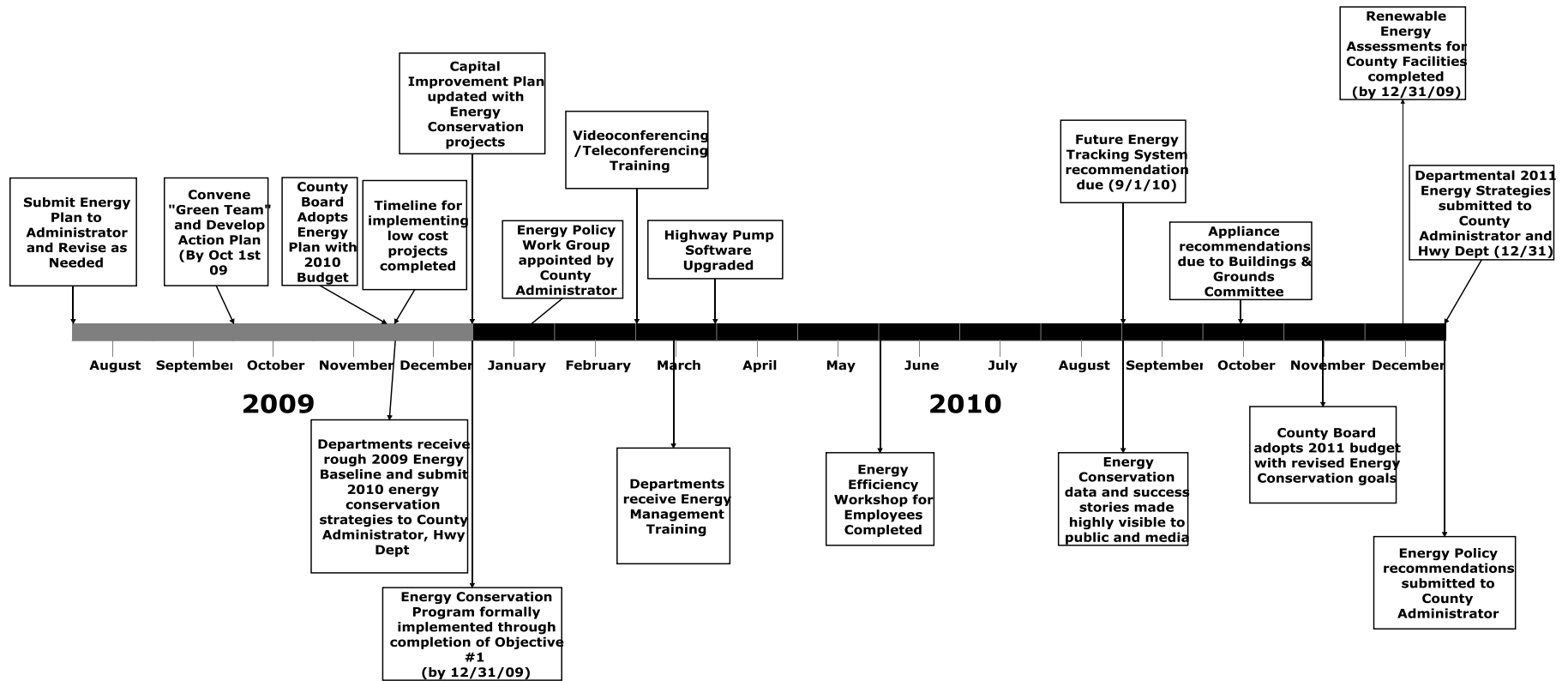


Figure 25 Management Cycle Diagram for County Energy Policy

Chippewa County Comprehensive Energy Conservation Plan

Timeline



Chippewa County Comprehensive Energy Conservation Plan

Measure	Potential Energy Savings/Benefit	Additional Resources Required	2010 Budget Request	2011 Budget Request	Other Potential Funding Sources
Upgrade Fleet Mgmt Software	Better vehicle tracking including by energy efficiency	\$10,000	\$10,000	0	
Perform Renewable Energy Assessments	Determine feasibility of future solar, wind, biomass projects at County facilities	\$10,000	\$10,000	0	Focus on Energy (FOE)
***Create PT/FT Senior Main Tech position (See justification below)	Reduced service contracts; increased functionality	\$80,000 New position	\$80,000	\$80,000	\$\$\$ Savings from reduced service contracts, FOE
Upgrade to hybrid vehicles	Pilot hybrid vehicles for county fleet; gas savings	\$100,000	\$100,000	0	ARRA, DOT grants
Implement MEP high priority/medium cost Energy Conservation Projects (<i>See Appendix D priorities 1-8</i>)	230,397 kWh annually 24,677 therms annually \$40,500 annually	\$200,000	\$200,000	0	Focus on Energy
Implement MEP high priority/high cost Energy Conservation Projects (<i>See Appendix D priorities ARRA 1,3</i>)	16,296 kWh annually 57,313 therms annually \$79,400 annually	\$392,300	\$163,300	\$229,000	ARRA (up to \$225,000), Bonding, FOE
Implement immediate low cost Energy Conservation Projects	Not determined	\$20,000	\$10,000	\$10,000	Focus on Energy
Implement Energy Conservation Education Program	Provide departments tools to reach energy savings targets	\$5,000	3,000	\$2,000	Focus on Energy
Total Budget Request 2010,2011			\$676,300	\$321,000	
Accumulated Dollar Savings Projected (a) by Year 2015 (\$634,869); by Year 2020 (\$2,238,224)					

- (a) Assumptions: Reduced service contracts =\$25,000/year savings; ARRA grant received=\$225,000; Low cost conservation projects=\$5,000/year savings; Maintenance Position funded over entire time period. Electricity and natural gas costs remain stable. Transportation fuel costs based on 2008 data. Transportation energy reduction targets of 10% and 20% achieved using 2008 as baseline. Dollars not adjusted for inflation.

Chippewa County Comprehensive Energy Conservation Plan

***Budget Justification for Senior Maintenance Technician Position

The creation of a senior maintenance technician position will enable the County to:

- Reduce its currently contracted maintenance services.
- Improve the efficiency of existing facilities through routine equipment servicing, tuning, and calibration leading to cost savings and improved employee comfort levels.
- Quickly complete smaller energy conservation projects in house which will result in cost savings and improved employee comfort levels.

The senior maintenance technician position will perform the following duties:

- Assist with gathering information that will be required to load the new maintenance management software package.
- Complete preventative maintenance on Heating, Ventilation, Air Conditioning, and Building Automation System equipment.
- Complete corrective maintenance on Heating, Ventilation, Air Conditioning, and Building Automation System equipment.
- Complete small energy conservation projects.
- Improve on our existing Fire System preventative maintenance program.

Partnerships

The County should look for additional opportunities to partners up with business, non-profit, and other local units of government to meet its energy conservation goals and objectives. There may be opportunities for sharing knowledge and other resources to accomplish mutual objectives. See “Partnership Policies” in Energy Policy Recommendations section below for additional partnership recommendations.

Funding Sources

There are several new funding opportunities emerging to support municipal energy efficiency planning and project implementation. The table below highlights relevant potential funding sources to support implementation of the County’s energy plan.

Focus on Energy	Multiple Grants Available www.focusonenergy.com Grants available for energy efficiency and renewable energy related projects for County government.
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Wisconsin Department of Commerce	Energy Efficiency and Conservation Block Grants – As a non-entitlement community, Chippewa County will be eligible to apply for these ARRA funds through Dept. of Commerce when the funding is made available http://www.commerce.wi.gov/COM/COM-Recovery.html Diesel Truck Idling Reduction Grant Program -- Annual Grant Cycle
Wisconsin DNR	ARRA Wisconsin Clean Diesel Grant Program http://dnr.wi.gov/air/mobile/CleanDieselGP.htm
Federal Stimulus (ARRA)	Energy Efficiency and Conservation Block Grants - Competitive Grant Program Chippewa County will be eligible to apply for these funds directly from the Federal Government when the notice is let.
U.S. Treasury Department	Clean Renewable Energy Bonds http://www.irs.gov/irb/2007-14_IRB/ar17.html Qualified Energy Conservation Bonds http://www.irs.gov/newsroom/article/0,,id=205018,00.html

Energy Policy Recommendations

A successful energy plan is contingent upon a set of supporting policies, partnerships, and other measures that align with the plan's goals and objectives.

As the County Board examines its policies related to energy, it should consider the opportunities that exist to align cost-driven energy concerns with other potential community priorities:

- green job creation and economic development
- pollution reduction
- assistance to low-income populations

If the County Board looks at energy policy through the lens of job creation, pollution reduction, and energy savings for County residents, it may identify win-win strategies for accomplishing multiple goals simultaneously.

The following is a list of recommendations for potential areas where the County Board and/or County Administrator can take steps to strengthen energy policy that will support energy conservation and other energy related goals.

Recommendations are divided into three categories – those which are primarily operational in nature, those which focus on developing partnerships, and those which are focused on community programs and services.

Chippewa County Comprehensive Energy Conservation Plan

Policy Recommendations

Operational Policies

- 1) Develop a policy that specifies the range of acceptable temperatures in courthouse facilities
- 2) **Develop a policy for appliances in the courthouse**
- 3) Aggressively pursue energy efficiency grant funding and other mechanisms to leverage County investments in energy conservation.
- 4) Devote some level of additional dedicated staff or consultant time to focus on implementing the energy plan.
- 5) Develop a comprehensive energy policy for the County that addresses both internal and community energy issues; include recommendations related to siting ordinances for wind, solar, and other renewable energy projects.
- 6) Develop and implement a GHG tracking system in concert with the energy conservation plan

Partnership Policies

- 7) Form an inter-governmental energy task force to identify cooperative strategies for energy reduction in the Chippewa Valley
- 8) Join WI Office of Energy Independence Energy Independent Communities program (completed)
- 9) Work with State to reduce barriers to finance energy efficiency and renewable energy deployment and develop synergistic programs and policies that leverage federal investments
- 10) Participate in NACO or Energy Star Energy Conservation challenge(s)
- 11) Position Chippewa County Government to be a leader in the promotion of energy efficiency and renewable energy for both the County and the community.

Program and Service Policies

- 12) Explore programs/services which could be made available to Chippewa County homeowners, businesses to increase energy efficiency and stimulate renewable energy
- 13) Explore alternative financing mechanisms which could be used to stimulate households and businesses to increase energy efficiency and deploy more renewable energy

Chippewa County Comprehensive Energy Conservation Plan

- 14) Support the deployment of renewable energy on County owned land and facilities to serve as a teaching tool and encourage private investment
- 15) Develop and maintain support for an inter-departmental “green team” to provide recommendations for on-going energy conservation measures related to transportation and facilities
- 16) Re-examine the current vehicle policy to reduce energy inefficiencies (including requirement that tank must be re-fueled when at $\frac{3}{4}$ full)
- 17) Examine facility use policy to identify potential energy savings if meeting times were limited and determine feasibility of implementing a four day work week, flex time, compressed work week, staggered work hours, or other energy saving scheduling options
- 18) Evaluate alternative service delivery option ideas identified through Employee Energy Survey and report back findings to all employees and follow up on those that make sense
- 19) Adopt energy standards for all equipment purchased by the County where appropriate
- 20) Form a regional consortium to reduce energy efficient vehicle costs, and to accelerate medium and heavy duty hybrid truck market
- 21) Invest in long-term energy efficiency and renewable energy strategies through dedicated funding streams and other financing methods
- 22) Develop a green building policy for new construction
- 23) Develop a “Sustainability Plan” for the County that addresses transportation, facilities, land use, economic development, housing, etc...
- 24) Develop a system of user incentives to encourage aggressive resource and energy reduction by County employees (for example, departments are returned 10% of energy savings)

Appendices

- Appendix A Chippewa County Ad Hoc Energy Committee Charge**
- Appendix B MEP Energy Audit**
- Appendix C Focus on Energy Highway Department Reports**
- Appendix D Energy Conservation Recommendations for Buildings and Grounds**
- Appendix E Solar Hot Water Assessment**
- Appendix F Transportation Energy Efficiency Outline**
- Appendix G Energy Independent Communities Resolution (25x25)**
- Appendix H Energy Costs and Use for 2006 – 2009**

Appendix A Chippewa County Ad Hoc Energy Committee Charge

A CONCEPTUAL OUTLINE OF COMMITTEE CHARGE
TO STUDY ENERGY CONSERVATION ISSUES AND OPPORTUNITIES
AS THEY DIRECTLY IMPACT COUNTY OPERATIONS

This is an ad hoc study and advisory committee. The committee is advisory to the County Administrator.

The committee has been created to:

1. Document energy consumption and costs associated with county operations, and
2. Develop an energy conservation plan with recommendations for consideration by the County Administrator and/or the County Board.

Duties and Responsibilities

1. Compile information regarding the types of energy consumed in county operations and service delivery.
2. 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.

3. Select a method or evaluation framework.
4. Compile and review the current policies, methods, and management approaches now used in Chippewa County to conserve energy.
5. 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, and monitor energy use and costs through time.

In evaluating these examples, identify the general strengths and shortcomings of each approach.

6. Using the knowledge gained, develop a written energy conservation plan which could be used to limit the county's energy use 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 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 courthouse facilities, satellite facilities, and the county vehicle fleet.

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.

At a minimum, these options will include:

- i. The retrofit of buildings to improve energy efficiency.
 - ii. The alteration of building operation to conserve energy.
 - iii. The purchase of any energy-efficient equipment.
 - iv. The education of employees about energy conservation methods.
- C. A five (5) year budget that projects anticipated costs and funding sources that will be pursued to implement the program recommendations.
 - D. An ongoing monitoring program with assigned duties and responsibilities to systematically measure ongoing energy consumption and to evaluate change and energy savings through time.

Appendix B MEP Energy Audit

The Energy Assessment for Chippewa County Courthouse

July 2009

Performed by MEP Associates

Is referenced as an Appendix to the Chippewa County Energy
Conservation Plan

Contact Larry Ritzinger

Maintenance Department Director

Chippewa County

for additional information

Appendix C Focus on Energy Highway Department Reports

April 14, 2009

Mr. Paul Mohr
Chippewa County Highway Department
801 E. Grand Avenue
Chippewa Falls, WI 54729

Dear Mr. Mohr:

First, on behalf of Focus on Energy, I would like to thank you for taking the time to meet with me regarding energy opportunities at several of your buildings. As you are aware, our goal is to provide you with ideas and identify opportunities that would save energy dollars.

All of the buildings we looked at are several years old, but very well maintained. In the following, I would like to offer a detailed discussion concerning a number of specific energy issues and provide some suggestions for you to consider.

David and I looked at several buildings - Cornell Highway Shop, Boyd Highway Shop, Bloomer Highway Shop, and Building C Bus Barn.

Lighting – One of the first areas we look at is lighting because it is at least 50% of your electric bill. Obviously, lights are needed to function within a building, but there are a couple items to consider when saving energy, turning off lights when the space is not occupied, convert to more energy efficient lamps, or upgrade existing fixtures to new energy efficient ones.

Exit lights – All of the exit lights appear to be changed or converted to LED lamps. If this in fact is not true, replace the lamps with a LED lamp kit or replace the fixture, the payback is very short and should be the very first energy project implemented for these buildings. Unfortunately, we no longer offer incentives for exit lights as of July 2007.

Office, lunch room & bathroom – The lighting fixtures in the three shops are new technology T- 8 fluorescent lamps and electronic ballasts. All of these spaces also have occupancy sensors. Staff should still be encouraged to turn off lights when their space is not occupied. Any time they will be gone for more than a minute, turn them off.

When relamping, specifically request 25 watt lamps for the new fixtures. A 25 watt lamp uses almost 7 watts less in energy than the typical 32 watt T-8 lamp, yet provides nearly the same amount of light output.

Also, lamp color is very important. Specifying 5,000 kelvin color lamp, which is a whiter color more like natural sunlight, provides easier reading of printed material, which some of this space is used for. Understand, the 25 watt lamps are more expensive (about \$3 each), yet the energy savings over the life of the lamp will be about \$7 compared to a typical 32 watt lamp.

Group relamping involves changing out all of the lamps in a work space near the end of the lamps life. Your lamps have a life of approximately 20,000 hours and should be replaced at approximately 18,000 hours for good light levels and excessive failures. Group relamping also saves downtime because it can be scheduled over a weekend or shutdown period and saves labor costs over replacing as they fail.

Create a spreadsheet when group relamping. Recording the hours of operation and estimated lamp life for the space, will provide data of when to order lamps and schedule the next relamp.

Cornell, Bloomer, & Building C Shops/Storage – All three of these building spaces have ceiling mounted HID fixtures. I suggest you consider replacing the HID fixtures with T-8/T-5 four foot fixtures. A six lamp T-8 fixture normally will replace a 400 watt HID, providing more light output with less light depreciation over time, and better light quality when 5,000 kelvin lamps are used. The best part, a six lamp T8 fixture will use less than half of the energy.

Boyd Shop – This shop has already been converted to T-8 6 lamp fixtures.

Exterior Security Lights – The outside lighting for all buildings appears to be HPS, which at this time, is probably the most reliable and cost effective light source. If any of these lights happen to be MV (mercury vapor), they should be replaced with HPS. MV will last forever, but the light output keeps reducing yet using the same energy. Also, MV can be replaced with a much smaller wattage HPS lamp.

Heating System – The heat for the lunch rooms, rest rooms, and offices is supplied by a rooftop furnace located on the roof. Temperature control is provided by thermostats. Significant savings will result from reducing the temperature during all non-occupied hours.

My biggest concern is the environment and the dirt that is showing on the room heat terminal openings. It suggests that the filters should be changed more often to eliminate some of this dirt. Also, the furnace should be cleaned on a regular basis making sure it is operating properly and efficiently. I would assume that the duct work is also accumulating dirt and should be cleaned periodically.

The garage/shop spaces are heated with Modeen type heaters, that are not very efficient, but appropriate for the application.

As a reminder, grants are available for the annual furnace tune-up.

Exhaust Fans – The exhaust fan used to clear the vehicle exhaust from the building and should be reviewed regularly. The system tends to be a large CFM fan/motor that can take a lot of heated air out of the building. When they are operated longer than necessary, they can waste a lot of heat energy.

DHW - The domestic hot water is point of use and a good choice for this type of application.

Temperature – Setting back the building temperature during unoccupied hours will also save energy. The rule is as follows:

- For every degree that the temperature is lowered in a 24 hour period, the savings is 2% of that day's energy.
- Lowering the temperature, for even half of a day, will save 1% for each degree.

It is important to remind everyone to keep windows and doors closed when that space is being heated or cooled.

Building Envelope – The goal in saving energy is to reduce the heat loss or limiting unwanted cold outside air from entering the building.

Windows – The windows are double pane and relative for the application.

Insulation – The insulation levels in the walls and ceiling spaces should be checked to make certain they are adequate. R-44 is recommended for the ceiling and about R-19 for the walls.

Caulking – The exterior caulking around all of the windows and doors should be reviewed annually. Make sure it is not cracked or missing as this is a source of air entering the building causing drafts and increasing your energy costs.

Door Maintenance – Each of the buildings had several service doors and a number of large overhead doors.

Service doors should be reviewed regularly during the heating season. Inspect the thresholds and the seals to make sure they are not damaged or missing. If you can see light around the door, it needs repair. Almost all of them were in some need of repair.

All of the overhead doors we looked at will require adjustments to the rails so they fit properly and/or seals so they eliminate any cracks at the bottom, top and sides. Another issue is to keep the time the overhead doors are left open to an absolute minimum. This can reduce the amount of heat loss and the energy bill. Only opening one door at a time will also eliminate the wind tunnel affect when opposing doors are open.

Focus on Energy Grants

Grants are available provided the building is served by a participating utility.

Implementation Grants – All energy saving opportunities should qualify for a Focus on Energy grant. Grants are based on the estimated first year savings of kW, kWh, or therms of natural gas for each measure implemented. Projects that do not have a

contractor or equipment cost may not be funded, but would be recorded on behalf of the customer.

It is important to contact me before doing any energy projects. I cannot give you a retro-active grant.

Summary

That concludes my comments. I trust you will find the information presented useful. If you have any questions or concerns, I would be more than glad to answer them.

I am always available to support you at meetings, project reviews, or with calculations for any of your energy saving opportunities.

Sincerely,

Darrell Beeksma
Energy Advisor

August 28, 2008

Mr. Paul Mohr
Chippewa County Highway Department
801 E. Grand Avenue
Chippewa Falls, WI 54729

Dear Mr. Mohr:

First, on behalf of Focus on Energy, I would like to thank you for taking the time to meet with me regarding energy opportunities at the village hall. As you are aware, our goal is to provide you with ideas and identify opportunities that would save energy dollars.

The building is several years old but very well maintained. In the following, I would like to offer a detailed discussion concerning a number of specific energy issues and provide some suggestions for you to consider.

Lighting – One of the first areas we look at is lighting because it is at least 50% of your electric bill. Obviously, lights are needed to function within a building, but there are a couple items to consider to save lighting energy, turning off lights when the space is not occupied, convert to more energy efficient lamps, or upgrade existing fixtures to new energy efficient ones.

Exit lights – All of the exit lights should be changed or converted to LED lamps. Either replace the lamps with a LED lamp kit or replace the fixture if it needs to be updated. In either case, the payback is very short and should be the very first energy project implemented. Unfortunately, we no longer offer incentives for exit lights as of July 2007.

Office & hall lighting – The lighting fixtures are new technology T- 8 fluorescent lamps and electronic ballasts. The only suggestion is to make sure the staff turns off lights when their space is not occupied. Any time they will be gone for more than a minute, turn them off.

When relamping, specifically request 25 watt lamps for the new fixtures. A 25 watt lamp uses almost 7 watts less in energy than the typical 32 watt T-8 lamp yet provides nearly the same amount of light output. Also, lamp color is very important. Ask for 5,000 kelvin color lamps. This whiter color is more like natural sunlight but is easier to read printed material, which is much of what this space is used for. Understand, the 25 watt lamps are more expensive (about \$3 each), yet the energy savings over the life of the lamp will be about \$7 compared to a typical 32 watt lamp.

Group relamping involves changing out all of the lamps in a work space near the end of the lamps life. Your lamps have a life of approximately 20,000 hours and should be replaced at approximately 18,000 hours for good light levels and excessive failures.

Group relamping also saves downtime because it can be scheduled over a weekend or shutdown period and saves labor costs over replacing as they fail.

Create a spreadsheet when a group relamp is done. Recording the hours of operation for the space and estimated lamp life will provide data of when to order lamps and schedule the next relamp.

Stairwells – The two lamp T-8 fixtures are very difficult to change due to height. My suggestion would be to consider replacing with another technology called “QL Induction Lighting”, which has an expected life of 100,000 hours or 3 to 4 times that of the existing fixtures. LED fixtures may also be a possible option.

Sensors – An occupancy sensor will make sure the lights are out when the space is not occupied. Bathrooms and meeting rooms are good examples where a sensor will work well. The lady’s bathroom did have a sensor, but the men’s bathroom/locker area did not have sensors.

Shop – This area has ceiling high HID fixtures and a lot of T-12 work area lights. I would suggest that you ask for one or more proposals from qualified contractors, but specifically require computer generated photo metrics that will verified the desired light levels needed.

The HID fixtures should be replaced with T-8/T-5 four foot fixtures. A six lamp T-8 fixture normally will replace a 400 watt HID with equivalent or more quality light and use about half of the energy. As you indicated, the staff only uses certain bays with others open and not used for long periods of time. Some switching changes would allow the lights to be off in the unoccupied bays. In addition, day light sensors would turn off the ceiling lights when there is more than enough natural light from the open doors.

The work lights can be replaced or retro-fitted with T8 lamps and electronic ballasts but I would suggest that occupancy sensors should be installed to turn them off when your staff are not in the immediate area.

Parts area – The lights over the parts racks are on during working hours. It is my suggestion that several sensors should be added to turn off the lights when that area is not being used.

Mechanical Room – The building heat is supplied by several high efficient furnace located in two locations. Temperature control is provided by programmable thermostats with some scheduling capability. As we discussed, make sure that the warm up is a short as it can be and the occupied schedule matches the occupancy of the building.

The domestic hot water is point of use and a good choice for this application.

Upstairs Office Area – The thermostat for the north part of the area is in an office which I suggest should be moved to the open office area. You may want to consider putting a

separate duct for the office, which is adjacent to the furnace room with its own thermostat.

Another issue, as mentioned by staff, is how cold the floor and wall on the north side can be, a result of the overhang. I would strongly suggest that you investigate how the overhang is insulated and how much insulation is actually installed. Adding insulation or a different type (spray foam) of insulation may help the problem.

Temperature – Setting back the building temperature during unoccupied hours will also save energy. The rule is as follows:

- For every degree that the temperature is lowered in a 24 hour period, the savings is 2% of that day's energy.
- Lowering the temperature for even half of a day will save 1% for each degree.

It is important to remind everyone to keep windows and doors closed when that space is being heated or cooled.

Building Envelope – The goal in saving energy is to reduce the heat loss or limiting unwanted cold outside air from entering the building.

Windows – The windows are double pane and very efficient.

Insulation – The insulation levels in the walls and ceiling spaces should be checked to make certain they are adequate. R-44 is recommended for the ceiling and about R-19 for the walls.

Caulking – The exterior caulking around all of the windows and doors should be reviewed annually. Make sure it is not cracked or missing as this is a source of air entering the building causing drafts and increasing your energy costs.

Door Maintenance – Doors should be reviewed regularly during the heating season. Inspect the thresholds and the seals to make sure they are not damaged or missing. If you can see light around the door it needs repairs.

Truck Storage Building – There are 56 HID fixtures in this building, 8 of which are used as emergency lights and are burning 24 X 7. I have two suggestions. First, all of the HID's fixtures should be changed to T-8/T-5 fixtures that will consume half of the energy. Secondly, I suggest adding a 1 lamp T-8 fixture above each entrance door that is on or on an occupancy sensor so it comes on as soon as the door opens. Eliminate the 8 fixtures as night or emergency lights. The potential savings for just the 8 HID's is 3.5 peak kW per month, 30,660 kWh per year and at \$.065 per kWh is equals to \$1,993.

Another issue is the fact that all four garage doors open when resetting the door opening system. The heat lost from that building is tremendous with four huge 20' X 18' holes in

the building. You really need to correct this problem. I have requested some additional information to generate an estimate of the amount of heat wasted with the system.

The exhaust fan used to clear the vehicle exhaust from the building should be reviewed regularly. The system tends to be large CFM fan/motor that can take a lot of heated air out of the building. When operated longer than necessary can waste a lot of heat energy.

Focus on Energy Grants

Grants are available provided you are served by a participating utility.

Implementation Grants – All energy saving opportunities would qualify for a Focus grant. Grants are based on the estimated first year savings of kW, kWh, or therms of natural gas for each measure implemented. Projects that do not have a contractor or equipment cost may not be funded, but would be recorded on behalf of the customer.

It is important to contact me before doing any energy projects. I cannot give you a retro-active grant.

Summary

That concludes my comments. I trust you will find the information presented useful. If you have any questions or concerns, I would be more than glad to answer them.

I am always available to support you at meetings, project reviews, or with calculations for any of your energy saving opportunities.

Sincerely,

Darrell Beeksma
Energy Advisor

Appendix D Energy Conservation Recommendations for Buildings & Grounds

Energy Conservation Recommendations

Priority	O&M / ECM	Description	Implementaion Cost (dollars)	Annual Projected Savings (dollars)	CO2 Savings (lbs / year)	Simple Payback (years)	Maintenance (Technical) Staff Time (increase hours) (decrease hours)		Employee Comfort (increase)	Notes
1	O&M-1a	Reduce Outdoor Air	\$49,836.00	\$20,919.00	268,245	2.40		x	x	2
2	O&M-4	Dock - Install Service Door	\$5,600.00	\$1,649.00	21,144	3.40		x	x	3
3	ECM-6	Energy Efficient Motors (12)	\$7,340.00	\$1,336.00	29,232	(2.7 - 10.4) 5.50				
4	ECM-10	Parking Lot Light Levels	\$4,140.00	\$1,032.00	27,197	4.00				
5	ECM-100	Lighting T-12 to T-8	\$22,773.00	\$4,800.00		4.75				4
6	O&M-1b	Reduce Outdoor Air 1951 / AHU-3	\$18,909.00	\$2,969.00	38,068	6.40			x	5
7	ECM-4	Install VFD on Fan Motors (4)	\$52,250.00	\$6,282.00	138,934	8.30			x	
8	ECM-4	Install VFD on Fan Motors (4)	\$14,250.00	\$1,496.00	33,081	9.50				
			\$175,098.00	\$40,483.00	555,901	4.32				
Priority	O&M / ECM	Description	Implementaion Cost (dollars)	Annual Projected Savings (dollars)	CO2 Savings (lbs / year)	Simple Payback (years)	Maintenance (Technical) Staff Time (increase hours) (decrease hours)		Employee Comfort (increase)	Notes
9	ECM-6	Energy Efficient Motors (2)	\$1,198.00	\$86.00	1890	13.80				
10	ECM-5	Pneumatic to DDC (HVAC Controls)	\$757,300.00	\$42,778.00	213,314	17.70		x	x	6
11	ECM-3	Energy Recovery Ventilators (4)	\$265,794.00	\$55,559.00	670,965	4.78	x			7
			\$1,024,292.00	\$98,423.00	886,169	10.41				
Priority	O&M / ECM	Description	Implementaion Cost (dollars)	Annual Projected Savings (dollars)	CO2 Savings (lbs / year)	Simple Payback (years)	Maintenance (Technical) Staff Time (increase hours) (decrease hours)		Employee Comfort (increase)	Notes
ARRA-1	ECM-2	Summer Boiler (Heating & Dom. Water)	\$163,300.00	\$17,000.00	199,462	9.60	x			11
ARRA-2	ECM-101	Solar (Domestic Water)	\$200,000.00	\$20,000.00		8.00 - 10.00				12
ARRA-3	ECM-1	Heat Pump Chiller (Heating & Dom. Water)	\$228,537.00	\$62,400.00	473,584	3.70	xx			13
Priority	O&M / ECM	Description	Implementaion Cost (dollars)	Annual Projected Savings (dollars)	CO2 Savings (lbs / year)	Simple Payback (years)	Maintenance (Technical) Staff Time (increase hours) (decrease hours)		Employee Comfort (increase)	Notes
	ECM-8	Lighting Sensors (large areas)	\$255.00	\$52.00	1232	5.00	x			9
	ECM-8	Lighting Sensors (offices)	\$65.00	\$7.00	164	9.50	x			9
	ECM-11	Courtroom Lighting	\$2,300.00	\$227.00	5434	10.20				9
Priority	O&M / ECM	Description	Implementaion Cost (dollars)	Annual Projected Savings (dollars)	CO2 Savings (lbs / year)	Simple Payback (years)	Maintenance (Technical) Staff Time (increase hours) (decrease hours)		Employee Comfort (increase)	Notes
	ECM-12	Disconnect Center Lamp	\$2,200.00	\$2,547.00	61,620	0.85		x		1
	ECM-9	New Lighting System	\$104,185.00	\$7,421.00	181,626	14.10				8
	ECM-3	Energy Recovery Ventilators (3)	\$92,100.00	\$3,192.00	39,372	28.85				10
	ECM-6	Energy Efficient Motors (4)	\$1,774.00	\$35.00	775	50.68				10
	ECM-7	New Chiller - Unoccupied	\$0.00	\$0.00	0	100.00				10
Notes:										
1. This ECM is not recommended. This ECM would reduce the level of light throught the campus to an unacceptable level.										
2. Some of the expense of this ECM will be covered by our existing service contract with JCI. Other aspects require system modification and / or new components.										
3. The Assistant D. A. office is located directly above the dock, and the floor is extremely cold in the winter. This modification will greatly improve this situation.										
4. ECM-100 was not calculated by MEP & Associates.										
5. AHU-3 in the 1951 Jail is a 100% outdoor air unit. Ductwork would have to be installed to return air back to the Air Handling Unit.										
6 DDC control would allow for better contol, which would provide improved comfort. It would also require much less maintenance than the existing pnematic system.										
7. The ERVs require additional man power for mainteance, dollars for filters. Projected annual savings may be optimistic. My experince with this application has not been very positive.										
8. ECM-9 is not recommended. The projected annual savings may be optimistic (already run on 2-lamps on many fixtures). Most fixtures were recently upgraded.										
9. Further evaluation is required, and / or new technology will allow for this opportunity at a later date.										
10. Not Recommended. Extended "Simple Pay Back" period, and / or increases maintenance staff requirements.										
11.The Summer Boiler project would replace (3) reheate converters. Additional gas fired domestic water heater(s) would also have to be installed. Low mainmtenance option.										
12 Solar project report has not been submitted at this time. Numbers are estimates. The Solar project would provide all domestic hot water to the campus.										
13. Heat Pump project has a great "Simple Payback", but will require more maintenance time, and will be somewhat of a complicated system.										

Appendix E Solar Hot Water Assessment



NEXT STEP ENERGY LLC

Specializing in Radiant Floor Heating and Alternative Energy Applications

28 Panel Solar Hot Water Heating System:

An Assessment

for

Chippewa County Jail

Chippewa Falls, WI

Site Assessor Contact Information:

Zeus Stark
PO Box 1971
Eau Claire, WI 54701
715-830-9337
zeus@nextstepenergy.com

Date of Consultation: 6/04/2009

Name of Client: Chippewa Valley Jail

Electric Utility: Xcel Energy

Address: 711 Bridge St.

City: Chippewa Falls

State: WI

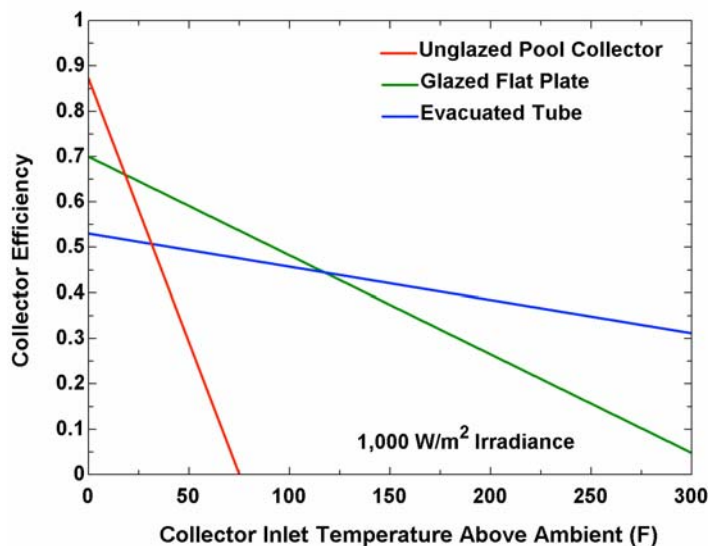
Zip: 54729

County: Chippewa

Solar Hot Water

Solar hot water systems consist of three major components: the solar collectors (panels), a solar storage tank and a circulation system. Collectors for solar water heating come in two main types – flat plate collectors and evacuated tube collectors. Flat plate collectors are typically composed of an insulated aluminum box with a tempered glass front. Behind the glass is an absorber plate connected to a grid of copper pipes. Evacuated tube collectors use a set of sealed glass tubes with a vacuum for a near perfect insulation. Each vacuum tube contains a heat tube absorber plate to absorb the solar energy. These absorber plates attach to an external manifold. Vacuum tube collectors have two layers of glazing which greatly reduces the amount of the sun's insolation on the actual absorber plate.

Each collector technology has an application where it will perform with optimum efficiency. When heating a seasonal swimming pool, an unglazed collector will be more efficient than a flat plate collector with a fraction of the cost. An unglazed collector heating a fluid around ambient temperature will not have any heat loss, therefore it does not need to be insulated. When the ambient to system delta is increased it becomes more important to insulate the collector against losses. Whereas collectors on seasonal pools operate within 10-20 °F of ambient, domestic hot water (DHW) collectors are designed to run through the colder winters and at higher temperatures in a wide range of 25-140 °F above ambient, depending on location and season. The last application of thermal is in high-end process heat such as steam production or powering absorption chillers in the range of 150 °F above ambient. Efficiency plots of the various collector styles against collector inlet fluid temperature above ambient are shown in the figure below. As discussed above, unglazed pool collectors optimum efficiency is in low temperature applications 0-25 °F above ambient, flat plates optimum efficiency is in the mid range of 25-125 °F, and evacuated tubes optimum efficiency is above 125 °F. This is the reason why no particular collector has dominated the entire thermal market, as each collector has its own application.



The performance charts above are only part of the efficiency equation. The other factor is the amount of sunshine (i.e., irradiance) on the collector. The lower the amount of sun, the greater the advantage of glazed over unglazed and evacuated tube over glazed. Actual collector output is the solar input x panel efficiency, therefore the input from low sun time coupled with high efficiency panels will still output a low amount of the actual annual Btus produced by a system.

Insulated pipes connect the collectors to a liquid-to-liquid heat exchanger which is plumbed to the solar storage tank. This tank, which is sized for the square footage of solar collectors, stores the solar-heated water and supplies it to your existing water heaters.

Most cool-climate solar hot water systems circulate a non-toxic antifreeze mixture to heat the water in the storage tank. When the sun shines on the collectors, the fluid absorbs the solar energy and becomes hot. A pump circulates the fluid through the insulated pipes to the heat exchanger, which transfers the heat from the solar fluid to the water in the solar storage tank. The fluid is then pumped back to the collector and the process begins again. This external heat exchanger/ tank system is very similar to your existing steam indirect water heaters with external heat exchangers.

Solar hot water systems are very reliable, with a long and successful track record in Wisconsin. The collectors and insulated piping can last the life of the building. The circulating pump, tank, non-toxic antifreeze mixture and other minor components are subject to wear and may need to be replaced eventually. Your mechanical maintenance staff should be educated on general maintenance and function of the system. The system should be checked every five years by a qualified service technician. Expect the average annual maintenance costs to be around \$150.

Sighting for system

We recommend utilizing the lower roof above the old jail, as the arrays could be located together and chasing of the supply and returns lines could mostly be done internally through the hallway. This location would limit the array size to 28 collectors. Enclosed is a Solar Pathfinder report summarizing the shading at this potential site for the collectors. The report shows a wide open solar window during 9:00 AM to 3:00 PM. This is the critical time period in the day to obtain usable solar heat. The panels would be in line with the building and facing 44 deg west of due south. Ideally the panels would face within 30 deg of due south. With more specific structural and drainage considerations the panels may be able to be racked closer to direct south. This would be a design detail which should be done if you decide to pursue a system.

28 Panel Solar Hot Water System

Please find the enclosed plans for the recommended solar hot water system. As you can see, the array is broken up into two sections. These arrays will be tilted up to 45 degrees to maximize the year round sun. Because of the longer days of summer, these panels should provide most of the hot water needs for the facility during this time. The system would be comprised of 1,200 sq ft of collectors. One 335 gallon storage tanks will be located near the kitchen water heater, two 225 gallon tanks will be located on the north wall of the second floor utility room and two 400 gallon tanks located as close as possible to water storage tank in boiler room 0016.

I would recommend utilizing curbs to fasten and seal racking to the existing roof. Racking should be aluminum and stainless steel. All piping should be run in copper, stainless steel or black iron pipe. Insulation should be rated to 250 degrees Fahrenheit. There is an extreme temperature swing with solar hot water systems so there should be adequate expansion joints with in feed and return lines and panels. Wiring to roof will be low voltage, all and mechanical components should be included and the installation should follow all local plumbing and heating codes. Solar should be installed by a licensed mechanical contractor and potable lines need to be installed by a licensed plumber. Additional costs include fees for required building permits and structural engineering for curbs and solar racking.



Boilers used for heating kitchen & new jail hot water year round



Location of new jail hot water solar storage tanks



hot water tanks used for new jail hot water



Boiler room 0016 hot water tank



Heat exchanger used for new jail hot water



Boiler room 0016 hot water heaters

Project Cost

Prices from most installers range from \$140-\$175 per square foot of solar panels. Being that extra labor may be involved due to security precautions and that there are three separate locations for the water heaters, I would estimate that most bids you receive on this job would be in the higher end of this continuum. A system this size should provide over 45-50% of your annual hot water needs for domestic use. The system will be plumbed in line with the conventional gas/ oil back-up indirect water heaters, and utilized the existing anti-scald mixing valves.

Included is a RET screen computer modeling analysis for a 28 panel system with an installed cost of \$196,000. An average hot water consumption of 13.75 gallons per day for 160 inmates was used. The payback analysis does not include any other incentives besides the Focus on Energy cash-back reward. Any Federal stimulus money received would obviously decrease the payback period.

This system will also help reduce maintenance and wear on the 5 million Btu boilers through the summer when heating is not being used.

Focus on Energy Implementation Grant

Focus on Energy has set guidelines for large-scale hot water systems that are good through the end of 2009. Your project meets the requirements to apply for this grant. Application information is located at the end of the report.

The amount of grant money available for this project is determined by the number of therms a solar system displaces over a one year period. Recipients of the grant will receive \$11.00 per therm offset up to 35 % of the system cost. A system this size will displace 2,651 therms annually and should qualify for a \$32,461.00 cash-back reward. The final reward amount will be determined by Focus on Energy.

Next Step Energy llc Site Report

Report Name Chippewa County Jail
Report Date 7/20/2009 2:26:11 PM
Declination 0d 49m
Location CHIPPEWA FALLS, WI, Zipcode: 54729
Lat/Long 44.959 / -91.319
Weather Station EAU_CLAIRE, WI, Elevation: 273 m
Site distance 10.24 miles

Array Type Fixed
Tilt Angle 44.96 deg
Ideal Tilt Angle 44.96 deg
Electrical Cost 5.00
Azimuth 210.00 deg
Ideal Azimuth 180.00 deg

Panel Make
Panel Model
Panel Count 5
DC Rate (per panel) 200.00 W
Inverter Make
Inverter Model
Inverter Count 1
Derate Method Inverter Derate Only
Derate Factor 1.000

Layout Configuration SinglePicture
Layout Point Count 1

Notes: Solar hot water assessment

Report generated by SolarPathfinder Assistant Version 2.0.8.0. <http://www.solarpathfinder.com>

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Layout Type Single Picture
Layout Point Count 1

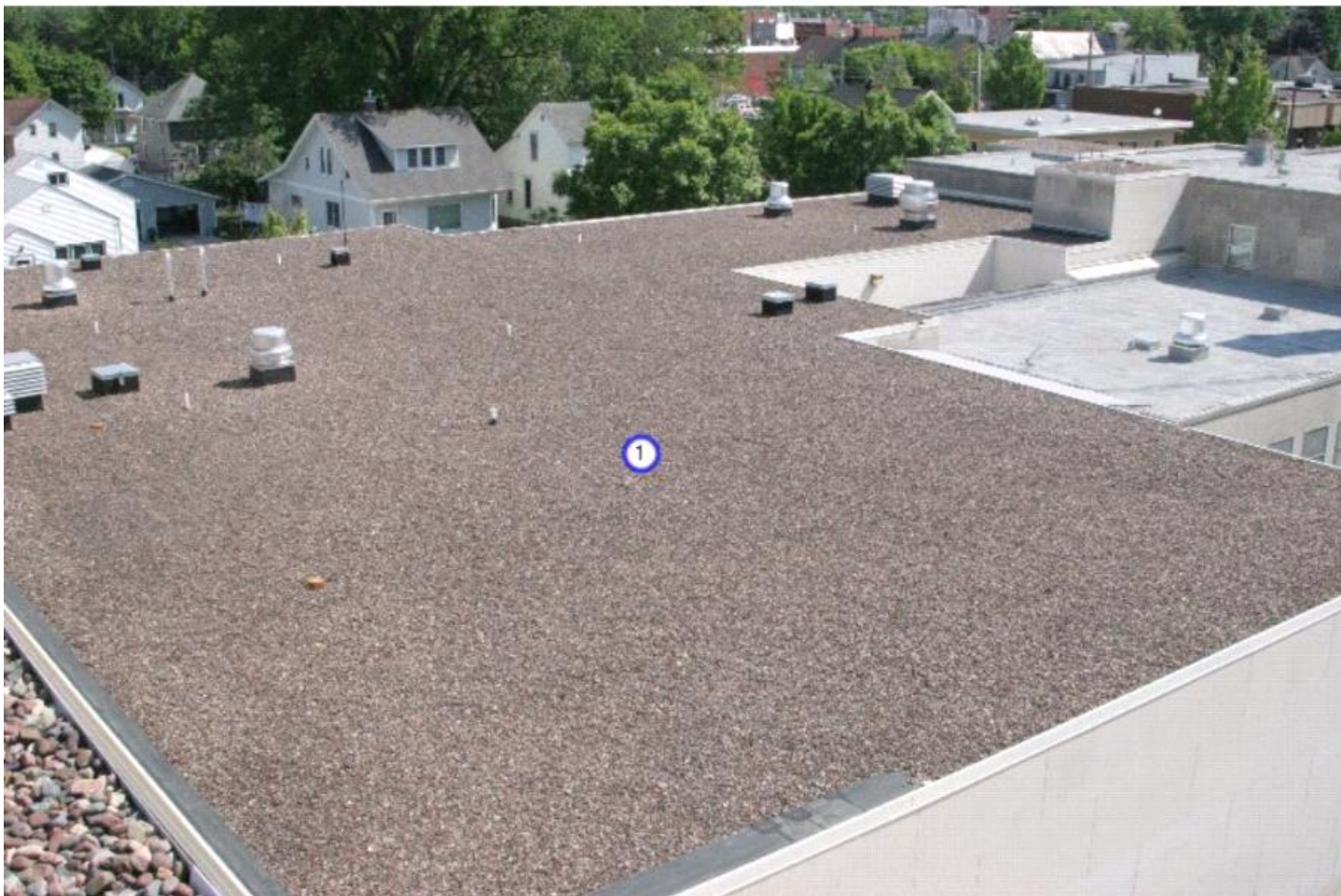


Image File IMG_2261.jpg

Solar Obstruction Data

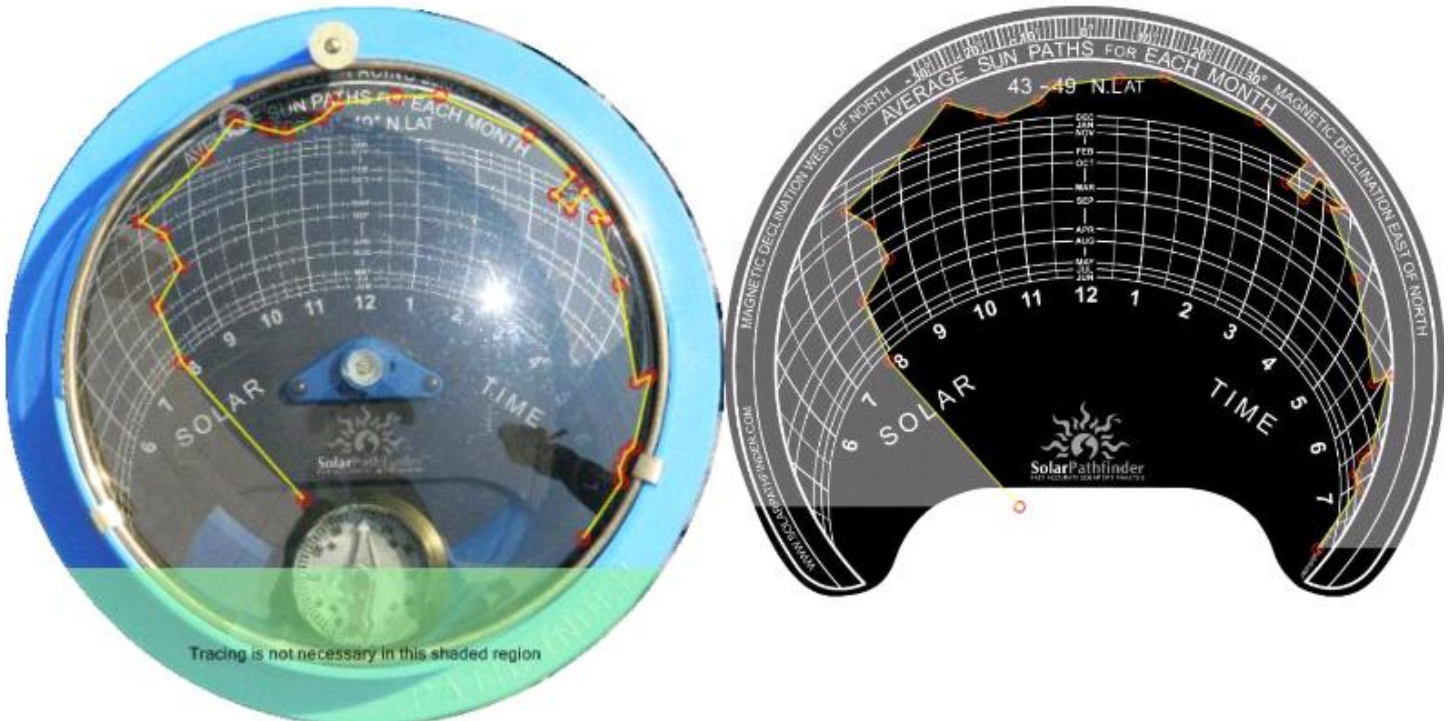
Month	Unshaded % of Ideal Site Azimuth=180 Tilt=44.96	Actual Solar Rad w/ Shading Azimuth=210.0 Tilt=44.96 KWH/m ² /day
January	92.00%	2.89
February	94.00%	4.24
March	90.00%	4.89
April	95.00%	4.63
May	93.00%	5.19
June	93.00%	5.54
July	93.00%	5.48
August	94.00%	5.12
September	91.00%	4.29
October	94.00%	3.41
November	94.00%	2.18
December	91.00%	2.04
Totals	92.84%	49.89
	Unweighted	Effect: 93.59%
	Yearly Avg	Sun Hrs: 4.16

Azimuth/Altitude Data

Azimuth / Altitude (degrees) where North = 180 degrees

-125	51.5	-80	31.5	-35	9.0	10	5.0	55	0.5	100	0.5
-120 (ENE)	51.0	-75	28.0	-30 (SSE)	6.0	15	3.0	60 (WSW)	4.5	105	0.0
-115	50.0	-70	27.5	-25	7.5	20	3.0	65	6.0	110	3.0
-110	48.5	-65	28.5	-20	14.0	25	3.0	70	6.5	115	0.5
-105	47.0	-60 (ESE)	25.5	-15	16.0	30 (SSW)	3.0	75	6.5	120 (WNW)	1.0
-100	44.5	-55	9.0	-10	14.0	35	1.0	80	6.5	125	1.0
-95	42.0	-50	10.5	-5	9.0	40	1.5	85	6.5		
-90 (E)	38.0	-45 (SE)	11.0	0 (S)	9.0	45 (SW)	1.0	90 (W)	5.0		
-85	35.0	-40	11.0	5	7.5	50	11.0	95	0.0		

Notes: pathfinder was taken flat on roof



Solar Obstruction Data

Month	Unshaded % of Ideal Site Azimuth=180 Tilt=44.96	Actual Solar Rad w/ Shading Azimuth=210.0 Tilt=44.96 KWH/m ² /day
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May	93.00%	5.19
June	93.00%	5.54
July	93.00%	5.48
August	94.00%	5.12
September	91.00%	4.29
October	94.00%	3.41
November	94.00%	2.18
December	91.00%	2.04
Totals	92.83%	49.89
	Unweighted	Effect: 93.59%
	Yearly Avg	Sun Hrs: 4.16

Azimuth/Altitude Data

Azimuth / Altitude (degrees) where North = 180 degrees

-125	51.5	-80	31.5	-35	9.0	10	5.0	55	0.5	100	0.5
-120 (ENE)	51.0	-75	28.0	-30 (SSE)	6.0	15	3.0	60 (WSW)	4.5	105	0.0
-115	50.0	-70	27.5	-25	7.5	20	3.0	65	6.0	110	3.0
-110	48.5	-65	28.5	-20	14.0	25	3.0	70	6.5	115	0.5
-105	47.0	-60 (ESE)	25.5	-15	16.0	30 (SSW)	3.0	75	6.5	120 (WNW)	1.0
-100	44.5	-55	9.0	-10	14.0	35	1.0	80	6.5	125	1.0
-95	42.0	-50	10.5	-5	9.0	40	1.5	85	6.5		
-90 (E)	38.0	-45 (SE)	11.0	0 (S)	9.0	45 (SW)	1.0	90 (W)	5.0		
-85	35.0	-40	11.0	5	7.5	50	11.0	95	0.0		

Notes: Solar hot water assessment

Report generated by SolarPathfinder Assistant Version 2.0.8.0. <http://www.solarpathfinder.com>

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RETScreen Energy Model - Heating project
Heating project

Technology

Solar water heater

Load characteristics

Application



Swimming pool



Hot water

	Unit	Base case	Proposed case
Load type		Hotel/Motel	
Number of units	Unit	200	
Occupancy rate	%	80%	
Daily hot water use - estimated	L/d	12,128	
Daily hot water use	gal/d	2,200	2,200
Temperature	°F	120	120
Operating days per week	d	7	7

☐ **Percent of month used**

Supply temperature method		User-defined
Water temperature - minimum	°F	45
Water temperature - maximum	°F	57

	Unit	Base case	Proposed case	Energy saved	Incremental initial costs
Heating	MWh	135.9	135.9	0%	\$ -

Resource assessment

Solar tracking mode		Fixed
Slope	°	45.0
Azimuth	°	44.0

☐ **Show data**
Solar water heater

Type	Glazed	\$ 196,000
Manufacturer	SunEarth Inc	
Model	EmpireEC-32	
Gross area per solar collector	ft²	40.00
Aperture area per solar collector	ft²	40.00
Fr (tau alpha) coefficient		0.71
Fr UL coefficient	(W/m²)°C	4.13
Temperature coefficient for Fr UL	(Btu/h)/ft²°F²	
Number of collectors		28
Solar collector area	ft²	1120
Capacity	kW	72.84
Miscellaneous losses	%	4.0%

[See technical note](#)
[See product database](#)
Balance of system & miscellaneous

Storage		Yes
Storage capacity / solar collector area	gal/ft²	1
Storage capacity	gal	1,568.0
Heat exchanger	yes/no	Yes
Heat exchanger efficiency	%	85.0%
Miscellaneous losses	%	3.0%
Pump power / solar collector area	W/ft²	0.50
Electricity rate	\$/kWh	0.100

Summary

Electricity - pump	MWh	1.1
Heating delivered	MWh	60.9
Solar fraction	%	45%

☐ **Heating system**

Project verification

	Base case	Proposed case	
Fuel type	Natural gas - 100 ft³	Natural gas - 100 ft³	
Seasonal efficiency	70%	70%	\$ -
Fuel consumption - annual	100 ft³	6,582.5	3,631.7
Fuel rate	\$/100 ft³	1.050	1.050
Fuel cost	\$	6,912	3,813

Financial Analysis

Financial parameters

Inflation rate	%	7.0%
Project life	yr	40
Debt ratio	%	

Initial costs

Heating system	\$	196,000	100.0%
Other	\$		0.0%
Total initial costs	\$	196,000	100.0%

Incentives and grants	\$	33,000	16.8%
-----------------------	----	--------	-------

Annual costs and debt payments

O&M (savings) costs	\$	
Fuel cost - proposed case	\$	3,928
Maintenance	\$	150
Total annual costs	\$	4,078

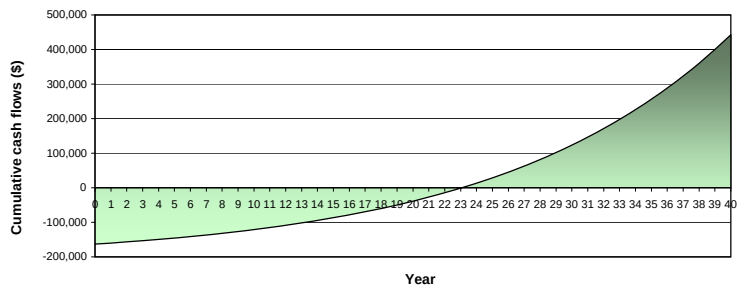
Annual savings and income

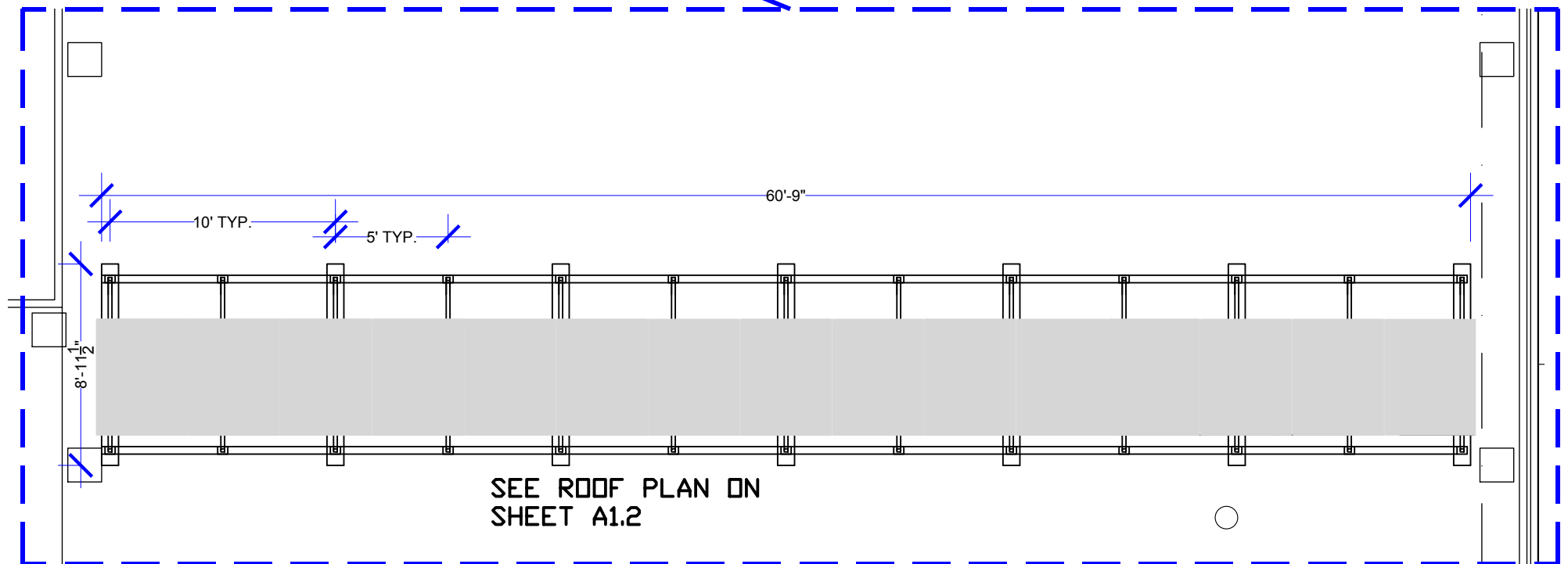
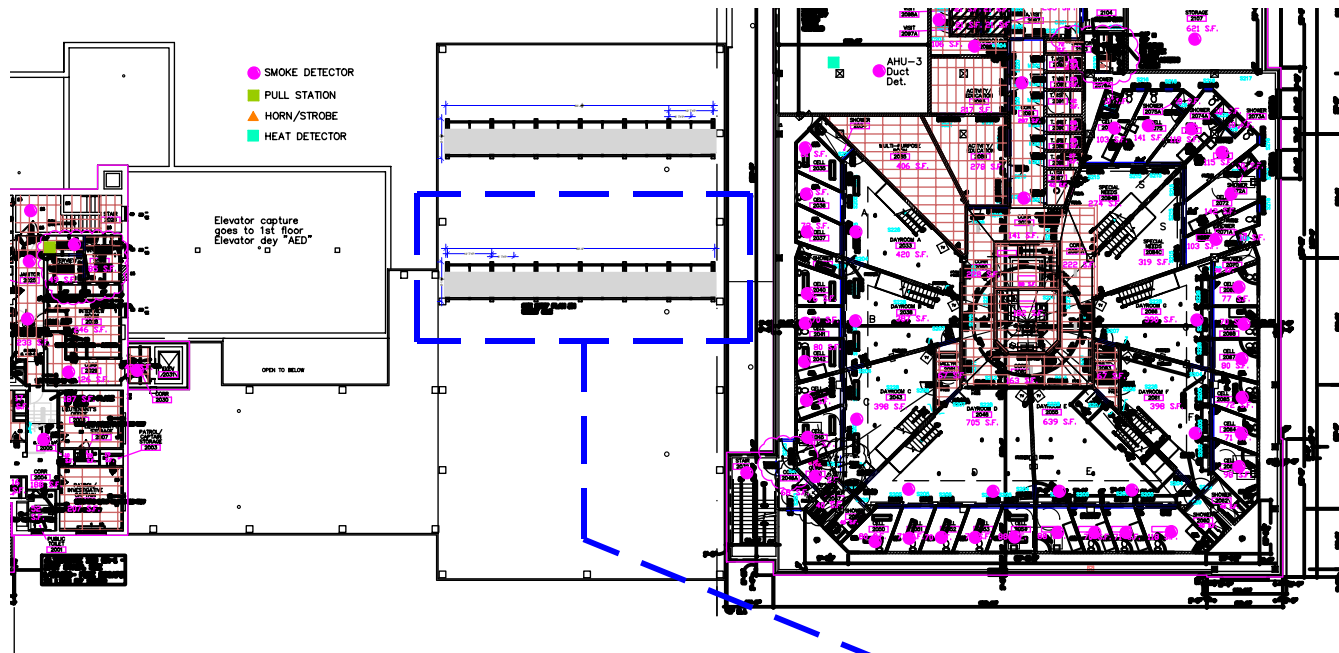
Fuel cost - base case	\$	6,912
Other	\$	
Total annual savings and income	\$	6,912

Financial viability

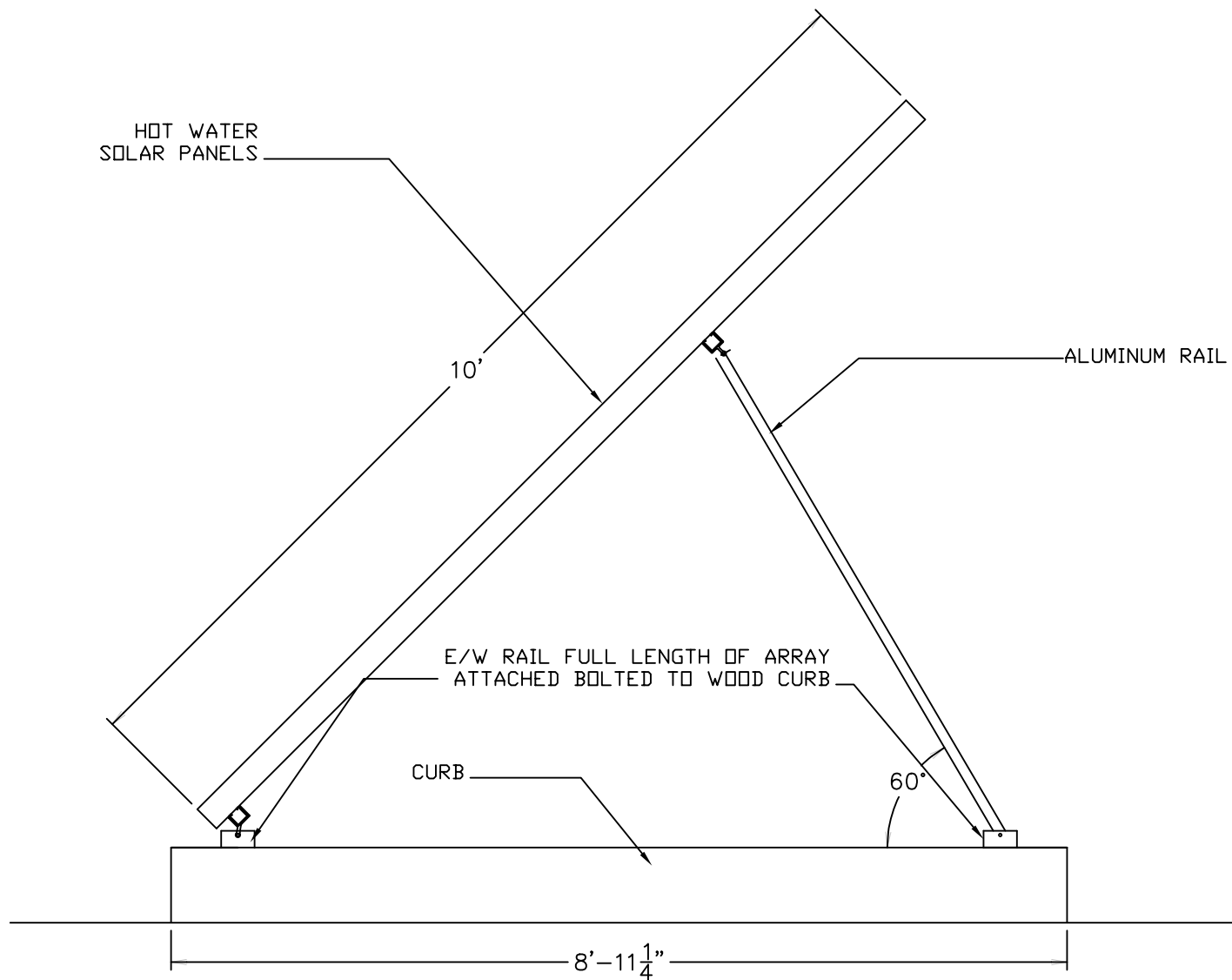
Pre-tax IRR - assets	%	5.2%
Simple payback	yr	57.5
Equity payback	yr	23.1

Cumulative cash flows graph

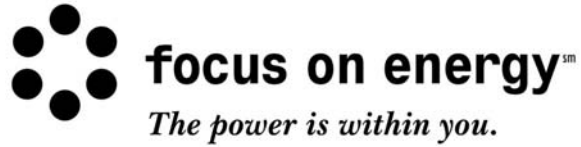




PLAN VIEW ENLARGEMENT SCALE 1"=80'



SECTION VIEW ENLARGEMENT SCALE 1"=20'



Focus on Energy Renewable Energy Program

Proposal Guidelines

2009 Solar Water Heating Implementation Grant

For systems that offset over 5,000 therms per year

Questions related to proposal submission should be directed to the
Focus on Energy Renewable Energy Program at:

888.476.9534 / 608.441.3840
renewableapplications@focusonenergy.com

Proposals are due on
the last Wednesday
of the month

This document is
valid through
December 31, 2009

Funds distributed on
a first-approved
basis

Focus on Energy Renewable Energy Program
431 Charmany Drive ~ Madison, WI 53719

What is Focus on Energy?

Focus on Energy works with eligible Wisconsin residents and businesses to install cost effective energy efficiency and renewable energy projects. Focus information, resources and financial incentives help to implement projects that otherwise would not get completed, or to complete projects sooner than scheduled. Its efforts help Wisconsin residents and businesses manage rising energy costs, promote in-state economic development, protect our environment and control the state's growing demand for electricity and natural gas.

Who is Eligible?

Businesses, organizations, institutions, units of government and residents are eligible for the Solar Water Heating Implementation Grant if their renewable energy system will displace electricity and the applicant purchases electricity from an electric provider participating with Focus on Energy, or if their renewable energy system will displace natural gas and the applicant purchases natural gas from a participating natural gas provider. The renewable energy system must be installed on a site whose owner purchases electricity from an electric provider participating with Focus on Energy (if the renewable energy system will offset electricity) or purchases natural gas from a participating natural gas provider (if the renewable energy system will offset natural gas) for that site. For a list of participating providers visit focusonenergy.com/utilities or call 888.476.9534.

What is an Implementation Grant?

Solar Water Heating Implementation Grants provide financial support for the installation of commercially available solar water heating systems that displace electricity and/or natural gas usage. For smaller residential or non-residential solar water heating energy systems, please use the Cash-Back Reward application forms available at focusonenergy.com/reincentives.

Available Funding

On a competitive basis, grants up to 25% of the project cost with a maximum grant of \$50,000 will be available to provide financial support for the installation of solar hot water systems that will produce over 5,000 therms annually at eligible Wisconsin businesses. Incentives for nonprofit or government entities may be approved for up to 35% with a maximum reward of \$75,000. The actual grant award is based on the annual estimated thermal energy displaced by the installed system (See System Guidelines for more information).

Important!

Before you sign an installation contract, order, purchase or begin to install any system components, your application must be approved by Focus on Energy and you must sign an Implementation Grant Agreement form. Payment of the Implementation Grant is made to you after the renewable energy system is installed and you submit a complete Notice of Installation.

Other Eligibility Requirements

1. Collaborations or partnerships with non-eligible entities are allowed, but the grant must support a project in an eligible territory. The applicant must be the majority owner of the renewable energy system.
2. The project's simple payback period must be greater than two years. Payback period is defined as: (total estimated cost of the project) divided by (the estimated annual savings minus annual recurring costs such as additional estimated operation and maintenance costs).
3. The proposed project must be replacing/saving natural gas or electricity. Projects replacing/saving other fuels such as propane, coal or oil do not qualify. Projects that improve the efficiency of an existing renewable energy system are eligible if the project results in additional renewable energy use.
4. Focus on Energy's policy limits awards to no more than \$500,000, for any combination of grant types, to any individual or business during each program year. This includes projects contracted between January 1, 2009 and December 31, 2009. There is no restriction on the number of contracts an individual or business can receive within the \$500,000 program year limit.

How do I Apply?

Fill out the Solar Water Heating Implementation Grant application, which is included as Appendix A at the end of this document. Be sure to complete all relevant sections, attach requested supporting information and have the application signed and dated. Please assemble the application and attachments into **one document**. Applications must be received by noon on the last Wednesday of the month to be considered for the next month's grant review meeting. Incomplete applications will not be reviewed by the committee until they are made complete.

Please e-mail or mail your completed application:

renewableapplications@focusonenergy.com

Focus on Energy
Attn: Renewable Energy Program
431 Charmany Drive
Madison WI 53719

What Happens After I Apply?

Solar Water Heating Implementation Grant applications are reviewed monthly and scored based on the following criteria:

25% of score	Impact of project to advance renewable energy markets
25% of score	Reasonableness of costs, proposed installation time schedule, amount of cost share
25% of score	Adequacy of equipment, installers and energy calculations
25% of score	Readiness to proceed with project (feasibility studies, financing, installation date, permits, power purchase agreements, etc.)

All proposals must include sufficient information to allow the above factors to be evaluated. Only applicants that furnish complete information will be considered for evaluation. Partial proposals will not be considered. The Focus on Energy Renewable Energy Program reserves the right to make final selections.

What Happens if my Grant Proposal is Approved?

If notified that you have been awarded a grant, you will be sent an Implementation Grant Agreement form and a W9 tax form which you must sign and mail back to Focus on Energy within 30 days. The Implementation Grant Agreement form contains terms and conditions you must follow, which are shown in the next section. **Before you sign an installation contract, order, purchase or begin to install any system components, your application must be approved by Focus on Energy and you must sign an Implementation Grant Agreement form.**

To receive the grant funds, you must submit a Notice of Installation after the renewable energy system has been installed. The Notice of Installation form will be mailed to you with the Implementation Grant Agreement form and a W9 tax form. The Implementation Grant funds will be paid within 60 days after the complete Notice of Installation has been received and approved by Focus on Energy.

General Terms and Conditions

The following terms and conditions apply to this Grant:

1. The recipient will abide by the terms, conditions and other requirements as specified in the Solar Water Heating Implementation Grant. The installation must comply with all applicable federal, state and local codes and regulations.
2. The Solar Water Heating project described within the recipient's Solar Water Heating Implementation Grant Application will be carried out as stated in the application.
3. If the renewable energy system is modified after signing this document, the recipient must notify Focus on Energy of the changes in writing. Changes must be approved by Focus on Energy. Failure to receive approval from Focus on Energy for any changes to the renewable energy system may result in a reduced grant.
4. This grant amount is a not-to-exceed amount. Only expenses identified in the Solar Water Heating Implementation Grant Application will be eligible for reimbursement. Renewable energy components ordered, purchased or installed before this Grant Agreement has been signed will not be eligible for reimbursement unless approved by Focus on Energy.
5. The grant recipient agrees to operate the renewable energy equipment, at the location proposed and as described in the Solar Water Heating Implementation Grant Application, for at least three years.
6. The renewable energy system must be installed and the Notice of Installation submitted within one year. Projects that take more than six months to complete must submit a progress report after six months noting substantial progress toward installation, including copies of receipts for equipment or a signed installation contract. If the installation does not meet the one year timeline Focus on Energy may terminate your reward. You will receive a written warning 30 days before your reward is canceled. Requests for extensions beyond the twelve-month period must be submitted in writing to Focus on Energy.

7. The grant award will be paid after the system has been installed and a complete Notice of Installation has been submitted. The grant award will be paid within 60 days of receipt and acceptance of the completed Notice of Installation. The Notice of Installation must include:
 - a. Dated and detailed invoices for all project costs; only costs directly linked to the renewable energy system are eligible
 - b. A description of any system changes
 - c. Copy of approved and inspected plumbing, heating, electrical and/or building permit (if applicable)
 - d. Copies of warranties for major system components and system installation
 - e. Photos of the installed system.
 - f. Other items stipulated in the Notice of Installation form
8. The grant recipient must maintain sufficient segregation of project accounting records from other projects or programs. The recipient should retain all records relating to this grant for one year after the expiration of this grant. Focus on Energy reserves the right to examine any directly pertinent records and computer files of the recipient involving transactions relating to this grant.
9. Focus on Energy reserves the right to:
 - a. Withhold payment until any identified project problems are resolved.
 - b. Terminate this reward in whole or in part due to the recipient's failure to fulfill the terms and conditions in this grant agreement, or due to non-appropriation of necessary funds
 - c. Alter or discontinue the grant program at any time without notice
 - d. Make the final determination on whether items meet the standards set forth in the program
 - e. Inspect funded projects to ensure that it is consistent with all "Terms and Conditions"
 - f. Monitor or evaluate the performance of the system for a period of two years
 - g. Publicize your participation in this program, unless you specifically request otherwise
10. The grant recipient will not construe, claim or imply that acceptance of this grant constitutes Wisconsin Focus on Energy Program's approval, warranty, guarantee or endorsement.

System Guidelines

This grant covers solar water heating systems only. Solar space heating systems do not qualify, nor do space heating components that are part of a combination solar water and space heating system. Note that only the therms specifically allocated to heating the water in combination water and space heating systems will be used to calculate the grant amount.

The repair of non-functioning solar water heating systems is eligible. Grant applications for repairs must include a detailed cost quote breaking out the repair needs. The solar water heating system must have a 2 year installation warranty and a one year equipment warranty. Solar water heating systems that malfunctioned due to a lack of maintenance are not eligible.

The grant award amount is based on an estimate of thermal energy displaced. Focus on Energy inputs your project's details into RETScreen software (available online) to determine a hot water and/or public pool heating savings estimate of the solar hot water system. If the system is displacing natural gas, RETScreen's savings estimate is divided by 0.8 to calculate the total energy displaced by your system. If the system is displacing electricity, RETScreen's savings estimate is the total energy displaced by your system. Savings from space heating are not considered

New Systems: Focus on Energy uses the following table to determine the "Reward Factor" for new systems. The appropriate Reward Factor is multiplied by your system's annual estimate of thermal energy displaced to determine your grant award amount. The grant award amount for solar water heating systems can not exceed the Maximum Cost Share or Maximum Reward.

System at:	Reward Factor	Maximum Cost Share	Maximum Reward
Business Sites	\$6.00	25%	\$50,000
Non-profit* or Government Sites	\$11.00	35%	\$75,000

* Non-profit groups must file a federal IRS form 990 or equivalent

Repairs: Focus on Energy uses the following table to determine the "Reward Factor" for repairs on existing systems. Multiply the repair cost by the appropriate Reward Factor to estimate your grant award amount.

System at:	Reward Factor	Maximum Reward
Business Sites	50%	\$5,000
Non-profit* or Government Sites	50%	\$5,000

* Non-profit groups must file a federal IRS form 990 or equivalent

System Requirements

1. **Professional Installation:** Attach bid for all projects. Attach system diagram for non-residential projects. System must be installed to meet System Requirements by a contractor on the [Focus on Energy Full Service Solar Hot Water System Installation Firms](http://focusonenergy.com/fullserviceinstallers) list (see focusonenergy.com/fullserviceinstallers). Deviations from these requirements must be submitted in writing by the Full Service Installer with this application. Product literature, system description and maintenance instructions must be provided to the customer.
2. **Wisconsin Administrative Code:** All systems installed must meet the requirements spelled out by the Wisconsin Department of Commerce for building, plumbing, heating and/or electrical code as it pertains to solar energy systems, as well as conform to any local requirements. System owners must adhere to state code and permit requirements by their local jurisdiction. System Requirements listed in this document are either above code requirements or are listed for clarification purposes. If state code requirements are more stringent than the Focus on Energy program requirements, then the code shall take precedence.
3. **System:** Unless for heating a public pool, the system shall be plumbed to provide domestic or process hot water as its primary function, and it must be a pressurized antifreeze system, a drainback system utilizing antifreeze, or a seasonal, public pool drainback system without antifreeze. A public pool is defined as non-single-family (1-3 unit) property. System must be labeled detailing the solar fluid used in the system, including manufacturer, percentage glycol concentration, toxicity & fill date.
4. **Collectors:** Collectors must be rated by the SRCC or an equivalent agency. Collectors must have a five year warranty. Unless for seasonal, public pool heating, flat plate collectors must have a tempered glass glazing.
5. **Fuels Saved/Displaced:** The renewable energy system must be saving or displacing natural gas or electricity. Systems saving or displacing other fuels such as coal, LP gas (e.g., propane) or oil are not eligible.
6. **Plumbing:**
 - a. **Pressurized Systems:** Solar system piping shall be in accordance with WI Admin. Code, Comm 71 and its references to WI Admin. Code, Comm 82. All piping between the collectors and the heat exchanger must be copper, stainless steel or black iron and insulated with insulation rated to withstand over 250 degrees Fahrenheit. The balance of system piping may be either copper, stainless steel, black iron or cross-linked polyethylene (Pex) (rated to at least 200 degrees F at 100 pounds per square inch) with insulation rated to withstand 180 degrees F. Exterior insulation must be covered with jacketing capable of withstanding moisture, ultraviolet radiation, and environmental exposure. All fittings, valves and gauges must be copper, bronze, stainless steel, black iron or brass. The solar loop must be fitted with the following components: check valve, pressure relief valve, expansion tank and pressure gauge. The solar fluid must be non-toxic, provide a minimum temperature rating of 320 degrees F, and provide "no slush" or "freeze" conditions to -28 degrees F.
 - b. **Drainback Systems:** Solar system piping shall be in accordance with WI Admin. Code, Comm 71 and its references to WI Admin. Code, Comm 82. All non-vertical piping must be copper with insulation rated to withstand over 180 degrees F. Vertical piping may be either copper, stainless steel or cross-linked polyethylene (Pex) (rated to at least 200 degrees F at 100 pounds per square inch) with insulation rated to withstand 180 degrees F. Exterior insulation must be covered with jacketing capable of withstanding moisture, ultraviolet radiation and environmental exposure. All piping in the system must have at least a ¾ inch inside diameter. Sloped piping must be copper, mounted

with at least a ¼ inch drop in slope per foot and supported every 4 feet, unless otherwise specified in a commercial system design. All fittings, valves and gauges must be copper, bronze, stainless steel or brass. The solar fluid must be propylene glycol, provide a minimum temperature rating of 320 degrees F, and provide “no slush” or “freeze” conditions to 9 degrees F. Seasonal, public pool heating systems may be installed with the equipment specified by the manufacturer for temperature and climate anticipated.

7. **Collector Mounting:** Collectors must be installed as per manufacturer specifications and applicable building codes for the site.
8. **Balance of System:** A temperature gauge shall be provided to determine the storage tank temperature. There must be a back-up system for heating water. The domestic hot water piping downstream of a tank-type backup water heater must be fitted with a thermostatic mixing valve (TMV) to limit the maximum temperature of the hot water to a set point of 120 degrees F (adjustable). The TMV may be installed before the feed to a backup water heater without storage (per manufacturer’s specifications).
9. **Performance Testing:** Focus on Energy reserves the right to test a number of systems prior to reward payment. Performance testing will be provided at no cost to the customer and will consist of checking those items set out in the System Requirements. If the system does not pass, the customer and installer will be notified immediately of the deficiencies and given 30 days to correct deficiencies (and still be eligible for the Cash-Back Reward). The second performance test will be at the installation contractor’s expense. Eligibility for the reward after 30 days will be at the discretion of Focus on Energy.
10. **Two-year Installation Warranty.** The system must include at least a two-year installation warranty that covers any defect in the workmanship of the installation at no charge to the owner.
11. **One-year Equipment Warranty.** All major system components must have at least a one-year warranty.

Example of Funding Level Determination:

Example #1: A solar water heating system is determined to produce 6,000 therms per year using RETScreen. The system is in Focus on Energy territory, installed on a for-profit business and saves natural gas. The system total cost is \$240,000. The grant calculations are determined by taking the estimated energy the system produces (6,000 therms) divided by 0.8 = 7,500 therms offset multiplied by \$6.00 = \$45,000. To check for the maximum incentive cap of 25% of system cost, 25% of \$240,000 = \$60,000 which is larger than \$45,000. The incentive for this system will be \$45,000 which is under the incentive cap of \$50,000 per system.

Example #2: A solar water heating system is determined to deliver 8,000 therms of solar water heat per year using RETScreen. The system is in Focus territory and installed on a municipally owned health care facility. The system total cost is \$290,000. The grant calculation is determined by taking the estimated energy the system will deliver (8,000 therms) divided by 0.8 = 10,000 therms offset multiplied by \$11.00 = \$110,000. To check for the maximum incentive cap of 35% of system cost, 35% of \$290,000 = \$101,500, so the amount is over the 35% cap and the incentive would be \$101,500. However, the maximum incentive cap of \$75,000 applies, so the incentive for this system would be \$75,000.

APPENDIX A
Solar Water Heating Systems Grant Application

Section 1: Applicant Information

Company/organization that will own the system:

Mailing Address:

Company's federal ID number (EIN or SSN): _____

Business Type (check one):

- ☐ LLC ☐ Corporation ☐ Partnership ☐ Individual/Sole Proprietor ☐ School
☐ 501(c)3 ☐ Government ☐ Church ☐ Other: _____

Business Classification (check one):

- ☐ For Profit ☐ Not for Profit

Name of primary contact: _____

Contact's phone number: _____

Contact's e-mail address: _____

Address where system will be installed:

Electric utility at the installation address: _____

Natural Gas supplier at the installation address: _____

Current water heating fuel type: _____

Section 2: Contractor Information

Name of installation contractor: _____

Phone number: _____

E-mail address: _____

Name of installation subcontractor (if any): _____

Phone number: _____

E-mail address: _____

Name of installation subcontractor (if any): _____

Phone number: _____

E-mail address: _____

Section 3: Project Description

Has a feasibility study or site assessment been performed for the proposed project? YES or NO

Location Details

Location: ☐ Apt/Condo Building ☐ Hotel ☐ Car Wash ☐ Other: _____

If Apt/Condo or Hotel: Number of units: _____ Rate of Occupancy (%): _____

System Usage: ☐ Service Hot Water ☐ Space Heating ☐ Pool Heating

If Pool Heating:

Pool area: _____ ft² Hours/Day Cover is Used: _____ Makeup Water Ratio: _____%/week

Daily Water Heating Load (gallons/day): _____

Desired Hot Water Temperature: _____

System Details

Installation: ☐ New Installation ☐ Repair

Estimated Installation / Repair Date ____ / ____ / ____

Estimated Installation Repair Cost: \$ _____

System Usage: ☐ Service Hot Water ☐ Space Heating ☐ Pool Heating

System Type: ☐ Pressurized ☐ Drainback

Collector Details

Collector Type: ☐ Flat Plate ☐ Evacuated Tube

Collector Location: ☐ Roof Mount ☐ Ground Mount

Number of Collectors: _____

Collector Manufacturer / Model Number: _____

Collector compass direction (in degrees): _____

Collector tilt angle (degrees from horizontal): _____

% Shading from 10 AM – 2 PM (attach shading diagram if >1%): _____

Tank / Pump / Controller Details

Storage Tank: Manufacturer: _____ Model: _____ Storage: _____ gallons

Back-up Water Heater:

Existing: Manufacturer: _____ Model: _____ Storage: _____ gallons

New / Replacement: Manufacturer: _____ Model: _____ Storage: _____ gallons

Pump: Manufacturer: _____ Model: _____ HP or Wattage: _____

If 2nd Pump: Manufacturer: _____ Model: _____ HP or Wattage: _____

If 3rd Pump: Manufacturer: _____ Model: _____ HP or Wattage: _____

Total Dynamic Head of Pump(s) (ft, or attach pump chart): _____

Controller: Manufacturer: _____ Model: _____ HP or Wattage: _____

System Savings

Estimated annual energy savings (attach RETScreen calculations): _____

Estimated annual revenue from electricity/gas savings (\$/yr): _____

Simple payback period (years): _____

System cost / (annual revenue - annual operation and maintenance costs)

Show simple payback period calculations _____

Section 4: Other Information

Have you applied for or been awarded other grants for this project? If yes, please identify the grant, source of grant, the grant award amount and anticipated award schedule:

Why do you need Focus on Energy funding for this project? Please explain:

Section 5: Attachments

Please attach copies of the following:

- ☐ A one page description of this project that includes the location, size, scope and intended goals or impacts of the proposed system
- ☐ Any solar site assessment or feasibility study that was completed for the project
- ☐ Site plan showing where the system will be located
- ☐ System diagram
- ☐ Installation contractor information / qualifications and a list of similar projects they’ve completed
- ☐ Installation bid from the selected installer
- ☐ Manufacturer literature and/or equipment descriptions
- ☐ Installation and product warranties
- ☐ Detailed service water and/or pool heating load calculation
- ☐ Financial information
 - o If this project requires financing in the form of a loan, please attach a letter from your lender which states that financial assistance is available for this project
 - o If this project does not require a loan, please attach a letter from your financial institution (bank, credit union, etc.) that indicates sufficient funds are available to complete this project

Section 6: Applicant Certification

I hereby certify that I have performed or reviewed this analysis and the attached documentation, and that the information is reasonable and accurate.

Applicant’s Signature

Date

Printed Name

Title

Keep a copy of this document for your files.

To be completed by Focus on Energy staff:

Application received by: _____
Name Date

Appendix F Transportation Energy Efficiency Outline

Transportation Energy Efficiency Outline

There are two options to reduce energy consumption related to transportation: reducing vehicle miles travelled and optimizing fuel efficiency. The outline below provides a framework for the different types of strategies that fall under each option.

This template is intended to serve as a resource for departments as they develop strategies for reducing energy related to transportation.

Vehicle Fleets and Personal Vehicle Usage

Option: Reduce Vehicle Miles Travelled (VMTs)

1. Reduce current service levels (including response time)
 - a. Eliminate/reduce low priority services and travel to low priority destinations
 - b. Time service delivery to minimize VMTs
2. Optimize task coordination and scheduling of routine tasks
3. Alternative Service Delivery (ASD)
 - a. Contracting out to the private sector
 - b. Partnering with other municipalities on new service delivery models
 - c. Better use of technology

Option: Optimize fuel efficiency

1. Factor fuel efficiency into fleet management decisions
 - a. Buy more fuel efficient vehicles
 - b. Assign and use most fuel efficient vehicles for the operation/task required
 - c. Use the most efficient fuel type
2. Maintain fleet program to optimize fuel efficiency
3. Use fuel efficient driving techniques

Appendix G Energy Independent Communities Resolution (25X25)

RESOLUTION TO SUPPORT THE STATE'S GOALS FOR ENERGY INDEPENDENCE AND TO PURSUE ALL OPPORTUNITIES FOR ENERGY CONSERVATION AND RENEWABLE ENERGY PRODUCTION

WHEREAS, energy use has a direct affect on Chippewa County operations and costs; and

WHEREAS, public benefit can be gained by pursuing more efficient energy use; and

WHEREAS, the State of Wisconsin has created an Office of Energy Independence with the stated goals of:

- Generating 25% of electricity and transportation fuels from renewable resources by 2025
- Capturing 10% of the emerging bio industry and renewable energy market by 2030
- Becoming a national leader in groundbreaking energy research; and

WHEREAS, the Office of Energy Independence is seeking partnerships with local units of government in furtherance of the State of Wisconsin's effort to achieve these goals; and

WHEREAS, by expressing its support toward pursuing these goals, Chippewa County will gain access to accelerated technical and financial assistance; and

WHEREAS, this assistance will help the County to reduce operational energy costs, and to explore opportunities for energy conservation and renewable energy production in Chippewa County;

NOW, THEREFORE BE IT RESOLVED, that the Chippewa County Board of Supervisors does hereby support the State of Wisconsin's goals for energy independence; and

BE IT FURTHER RESOLVED, that the Chippewa County Board of Supervisors directs the County Administrator to use the authority of the position to actively pursue agreements, contracts, and financing to improve energy efficiency in county operations, and to explore broader opportunities for energy conservation and renewable energy production in Chippewa County.

Dated this 12th day of May, 2009.

CHIPPEWA COUNTY EXECUTIVE COMMITTEE

1st Reading 5/12/09 2nd Reading N/A
 Board Action • Vote Required 5/11
 For Unanimous Absent 3
 Against None Abstain 0
 Clerk Signature: Richard Schoch

	Yes	No	Abstain	Absent
Richard Schoch	✓			
Allan Schlaugat	✓			
Lila McConville	✓			
William Dixon	✓			
Evelyn Maloney	✓			
David Hillman	✓			
Paul Michels				✓
Mary Ann King	✓			
Lee McIlquham	✓			

Richard Schoch
 Richard Schoch, Chairman

5-5-09
 Date

FISCAL IMPACT STATEMENT

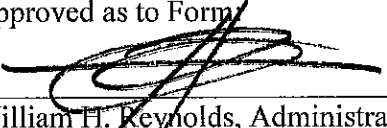
Costs

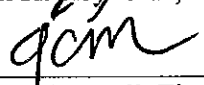
1. Additional administrative and accounting costs associated with grant administration.

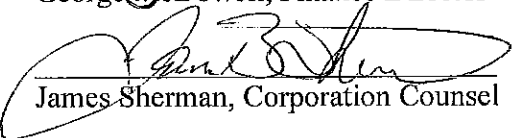
Benefits

1. Additional access to state and federal funding.
2. Increased technical assistance from state and federal agencies.
3. Improved energy efficiency creating additional savings and capital availability for budgeting.
4. Potential environmental benefits associated with reduced carbon emissions.

Approved as to Form


William H. Reynolds, Administrator

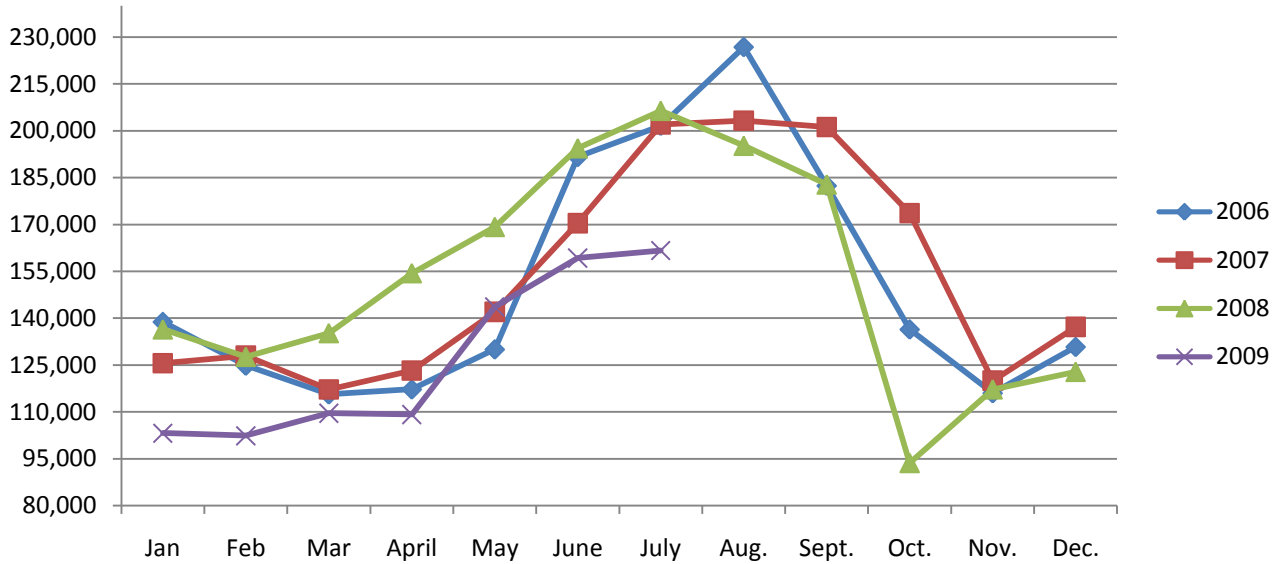

George McDowell, Finance Director


James Sherman, Corporation Counsel

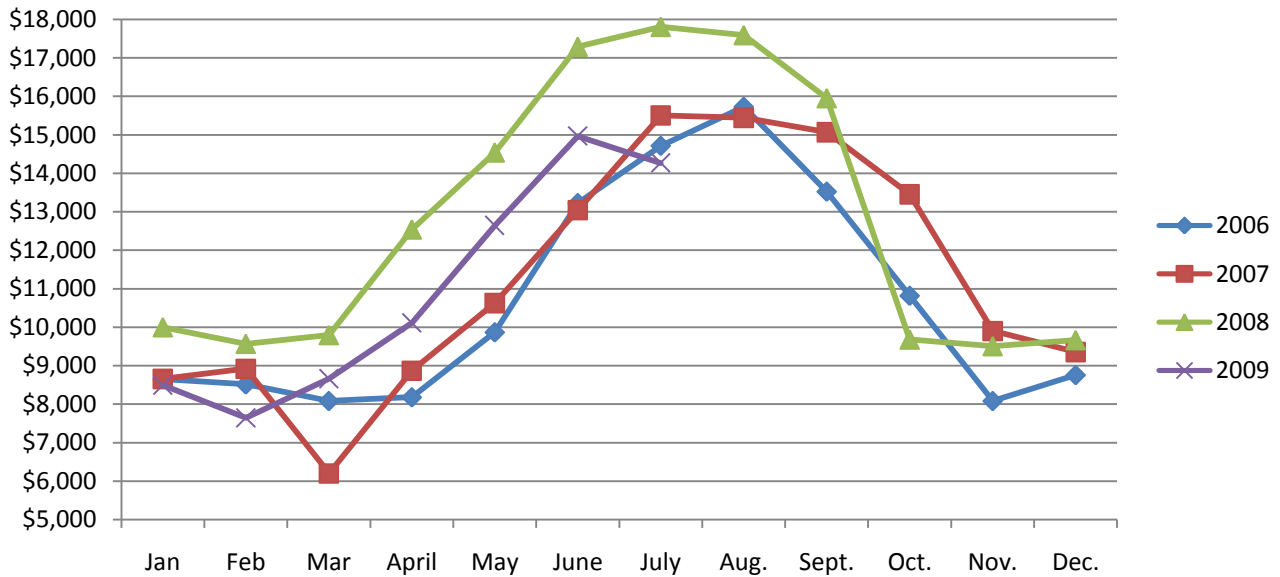
Appendix H Energy Costs and Use for 2006-2009

**Chippewa County
Courthouse / Sheriff's Dept. / 1951 Jail**

2006 - 2009 Electric Use (kWh)



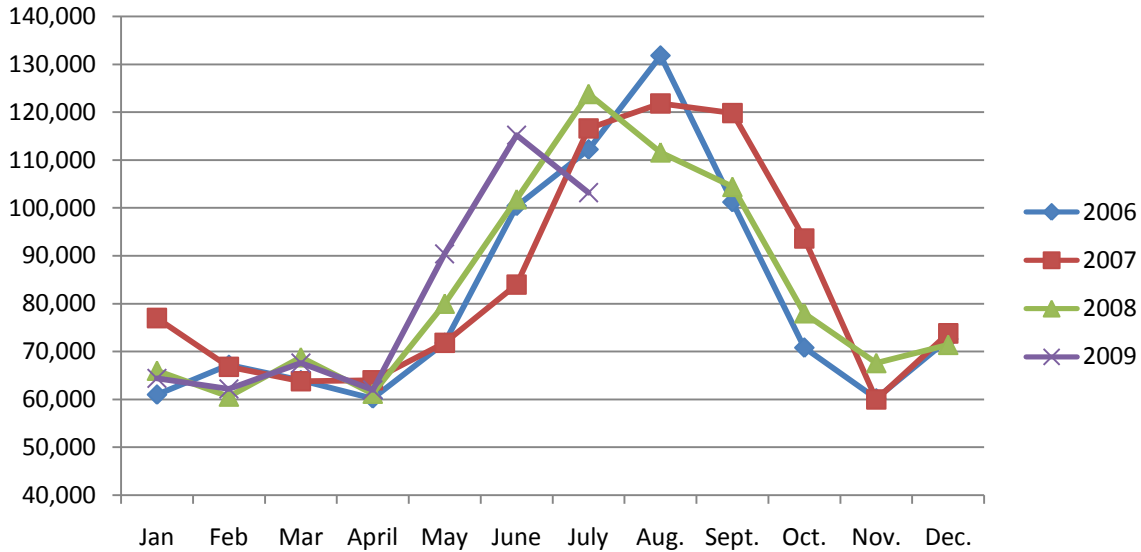
2006 - 2009 Electric Costs



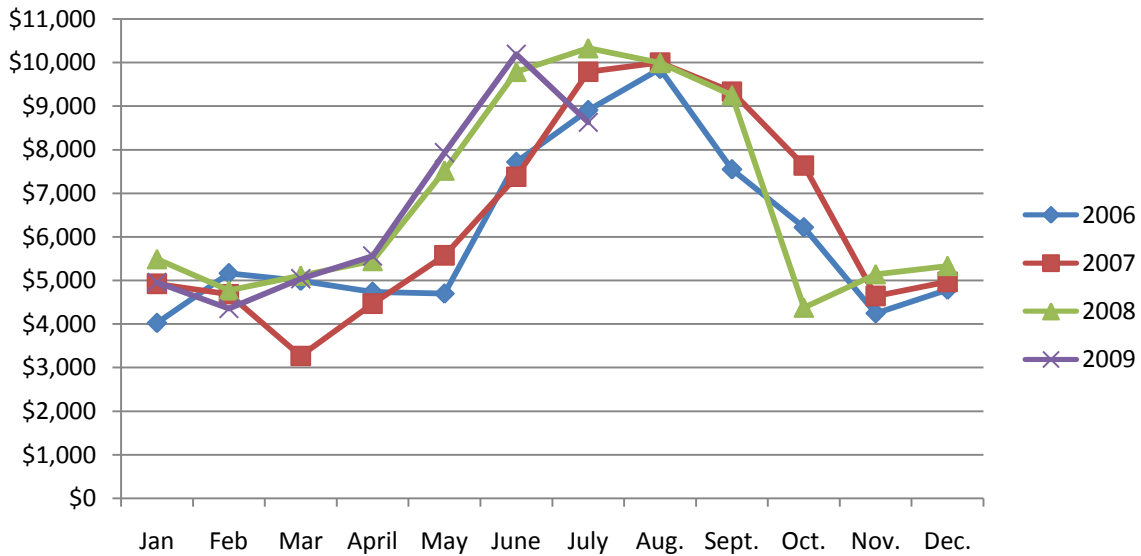
Electrical - Courthouse / Sheriff's Dept. / 1951 Jail											
Month	2006		2007		2008		2009				
	\$	kWh	\$	kWh	\$	kWh	\$	kWh			
Jan	\$8,647	138,800	\$8,655	125,600	\$9,996	136,400	\$8,489	103,200			
Feb	\$8,513	124,800	\$8,917	128,000	\$9,565	127,600	\$7,644	102,400			
Mar	\$8,081	115,600	\$6,199	117,200	\$9,792	135,200	\$8,662	109,600			
April	\$8,177	117,200	\$8,869	123,200	\$12,537	154,400	\$10,113	109,200			
May	\$9,866	130,000	\$10,628	142,000	\$14,539	169,200	\$12,644	143,600	January - July Totals		
June	\$13,224	191,600	\$13,042	170,400	\$17,287	194,400	\$14,964	159,200	2008	2,007	2006
July	\$14,713	201,600	\$15,503	202,000	\$17,803	206,400	\$14,267	161,600	1,123,600	1,008,400	1,019,600
Aug.	\$15,726	226,800	\$15,442	203,200	\$17,589	195,200			\$73,716	\$56,310	\$56,508
Sept.	\$13,522	182,400	\$15,067	201,200	\$15,951	182,800					
Oct.	\$10,816	136,400	\$13,456	173,600	\$9,676	93,600					
Nov.	\$8,080	116,000	\$9,900	120,000	\$9,505	117,200					
Dec.	\$8,755	130,800	\$9,354	137,200	\$9,661	122,800					
	\$128,120	1,812,000	\$135,032	1,843,600	\$153,901	1,835,200	\$76,783	888,800			
Notes:	1. Increase in energy usage from 2007 to 2008 - Chiller Construction Project										
	2. Actual energy rates (increases usually effective January 1st of each year)										
	2006		2007	2008	2009	2010					
		\$.071 / kWh	\$.073 / kWh	\$.084 / kWh	\$.086 / kWh	\$.091 / kWh					
			+3%	+15%	+2%	+6%					
									Implementation Date		
Projects	1. Disconnected the lights in the vending machines in the Lunchroom of the Courthouse.								Sept., 2008		
	2. Installed programs on the Building Automaton System (BAS) to allow for the safe shutdown of (11) air handling units during evenings, nights, holidays & weekends.								Oct., 2008		
	3. Installed occupancy sensors on (7) Conference Rooms on the 2nd floor.								Oct., 2008		
	4. Updated Lighting in the 1992 Courthouse, greatly improving the lighting efficiency.								Feb., 2009		
	5. Installed occupancy sensors in (14) bathrooms and the lunchroom in the Courthouse								Feb., 2009		
	6. Upgraded two aging chillers with one highly efficient chiller.								May, 2009		
	7. - Completed a comprehensive Energy Audit (electrical, mechanical and control systems) of the L.E.C. campus.								July, 2009		

Chippewa County 2002 Jail

2006 - 2009 Electrical Use (kWh)



2006 - 2009 Electrical Costs

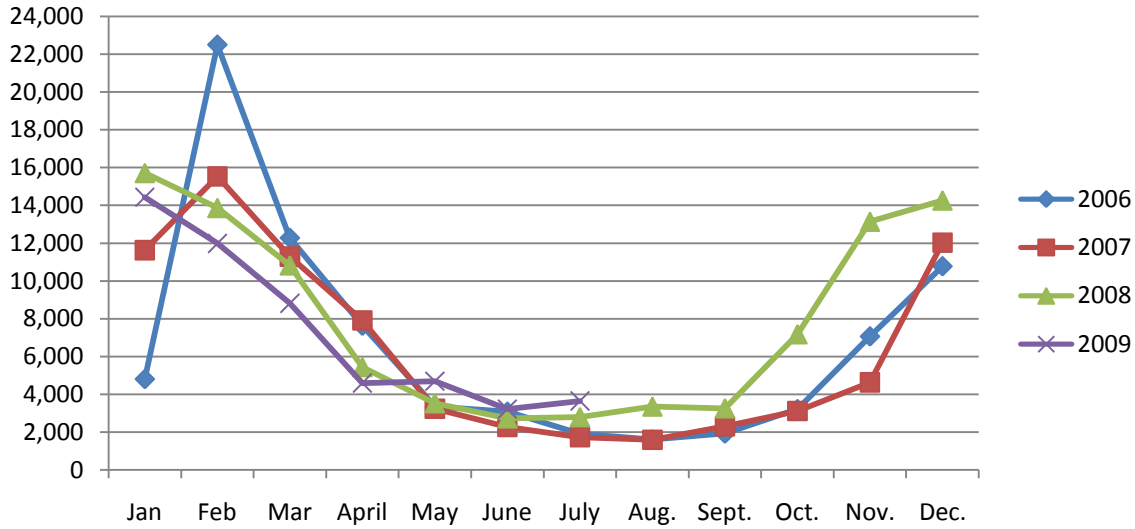


Electrical - 2002 Jail

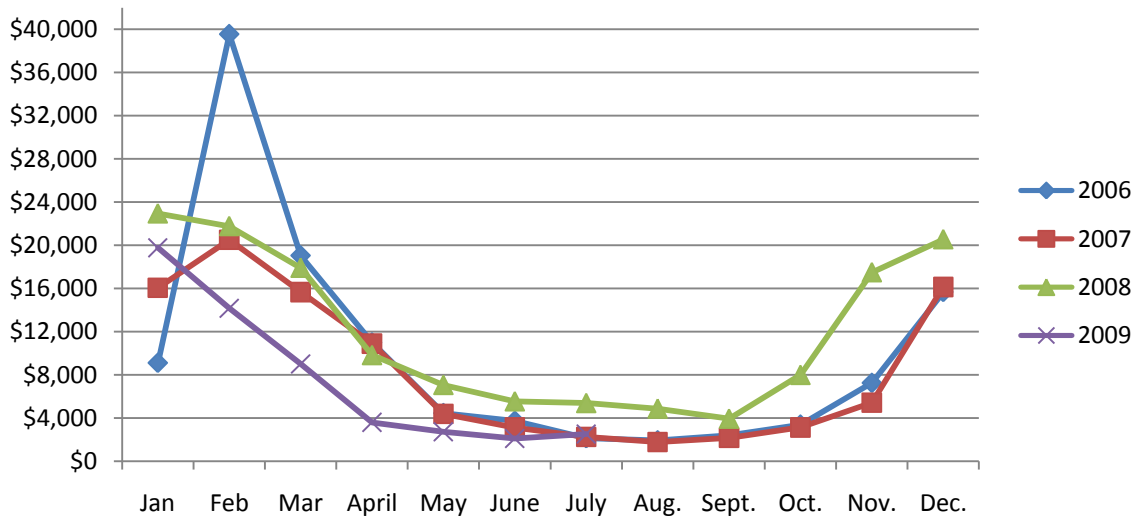
Year:	2006		2007		2008		2009				
Month	\$	kWh	\$	kWh	\$	kWh	\$	kWh			
Jan	\$4,024	61,000	\$4,924	77,000	\$5,489	66,000	\$4,953	64,400			
Feb	\$5,165	67,200	\$4,685	66,800	\$4,773	60,600	\$4,354	62,200			
Mar	\$4,991	64,000	\$3,269	63,800	\$5,110	68,800	\$5,040	67,600			
April	\$4,739	60,200	\$4,469	64,000	\$5,446	61,200	\$5,560	62,000			
May	\$4,697	71,800	\$5,577	71,800	\$7,522	80,000	\$7,933	90,400	January - July Totals		
June	\$7,717	100,400	\$7,381	84,000	\$9,790	101,800	\$10,191	115,200	2008	2,007	2006
July	\$8,907	112,200	\$9,790	116,600	\$10,332	123,800	\$8,627	103,200	562,200	544,000	536,800
Aug.	\$9,851	131,800	\$10,002	121,800	\$9,994	111,600			\$48,462	\$40,095	\$40,240
Sept.	\$7,549	101,200	\$9,337	119,800	\$9,252	104,400					
Oct.	\$6,218	70,800	\$7,638	93,600	\$4,376	78,000					
Nov.	\$4,247	60,200	\$4,644	60,000	\$5,143	67,600					
Dec.	\$4,787	72,600	\$4,969	73,800	\$5,334	71,400					
	\$72,892	973,400	\$76,685	1,013,000	\$82,561	995,200	\$46,658	565,000			
Notes:											
	1. Actual energy rates (increases usually effective January 1st of each year)										
	2006	2007	2008	2009	2010						
	\$.075 / kWh	\$.076 / kWh	\$.083 / kWh	\$.083 / kWh	\$.088 / kWh						
		+1%	+9%	0%	+6%						
									Implementation Date		
Projects	1. Installed a capacitor bank in the 2002 Jail, to improve the power factor on main electrical service.								Sept., 2008		
	2. Completed a comprehensive Energy Audit (electrical, mechanical and control systems) of the L.E.C..								July, 2009		

Chippewa County Law Enforcement Campus

2006 - 2009 Natural Gas Use (therms)



2006 - 2009 Natural Gas Costs



Natural Gas - Law Enforcement Campus												
Year:	2006		2007		2008		2009					
Month	\$	therms	\$	therms	\$	therms	\$	therms				
Jan	\$9,097	4,809	\$16,056	11,631	\$22,945	15,712	\$19,765	14,432				
Feb	\$39,541	22,497	\$20,494	15,527	\$21,771	13,862	\$14,160	11,988				
Mar	\$19,039	12,275	\$15,656	11,289	\$17,915	10,823	\$9,014	8,816				
April	\$10,979	7,628	\$10,880	7,906	\$9,830	5,438	\$3,600	4,596				
May	\$4,440	3,348	\$4,369	3,236	\$7,066	3,523	\$2,714	4,686	January - July Totals			
June	\$3,732	3,080	\$3,103	2,274	\$5,552	2,722	\$2,104	3,216	2008	2,007	2006	
July	\$2,118	1,899	\$2,231	1,735	\$5,392	2,786	\$2,505	3,644	54,866	53,598	55,536	
Aug.	\$1,918	1,602	\$1,765	1,598	\$4,877	3,348			\$90,471	\$72,789	\$88,946	
Sept.	\$2,382	1,925	\$2,157	2,306	\$3,945	3,255						
Oct.	\$3,374	3,215	\$3,114	3,118	\$7,995	7,175						
Nov.	\$7,240	7,066	\$5,409	4,635	\$17,500	13,136						
Dec.	\$15,659	10,777	\$16,131	12,028	\$20,556	14,259						
	\$119,519	80,121	\$101,365	77,283	\$145,344	96,039	\$53,862	51,378				
Notes:												
	1. Actual energy rates (increases usually effective January 1st of each year)											
	2006	2007	2008	2009	2010							
	\$1.49 / thm	\$1.31 / thm	\$1.51 / thm	\$1.05 / thm	\$1.25 / thm							
									Implementation Date			
Projects	1. Completed a steam trap survey on (124) traps. Located (35) faulty steam traps.								Sept., 2008			
	2. Performed efficiency testing on (3) steam boilers. Made adjustments to improve efficiencies by .0075%								Sept., 2008			
	3. Completed a comprehensive Energy Audit (electrical, mechanical and control systems) of the L.E.C..								July, 2009			