Final Technical Report

Project Title:	**Keweenaw Bay Wind Feasibility Study**
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Recipient Organization:	**Keweenaw Bay Indian Community**
Award Number:	**DE-EE0002513**
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1. **Executive Summary:** Through the assistance of the Community Capacity Development Office of the U.S. Department of Justice, the Keweenaw Bay Indian Community conducted a week-long community planning session in June of 2008. Meetings included Tribal members and local non-Tribal community leaders. Specifically targeted at promoting economic development and also focusing on the Tribe's legal infrastructure, a number of recommendations were developed. Among these revelations was the Tribe's commitment to its natural environment, to preserve and improve the quality of our water, air, land and all life within. The strength of the existing local business community is in manufacturing. Immediately, the Keweenaw Bay Indian community sought professional assistance to combine the core values of the Tribe with the strength of the local manufacturing community to create jobs.

   In the fall of 2008, the Council for Energy Resource Tribes (CERT) met with the community to guide the development of an Alternative & Renewable Energy Strategic

Plan. It was this plan that was our guiding document in seeking grant funding to assess the feasibility of renewable energy development and energy efficiency deployment on Tribal lands.

The Community applied for a grant from the DOE Energy Efficiency and Renewable Energy office to conduct our study. This study strengthened the belief that the Keweenaw Bay Indian Community may become more energy efficient and create manufacturing and assembly plants on the reservation to produce alternative energy systems for installation at Tribal facilities.

2. **Comparison of Accomplishments with Goals and Objectives:** A number of goals were identified in the project objectives. Among these are the cultural goals to use our resources wisely. A primary goal is to reduce the Tribe's consumption of fossil fuels, especially the mercury and carbon dioxide emissions which harm our water and land. The goal also included creating business opportunities, jobs, and revenue for the Community.

   The goal of our study has been accomplished, although not in the manner we had anticipated. When we first began considering the alternative energy production opportunities four years ago, we focused upon wind energy. This was due to multiple presentations we had received indicating that the wind along the shores of Lake Superior was strong and that wind technology was progressing to the point it was a viable and cost effective alternative to consuming fossil fuels.

   We were also had some preconceived notions. It was our belief that we had strong winds in our area and that due to the lake effect causing precipitation and cloud cover, we felt that solar energy would not be as productive as wind energy. For this reason, we targeted our study toward wind energy production, along with promoting energy efficiency.

   However, we have learned that we are in a moderate and not strong wind area. We also learned that photovoltaic energy production has increased in efficiency by approximately 40% over the past 5 years. In addition, our area not only supports the manufacturing capabilities to produce alternative energy systems, but a local engineering university has experts in photovoltaic energy systems. We amended our study to request the consultants to include a basic analysis of solar energy systems in addition to the wind energy and the results were revelatory.

   While our target of assessing wind energy was misguided, the analysis lead us to the conclusion that wind energy may become financially feasible in the near future, but solar energy is financially feasible immediately. In addition the Tribal Community has the commitment to reduce our reliance upon fossil fuels, the local non-Tribal community has the manufacturing capabilities and the higher education community has the expertise to guide us as we shift from manufacturing wind turbines to solar panel production.

   In short, we are confident solar panel production and installation will be accomplished at the Keweenaw Bay Indian Community within the next 5 years.

3. **Summary of Activities through Funding Period:** The activities funded under the grant included an assessment of our current utility consumption and recommendations on how to conserve our resources and the study of the wind and solar capacity of the area. Examples were provided to identify and illustrate the feasibility of implementation of both the costs and the benefits of the recommendations.

   Tim Mulvaney prepared a document to identify our energy conservation measures to reduce our consumption. In this 148 page document (attached), Tim specifically identifies immediate and future savings which can be received from implementing efficiency and conservation equipment and strategies within our facilities. These include conserving water, upgrading lighting, sealing the building envelope, installing mechanical equipment and implementing an energy management system.

   One of the great measures provided by Tim in addition to cost savings is our impact on the environment. By implementing the measures recommended by Tim, he conservatively estimates we can eliminate 5,596 pounds of $CO2$ emissions by conserving water at the Ojibwa Hotel, 101 tons of carbon dioxide by reducing natural gas usage by 10% and 320 tons of carbon dioxide by reducing electrical usage by 10%. Further, he correlates the reduction in emissions from gas and electric reductions to 1,168,387 miles not being driven in a passenger car. The Keweenaw Bay Indian Community has begun implementing these measures. Some upgrades, including water conservation and mechanical system upgrades were installed immediately. Others, such as upgrading lighting systems, will be installed as the existing systems require replacement.

   Consultants from H&H Wind Energy analyzed two sites for wind production (attached Wind Energy Feasibility Study). The preferred site for wind power generation showed wind speeds of 5.78 meters per second (12.9 mph). Based upon the cost of acquisition, installation, maintenance and repair of a large turbine (1.6 MW GE or 1.8 MW Vestas), and the low buyback rate from our local utility company (on-peak: $0.04781 kWh; off-peak: $0.03134 kWh), such a system could not provide a positive return of investment (ROI) with the 20 year term required by the Community. This is so even if the Community would receive a grant to cover 50% of the costs for acquisition and installation.

   While the Community's Committee for Alternative & Renewable Energy was disappointed to learn these results, we are far from discouraged. The Committee requested the consultants to conduct preliminary estimates of installing solar panels at two facilities. At one facility, the New Day substance abuse treatment facility, an analysis showed that purchasing and installing a 90kW solar system with a 50% grant for the project will provide a positive return of investment within 12 years. A second analysis at the Community Foods Warehouse showed a similar return, with a payback in 13 years.

   Based upon these projections, the Keweenaw Bay Indian Community shifted its focus from wind energy production to photovoltaic energy production. At a meeting with Dr. Joshua Pearce, an expert in photovoltaic energy systems at Michigan Technological University, Dr. Pearce described the technical evolution of solar systems over the past 5 years. Because such systems are becoming more efficient, Dr. Pearce believes that the Keweenaw Bay Indian Community may receive power 100% off-grid and has expressed his desire to work with KBIC to accomplish this goal. In addition, Dr. Pearce believes this is immediately possible with a positive return on investment even without grant subsidies. To accomplish this vision, KBIC will need to develop its own manufacturing and assembly facility.

Ultimately, the production, installation and utilization of photovoltaic energy systems on Tribal lands is immediately feasible. The Community will seek grant funds to expedite the development of manufacturing and assembly plants to hire Tribal member employees for both the production and providing maintenance and repairs for these systems. While it is anticipated that the Keweenaw Bay Indian Community governmental facilities will install the first systems, our goal is to continue research and development of the production of solar systems for use by remote residential, recreational and commercial facilities. This would include Tribal residences, hunting camps and Tribal enterprise businesses.

In addition to the above, a Tribal corporation, Aanikoosing Inc., is meeting with a local metal fabricating company on a joint venture to produce a portable alternative energy production system, which includes wind, solar and diesel generation, for application by the U.S. military, FEMA and other larger remote consumers.

4. **Products Developed and Technology Transfer:** One product has been developed through technology transfer and another is in the initial stages for development. The X-3 Energy system was designed by a local metal fabricating company that seeks to create a joint venture with Aanikoosing Inc., a corporation owned by the Keweenaw Bay Indian Community. This system was developed after KBIC recruited and met with a turbine designer and manufacturer. The proposed new business would be created on the KBIC Reservation to assemble the product. Van Straten Bros., an existing metal fabricating company, would continue to produce components for this system. A wind turbine, solar panels and diesel generator are incorporated into the final product, which is a portable power system, manufactured to customer specifications. The product can be viewed at: www.x3energy.net. One main reason the fabricating company seeks to create a joint venture with KBIC is due to the Tribal corporation's ability to be certified as a minority and disadvantaged business enterprise to contract with the federal government.

   The second product to be developed is solar panels. With the assistance of Dr. Joshua Pearce (see: http://www.mtu.edu/ece/department/faculty/pearce/) Aanikoosing Inc. will produce photovoltaic cells for residential, commercial and remote application, including production as a component of the X-3 Energy system.

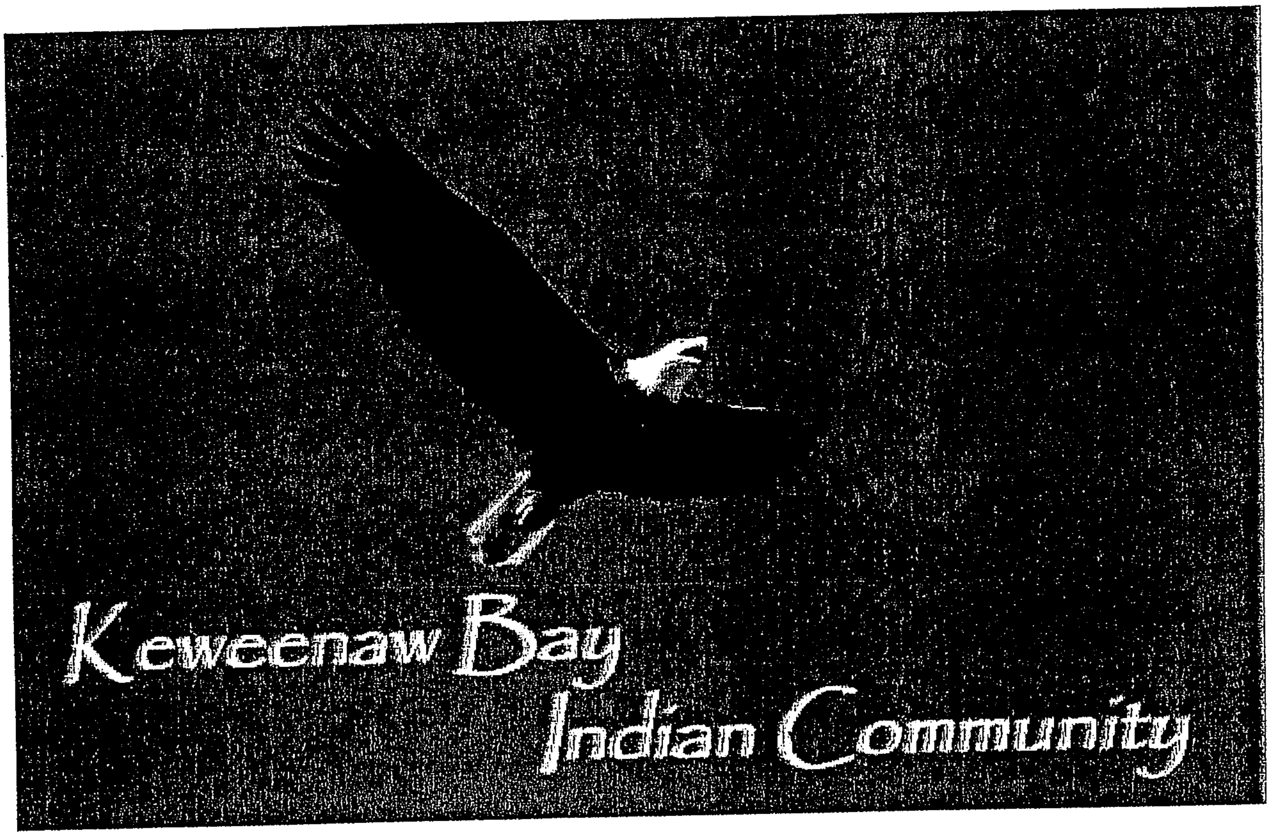
5. **Lessons Learned:** The lesson we have learned is to be flexible in the method utilized to accomplish our goals. While we initially wanted to reduce our fossil fuel emissions and create employment through the development of production plants to make wind turbines, we have learned that solar energy is more efficient currently. While we expect that technological improvements may increase the efficiency of wind turbines for future application, we are able to focus our development on photovoltaic systems to

immediately achieve our goals. Ultimately, we believe that the utilization of solar, wind and other innovative systems to be developed or improved in the future may be produced and implemented to take KBIC entirely off the existing electrical grid which produces energy primarily from coal-burning power plants.

Attachments

Energy Efficiency Study
H & H Wind Energy Feasibility Study
Utility Consumption Study

Energy Efficiency Study



energy.3

March 2012

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INTRODUCTION

This report will address the energy use and consumption of the majority of the buildings operated by the Keweenaw Bay Indian Community. Our energy engineers and energy analysts looked at all aspects of energy usage with a two-fold goal, to point out things that are being done correctly and also things where there is an opportunity to improve energy efficiency.

Energy efficiency is not a one time event nor is it a problem to be solved solely with equipment upgrades. The human factor plays a significant role in conserving energy and seeking out opportunities for energy efficiency.

This report is not only a synopsis of findings for the KBIC energy report, it is also a primer in energy efficiency and energy conservation. The purpose of this approach is to take actions on recommendations made in this report to improve energy efficiency and also to educate the reader so future actions can be taken to reduce consumption as well.

This report includes significant background material on energy efficiency equipment and practices. The intention is that those who will benefit the most from energy efficiency will not only make the improvements recommended in this report but to also install an ongoing energy management and energy efficiency program to maintain the savings that can be achieved with such a program.

At some points, this report may seem redundant in the presentation of material. For example, recommendations for lighting improvements may appear in the section on lighting and also in the section on the individual buildings. The reason for this is some people will only read the sections of this report pertinent to their respective area. By including the same information in several different places, hopefully the information is received by the appropriate parties needing to get the information.

This report contains specific recommendations for improvements in energy efficiency and opportunities for energy conservation at specific KBIC buildings around the area. But this report goes beyond just naming specific remedies for problems. This report offers advice, suggestions and recommendations for a wider range of upgrades and hopefully offers some goals to be reached for energy efficiency in the future.

Just as an example of this, in the lighting section of this report are several tables showing a variety of lighting alternatives. Each of these alternatives could be used with good results but a number of different scenarios are offered so as the most advantageous method can be selected.

Our recommendations hopefully have taken a common sense approach. Many of the buildings we toured were simple, single use buildings. We attempted to address the basics for these buildings and tried to recommend simple solutions for heating, lighting, and water conservation. For the larger buildings a more in-depth approach was taken to look at maximizing the energy conservation opportunities while keeping in mind the common sense approach.

Overall, your buildings are in good shape. We were very impressed with the caliber of the staff taking care of these buildings. Clay Van Buren and his staff as well as the individual building managers were very helpful and very knowledgeable about their buildings and about their equipment.

WATER CONSERVATION

The following pages contain four water analysis studies on various buildings owned and operated by the Keweenaw Bay Indian Community. These studies show the positive impact of installing water conservation equipment in those buildings. Studies include:

- Ojibwa Motel and Restaurant, Study 1 – This study includes 39 motel room showers and faucets as well as two kitchen faucets. The pre-rinse sprayer valve is not included in this study but is discussed separately below in Study 5.
- Four Seasons Inn, Study 2 – This study includes 39 motel room showers and faucets.
- Twenty KBIC Misc. Buildings, Study 3 – This study includes 20 buildings of various uses around the Baraga community. Included are 60 faucets.
- Casino, Study 4 – This study includes ten faucets in the casino, primarily in the bathrooms.
- High Flow Pre-Rinse Sprayer, Study 5 – This study shows the significant savings of converting to a water conserving sprayer.

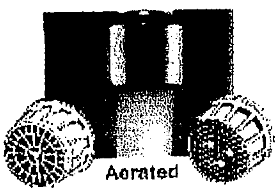
Analysis of all water related energy efficiency improvements were six months or less. In the energy world, a payback of five to seven years is acceptable. Paybacks under one year are mandatory if you are thought to be serious about energy efficiency and saving money.

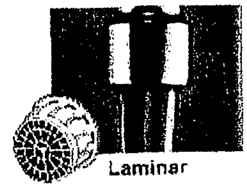
Low Flow Shower Heads

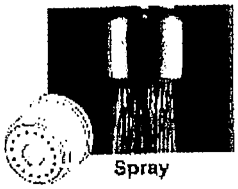
The Water Savings Analysis Studies for the Ojibwa Motel and the Four Seasons Inn demonstrate how critical a small investment in energy efficiency can be. These two studies indicate paybacks of 2½ to 3¼ months. The two studies are the same with the exception of the shower heads, one being a 1.75 gallon per minute shower head at the Ojibwa Motel and the other being a 2.0 gallon per minute shower head at the Four Seasons Inn. Either shower head can be used at either location, but the difference gpm shower heads were used to illustrate that by using either one, significant savings will be realized.

Low Flow Faucet Aerators

Low flow aerators for the bathroom and kitchen faucets are another "no-brainer." With







paybacks in the two to three month range, this low cost item is a must. Depending on the current equipment installed, savings from 25% to 75% can be easily realized. Easy to install and long lasting and low cost, this is one of the best energy efficiency measures that can be taken. For bathroom sinks, .5 gallons per minute is sufficient and for kitchen faucets, a 1.0 or 1.5 gallon per minute can be used depending on if the faucet is used for filling pots or just hand washing.

Commercial Pre-Rinse Spray Valve

The pre-rinse spray valve is used to remove food from dishes before they are placed in the dishwasher. The amount of water used to accomplish this task is secondary to the pressure or force produced by the sprayer. The object is to remove the food faster and more efficiently with the sprayer.

There are several pre-rinse sprayers currently being used in KBIC kitchens. As is evident in the Water Savings Analysis Study, all sprayers, regardless of frequency of usage, should be replaced with 1.6 gallon per minute sprayers. **The return on investment for the sprayer is the best energy efficiency investment in this entire report, 1.1 months considering usage only 180 days (half time) per year.**

Conservacap

This plastic cap is placed in flushometer toilets (toilets with direct from the wall water, no tank) to reduce water flow. Although very few are in use in tribal buildings, installation of the caps will enhance energy efficiency by reduced water consumption. The Conservacap has been shown to reduce water consumption by 21% - 33%.

Washing Machines

Newer, energy efficient washing machines are far superior than older models. ENERGY STAR washers come in both front load and top load models. They look like standard machines on the outside, yet they do not waste water filling up the tub. They clean using sophisticated wash systems to flip or spin the clothes through a stream of water. They also rinse the clothes with repeated high-pressure spraying instead of soaking them in a full tub of water.

Full sized energy efficient washers use 14 gallons of water per load compared to older models using 27 to 40 gallons per load. Even at the 27 gallons per load, the new machines use 50% less water per load. Over the lifetime of the machine that is a savings of 43,000 gallons.

The new washers do not have an agitator so clothes last longer because there is no wear and tear on them. Clothes are spun drier so less time and gas or electricity is needed for the dryer. Other advantages include less detergent required to clean a load, longer lasting machines because there is not the traditional transmission, and cleaner clothes.

Reduce the Size of the Domestic Hot Water Tanks

In certain buildings, the domestic hot water tank is too large for the amount of hot water needed or used. For example, the Commodity Foods building has a 40+ gallon hot water tank. The only demand on the tank is hand washing a few times a day.

A domestic hot water tank heats about 50 degree incoming water to approximately 120 degrees. Once the water is heated, the temperature is maintained 24 hours a day, 7 days a week. We would recommend a much smaller tank for this limited use of hot water. Two options that would be viable for a number of the KBIC hot water locations would be a point of use fixture or a tankless water heater. Both cater to small or limited use situations such as only hand washing or where hot water is needed but on a limited basis.

Water Savings Analysis Studies

NOTE: The Water Savings Analysis Studies on the following pages include formulas for heating water. In those formulas, is the number 8.34. One gallon of water weighs 8.34 pounds and 8.34 BTU's are needs to raise the temperature of water one degree Fahrenheit. The number 8.34 indicates the weight of the water.

Water Savings Analysis Study 1

Ojibwa Motel & Restaurant

Project Costs	$ 544	
Project Annual Savings	$ 2,580	at full occupancy
Return on Investment	474%	
Capital Recovery	2.52	months

Number of occupants is the number of rooms available times 1.5 persons per room and an additional 50 restaurant patrons using the restroom faucets.

Savings are based on the following assumptions:				
Price per 1,000 gallons (water and sewer)			$ 13.59	
Gas rate per therm			$ 0.55	
Total occupants			111	
	Showers - Motel	Faucets - Motel	Faucets - Misc	
Number	39	39	2	
Current gpm Usage	2.50	2.00	2.00	
Proposed gpm Usage	1.75	1.00	1.00	
gpm Saved	0.75	1.00	1.00	
Avg Uses Per Day	360	180	25	
Duration of Use (Minutes)	0.5	0.5	0.5	
Gallons Saved Per Month	8,111	5,400	750	
Cost per 1,000 gallons	$ 13.59	$ 13.59	$ 13.59	
Monthly Savings	$ 110	$ 74	$ 10	$ 194
Annual Water Savings at Full Occupancy	$ 1,320	$ 888	$ 120	$ 2,328

	Total Gallons	Monthly Savings	Annual Savings
Total Water Savings	14,276	$ 194	$ 2,328
Heating Savings (Note below)	7,138	$ 21	$ 252
Total Savings at Full Occupancy			**$2,580**
Annual Savings at 50% Occupancy			**$1,290**

NOTE 1:

Energy calculations for heating water assume that 50% of the faucet/shower water is heated and utilize the following formulas:

1. (Gallons of water X 8.34 X change in water temperature) / 3413 = Kilowatt Hours
2. (Gallons of water X 8.34 X change in water temperature) / 100,000 = Therms of Gas
3. (Gallons of water X 8.34 X change in water temperature) / 132,000 = Gallons of Oil
4. Water temperature as it enters a building from ground level is 55 degrees. Because most water is heated to not more than 120 degrees for domestic use to avoid scalding, the normal change in water temperature is 65 degrees.

Water Savings Analysis Study 2

Four Seasons Inn

Project Costs	$ 527	
Project Annual Savings	$ 1,956	at full occupancy
Return on Investment	372%	
Capital Recovery	3.23	months

Savings are based on the following assumptions:

Price per 1,000 gallons (water and sewer)	$ 13.59
Gas rate per therm	$ 0.55
Total occupants	61

Number of occupants is the number of rooms available times 1.5 persons per room.

	Showers - Motel	Faucets - Motel	Faucets - Misc	
Number	39	39	-	
Current gpm Usage	2.50	2.00	-	
Proposed gpm Usage	2.00	1.00	-	
gpm Saved	0.50	1.00	-	
Avg Uses Per Day	360	180	-	
Duration of Use (Minutes)	0.5	0.5	-	
Gallons Saved Per Month	5,408	5,400	-	
Cost per 1,000 gallons	$ 13.59	$ 13.59	$ -	
Monthly Savings	$ 73	$ 74	$ -	$ 147
Annual Water Savings at Full Occupancy	$ 876	$ 888	$ -	$ 1,764

	Total Gallons	Monthly Savings	Annual Savings
Total Water Savings	10,823	$ 147	$,764
Heating Savings (Note below)	5,411	$ 16	$ 192
Total Savings at Full Occupancy			**$1,956**
Annual Savings at 50% Occupancy			**$ 978**

NOTE 1:

Energy calculations for heating water assume that 50% of the faucet/shower water is heated and utilize the following formulas:

1. (Gallons of water X 8.34 X change in water temperature) / 3413 = Kilowatt Hours
2. (Gallons of water X 8.34 X change in water temperature) / 100,000 = Therms of Gas
3. (Gallons of water X 8.34 X change in water temperature) / 132,000 = Gallons of Oil
4. Water temperature as it enters a building from ground level is 55 degrees. Because most water is heated to not more than 120 degrees for domestic use to avoid scalding, the normal change in water temperature is 65 degrees.

Water Savings Analysis Study 3

Twenty (20) KBIC Misc. Buildings

Project Costs	$ 300	
Project Annual Savings	$ 543	
Return on Investment	181%	
Capital Recovery	6.60	months

Number of occupants is the average number of people using facilities in the 20 buildings.

Savings are based on the following assumptions:	
Price per 1,000 gallons (water and sewer)	$ 13.59
Gas rate per therm	$ 0.55
Total occupants	200

			Faucets - Misc	
Number	-	-	60	
Current gpm Usage	-	-	2.00	
Proposed gpm Usage	-	-	1.00	
gpm Saved	-	-	1.00	
Avg Uses Per Day	-	-	100	
Duration of Use (Minutes)	-	-	0.5	
Gallons Saved Per Month	-	-	3,000	
Cost per 1,000 gallons	$ -	$ -	$ 13.59	
Monthly Savings	$ -	$ -	$ 41	$ 41
Annual Water Savings	$ -	$ -	$ 492	$ 492

	Total Gallons	Monthly Savings	Annual Savings
Total Water Savings	3,000	$ 41	$ 492
Heating Savings (Note below)	1,500	$ 4	$ 48
Total Savings			**$ 540**

NOTE 1:

Energy calculations for heating water assume that 50% of the faucet/shower water is heated and utilize the following formulas:

1. (Gallons of water X 8.34 X change in water temperature) / 3413 = Kilowatt Hours
2. (Gallons of water X 8.34 X change in water temperature) / 100,000 = Therms of Gas
3. (Gallons of water X 8.34 X change in water temperature) / 132,000 = Gallons of Oil
4. Water temperature as it enters a building from ground level is 55 degrees. Because most water is heated to not more than 120 degrees for domestic use to avoid scalding, the normal change in water temperature is 65 degrees.

Water Savings Analysis Study 4

Casino

Project Costs	$ 50	
Project Annual Savings	$ 264	
Return on Investment	528%	
Capital Recovery	2.27	months

Savings are based on the following assumptions:

Price per 1,000 gallons (water and sewer)	$ 13.59
Gas rate per therm	$ 0.55
Total occupants	100

Number of occupants is the average number of people using facilities in the casino, lounge, bowling alley, and bars.

			Faucets - Misc	
Number	-	-	10	
Current gpm Usage	-	-	2.00	
Proposed gpm Usage	-	-	1.00	
gpm Saved	-	-	1.00	
Avg Uses Per Day	-	-	50	
Duration of Use (Minutes)	-	-	0.5	
Gallons Saved Per Month	-	-	1,500	
Cost per 1,000 gallons	$ -	$ -	$ 13.59	
Monthly Savings	$ -	$ -	$ 20	$ 20
Annual Water Savings	$ -	$ -	$ 240	$ 240

	Total Gallons	Monthly Savings	Annual Savings
Total Water Savings	1,500	$ 20	$ 240
Heating Savings (Note below)	750	$ 2	$ 24
Total Savings			**$ 264**

NOTE 1:

Energy calculations for heating water assume that 50% of the faucet/shower water is heated and utilize the following formulas:

1. (Gallons of water X 8.34 X change in water temperature) / 3413 = Kilowatt Hours
2. (Gallons of water X 8.34 X change in water temperature) / 100,000 = Therms of Gas
3. (Gallons of water X 8.34 X change in water temperature) / 132,000 = Gallons of Oil
4. Water temperature as it enters a building from ground level is 55 degrees. Because most water is heated to not more than 120 degrees for domestic use to avoid scalding, the normal change in water temperature is 65 degrees.

Water Savings Analysis Study 5

High Flow Pre-Rinse Sprayer

Project Costs	$ 70	
Project Annual Savings	$ 795	at 180 days of use
Return on Investment	1136%	
Capital Recovery	1.08	months

Savings are based on the following assumptions:

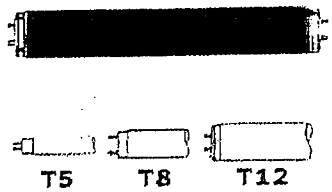
Price per 1,000 gallons (water and sewer)	$ 13.59
Gas rate per therm	$ 0.55

	Old Sprayer	New Sprayer
Gallons Per Minute	3	2
Hours Per Day Usage	3	3
Days a Year Used	180	180
Daily Consumption	540	288
Annual Consumption	97,200	51,840
Converted Water Units	97.2	52.0
Cost per 1,000 gallons	$ 13.59	$ 13.59
Monthly Cost	$ 1,321	$ 705
Water Heating:		
Gallons of Water	$ 97,200	$ 51,840
lb/gal	8.33	8.33
lb	809,676	431,827
Delta T	60	60
BTU	48,580,560	25,909,632
Water Heater Efficiency	0.7	0.7
BTU Input	69,400,800	37,013,760
Therms Consumed	694	370
Heating Cost	$ 382	$ 204
Total Water and Heating Cost	**$ 1,703**	**$ 908**

LIGHTING

A significant opportunity for energy efficiency comes in the area of lighting. New advances in technology and lower price points for this new technology make lighting improvements mandatory for any energy conservation program. The majority of the lighting issues addressed for the Keweenaw Bay Indian Community are for improvements in fluorescent lighting.

This report will discuss three types of fluorescent lamps, T12, T8, and T5 lamps. The numbers define the diameter of the lamps in eighths of an inch. A T12 lamp is 12 eights or 1½ inches in diameter. A T8 is one inch in diameter and a T5 is ⅝ inch, T8 and T5 being the newer technology.



Another difference in these fluorescent lamps is their energy usage. A T8 bulb can be 28 or 32 watts while a T12 can be 34 or 40 watts making the T8 more energy efficient. Light output from the two lamps is quite similar, the T8 producing 2,600 lumens and the T12 producing around 2,520 lumens.

Energy savings are the primary consideration for lighting upgrades. Depending on the technology (lamps and ballasts) currently being used and the proposed improved technology, energy savings of 17% to 45% depending on specific lamps and ballasts.

It has been found that when replacing a four lamp T12 fixture with T8 technology, delamping to three T8 lamps can occur without significant impact on the brightness realized. This delamping alternative should be tried to determine if lighting levels are sufficient with the three T8 lamps. Places where this delamping application may be workable are areas such as hallways, bathrooms, common areas, etc. where lighting demands are not as great as an office area. If it is found that lighting levels are adequate, additional energy savings can be realized.

Over time all lamps will lose their intensity or their brightness. T8 lamps have a slower period of decrease only losing about 10% of their initial brightness after 7,000 hours of use. In comparison, T12 lamps can lose 20% of their brightness after the same number of hours. Bulbs operating 10 hours per day can last up to two years before showing noticeable signs that they are in need of replacement. T8 lamps have a higher color rendering index or CRI than standard T12 lamps. The higher CRI makes objects and surfaces in a room appear more like they would under natural light.

T8 lamps come on instantly when switched on as opposed to T12 which have a slight delay when switched on. Also, T12 tend to flicker as they age causing eye problems for the people working under these lamps.

Ballasts are a significant part of a lighting change when upgrading from T12 to T8 lamps. With electronic ballasts and T8 lamps there can be less energy usage, better light quality, they will run cooler and quieter and last longer than the older technology. Electronic ballasts can hold multiple bulbs and use less energy to power those bulbs. Electronic ballasts are more suited to T8 lamps and magnetic ballasts are used for T12 lamps. When replacing T12 lamps with T8 lamps, the ballast should also be replaced. Using a magnetic ballast with T8 lamps will hinder the amount of light produced by the lamp and may significantly reduce to life of the T8 lamp. Also, when replacing T12 lamps with T8, all lamps in the same fixture should be the same type of lamps, either all T12 or all T8 lamps.

For energy saving T8 lamps, energy savings can be optimized by combining the lamp with a high-efficiency ballast or if lower light output is acceptable, a low-output ballast.

Depending on the type of fixtures already being used and the type of new lamps to be installed, it may be advantageous to replace the entire fixture. If the lamps and ballasts are being replaced, the cost of a new fixture with ballast and lamps could be "swapped out" in a matter of minutes as opposed to rewiring ballasts and installing new lamps in the old fixture. Labor costs to revamp the old fixture could outweigh the costs of installing a new fixture. In addition to the cost advantages, a new fixture may offer better lighting with a new reflector in the fixture. Reflector improvements now give lighting better color rendition and better overall lighting brightness. The cost of the new fixture may determine whether this is the proper course of action for a lighting retrofit.

Another advantage of using all the same type of lamps, all four foot T8 lamps, is only one type of lamp has to be ordered and stored. Quantity price breaks and bulk purchasing may be another positive for standardizing the lamps used.

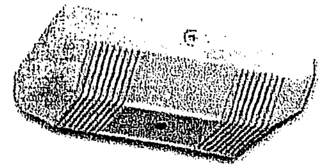
Exit Signs

Many of the Exit signs used in the KBIC properties are LED (light emitting diodes) lighted signs. Overwhelming evidence proves the LED lit signs are far superior for a number of reasons. Energy efficiency, cost of operation, visibility, and long life are all positives for these types of energy improvements. Payback on LED lighted Exit signs is generally from one to two years. LEDs consume 95% less electricity than incandescent bubs and 75% less than energy efficiency compact fluorescent lamps. In addition, they virtually eliminate maintenance.

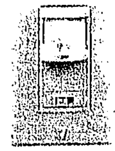
Occupancy Sensors, Lighting Timers

Occupancy sensors automatically turn off lighting in unoccupied spaces. These sensors take away the responsibility of human decision to reduce energy when energy is not required.

The typical office spends 29% of its electrical energy costs for lighting. Occupancy sensors can reduce these charges by 50% or more. Sensors are infrared and ultrasonic. Passive infrared sensors detect temperature changes in a room. Ultrasonic sensors use high frequency sound to detect motion. The type of room will dictate the sensor to be used. Cost will vary but the cost is relatively low compared to the benefits and the payback for occupancy sensors is usually between .5 and 4 years.



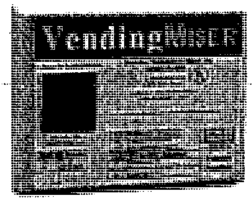
Ultrasonic Ceiling Mount

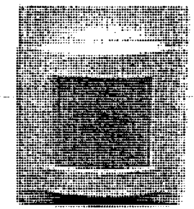


Infrared Occ Sensor

Vending Machines / VendMiser

Vending machines and pop machines can consume a large amount of electricity. Pop machines are especially big consumers of electricity because they are both a heater and a refrigerator in one box. The compressor cools the beverages and the lights inside the vending machine act as heaters, generating heat when the lights are on and causing the compressor to work harder to cool the air inside the machine.





A very good solution to this problem is a VendMiser, a plug and play device that installs in minutes. It is a quick and inexpensive solution for immediate savings. The Vendmiser allows the compressor to cycle and keeps the lights off until someone walks by the machine. Then, the occupancy sensor turns on the light. Vending companies have approved of this technology.

The following few pages will offer some ideas or suggestions about retrofitting or replacing existing T12 lighting with T8 lighting. Since it is not the intent of this report to design lighting, these lighting tables are offered as suggestions as how to approach various lighting opportunities. For example, an office and the casino floor may both have fluorescent lamps illuminating the space. However, the lighting demands will be quite different. Where the office might require high light levels, on the casino floor this type of lighting would not work. By evaluating the lighting situation, some combination of the data below can be used to optimize energy savings without hindering the necessary lighting levels.

Standardize Lighting

For the most part, KBIC buildings use four foot standard fixture fluorescent lights. Both for cost control and inventory control, standardization of lamps and ballasts is desirable. Only having to stock one or two sized lamps is the best way to operate if those lamps meet your needs. We would recommend using T8 lamps and electronic ballasts and converting even fixtures that would have a significantly longer payback. T12 lamps will not be available in the future and now would be a good time to make the switch.

Upgrading Lighting Opportunities

The following definitions will assist in explaining the subsequent pages showing upgrading opportunities for new lighting systems.

Input Watts – The total wattage required by both the ballast and the lamp in the fixture.

Ballast Factor – The ballast factor is defined as the light output in lumens with a test ballast, compared to the light output with a laboratory reference ballast that operates the lamp at its specified nominal power rating. The ballast factor must be considered in lighting design; a low ballast factor may save energy but will produce less light.

Light Output – The number or amount of lumens (visible light) emitted by a source.

Net System Lumens/Watt – The explanation is found at the bottom of each of the lighting tables below.

Upgrading Opportunities: From a T12 system to a T8 system

This system has upgrading opportunities. Some energy efficiency options follow.

System Lamps	*System Ballasts*	*Input Watts*	*Ballast Factor*	*Light Output vs T12*	*Savings vs T12*	*Net System Lumens/Watt**
(4) 34W T12	(2) energy saving magnetic	144	0.88	100%	n/a	56.2

Here are some options for more light output:

System Lamps	*System Ballasts*	*Input Watts*	*Ballast Factor*	*Light Output vs T12*	*Savings vs T12*	*Net System Lumens/Watt**
(4) 30W T8	(1) high efficiency electronic	100	0.87	118%	31%	95.7
(4) 32W T8	(1) standard electronic	112	0.88	117%	22%	84.9
(4) 32W T8	(1) high efficiency electronic	106	0.87	116%	26%	88.6
(4) 28W T8	(1) high efficiency electronic	93	0.87	111%	35%	96.5

Here are some options for the same light output:

System Lamps	*System Ballasts*	*Input Watts*	*Ballast Factor*	*Light Output vs T12*	*Savings vs T12*	*Net System Lumens/Watt**
(4) 30W T8	(1) high efficiency low-wattage (LW) electronic	89	0.77	105%	38%	95.2
(4) 32W T8	(1) high efficiency (LW) electronic	95	0.77	103%	34%	87.5
(4) 25W T8	(1) high efficiency electronic	83	0.87	98%	42%	95.6
(4) 28W T8	(1) high efficiency (LW) electronic	82	0.77	98%	43%	96.9

Here are some options if light output can be sacrificed for energy savings:

System Lamps	*System Ballasts*	*Input Watts*	*Ballast Factor*	*Light Output vs T12*	*Savings vs T12*	*Net System Lumens/Watt**
(4) 25W T8	(1) high efficiency (LW) electronic	75	0.77	87%	48%	93.6

* Net system lumens per watt = (mean lumens X number of lamps X ballast factor) / input watts
NOTE: Depending on needed light levels, when switching to a T8 system, delamping may be an alternative, saving even more.

Upgrading Opportunities: From an older T8 system to a newer T8 system

This system has upgrading opportunities. Some energy efficiency options follow.

System Lamps	*System Ballasts*	*Input Watts*	*Ballast Factor*	*Light Output vs T12*	*Savings vs T12*	*Net System Lumens/Watt**
(4) 32W T8	(1) standard electronic	112	0.88	100%	n/a	84.9

Here are some options for about the same light output:

System Lamps	*System Ballasts*	*Input Watts*	*Ballast Factor*	*Light Output vs T12*	*Savings vs T12*	*Net System Lumens/Watt**
(4) 30W T8	(1) high efficiency electronic	100	0.87	118%	31%	95.7
(4) 32W T8	(1) high efficiency electronic	106	0.87	99%	5%	88.6

Here are some options if light output can be sacrificed for energy savings:

System Lamps	*System Ballasts*	*Input Watts*	*Ballast Factor*	*Light Output vs T12*	*Savings vs T12*	*Net System Lumens/Watt**
(4) 28W T8	(1) high efficiency electronic	93	0.87	94%	17%	96.5
(4) 30W T8	(1) high efficiency (LW) electronic	89	0.77	89%	21%	95.2
(4) 32W T8	(1) high efficiency (LW) electronic	95	0.77	88%	15%	87.5

Here are some options if light output can be sacrificed even more for energy savings:

System Lamps	*System Ballasts*	*Input Watts*	*Ballast Factor*	*Light Output vs T12*	*Savings vs T12*	*Net System Lumens/Watt**
(4) 28W T8	(1) high efficiency (LW) electronic	82	0.77	84%	27%	96.9
(4) 25W T8	(1) high efficiency electronic	83	0.87	83%	26%	95.6
(4) 25W T8	(1) high efficiency (LW) electronic	75	0.77	74%	33%	93.6

* Net system lumens per watt = (mean lumens X number of lamps X ballast factor) / input watts

NOTE: Depending on needed light levels, when switching to a T8 system, delamping may be an alternative, saving even more.

THE BUILDING ENVELOPE

One aspect that is very important and is often overlooked in an energy conservation program is the building envelope or the exterior of the building. The goal for the building envelope is to reduce to a minimum, the amount of air filtration. The KBIC buildings we observed were of various ages and various construction. Some of the buildings have had multiple uses. For example, the current police department was once a service station/tire repair facility. In the case of the police department, the garage that was once actively used for a business is not used primarily for vehicle storage with very sporadic use. If the building were used as a business with ongoing work and people in that space, it would be treated differently relative to energy upgrades as if were to be used for vehicle storage. As a practical matter, the first question to ask is what will this buildings usage be in the immediate future. If is not going to be occupied, minimum upgrades should be done. However, if the building is going to be occupied and used for a purpose, improvements should be made to the buildings envelope because of the low cost and the relatively quick payback of these improvements.

There are a number of items to consider with the envelope, roofs, windows, doors, vents, lighting and electrical outlets, and any other holes or fixtures that would allow the infiltration of air. Outside air can infiltrate through any number of openings, creating drafts and cold hands and cold feet. The ultimate goal is to keep the occupants of the building comfortable at a reasonable cost. If the building is not providing the comfort they need, they will bring in fans, space heaters, and other energy consuming equipment to satisfy their need for comfort. This will be additional costs for utilities.

Roofs

Many times roofs, because they are out of sight, are neglected until something happens such as a water leak. Roofs should not be replaces solely to improve the buildings energy efficiency, however is a new roof is being installed, insulation should be part of that project. If a new roof is installed, it would be wise to add insulation if not much insulation is present. Heat rises and roofs are a great source of thermal loss.

Door Seals

Often we overlook doors that have a gap around the edge of the door. From opening and closing, especially in high traffic public buildings, doors often go out of alignment. A quarter inch gap around a set of double doors is the same as have a 10 inch hole in the wall. If there was a ten inch hole, it would be repaired immediately, but with the door problem, it often gets passed over. (__) The line between the two parentheses is a quarter of an inch, not a very big gap.

Insulate Openings / Window Caulking

Hidden air leaks cause some of the largest heat losses in a building. Common air leakage sites include, but are not limited to the following:

- Plumbing penetrations through insulated floors and ceilings
- Recessed light and fans in insulated ceilings and exterior walls
- Electrical outlets and switches, especially on exterior walls
- Window, door, and baseboard moldings
- Dropped ceilings

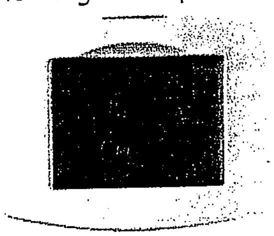
The best material for sealing hidden air leaks depends on the size of the gap and where the gap is located. Caulk is best for cracks and gaps less than ¼" wide. Expanding foam sealant is an excellent material to use for sealing larger cracks and holes.

HEATING, COOLING, MECHANICAL

The primary recommendations relative to the heating, cooling, and mechanical upgrades for each building are contained in the individual building write ups that follow. Because the mechanical, and the heating and cooling segments of an energy efficiency project are the lion's share of the work and the lion's share of the financing, we segregated these recommendations for each building to give them the attention necessary for a full evaluation. In doing this, it will give you a better picture of what is involved with upgrading each building. *The recommendations for mechanical improvements are in blue in color and are in italic type and each recommendation is explained in detail for each building.* If there are similar recommendations for two or more buildings, these recommendations will appear in several places where they would be appropriate for energy efficiency upgrades. Several of the common recommendations are shown below with an explanation of their benefits.

Programmable Thermostats

A few programmable thermostats are being used in KBIC buildings. However if the number in use was increased, energy costs would go down. Space conditioning (heating and cooling) is the largest expense for many facilities and automated thermostats are the most effective energy management device available. Space conditioning systems can be programmed based on occupancy schedules. This type of programmable thermostat is the simplest. Other more sophisticated thermostats can be included in an energy management system. (See the reference to an Energy Management System included in this report).



Variable Frequency Drives

Variable frequency drives (VFD) or variable speed drives, often called "freq-drives," adjust motor speeds according to the process load requirements, flow variations, or other factors needed to run the motor more efficiently. VFDs can often achieve significant energy savings when conditions allow. VFDs have a soft start, starting the motor slowly and working up to speed, which reduces wear and tear on the motor and extends the life of the motor. It is best to seek professional advice when considering VFDs on motors. However, as a rule of thumb, motors larger than 1 hp should be considered for a variable speed drive.

In our tours of the KBIC buildings, it was noted that there was a possibility of installing a couple of 15 hp motors in the Natural Resources area and VFDs were being considered for those motors. Personnel considering this option should be commended for their forethought.

Refrigeration

A large part of your utility costs are for refrigeration, in refrigerators, coolers, and freezers. There are not many products on the market to address the concerns of reducing these costs with the exception of replacing equipment. Much of the refrigeration equipment used by the KBIC is new equipment or in very good condition and replacement is not warranted. However, the performance and life expectancy could be improved by a product we have used before called "eCube®."

The eCube® can lower energy costs by 30%. The device fits over the thermostat probe in the refrigerator or freezer and mimics the properties of food allowing the refrigerator or freezer to react to the temperature of the food rather than react to the temperature of the air which is much more volatile. With the eCube® the number of compressor cycles is reduced by up to 80% so the compressor will last longer because of the reduced use. The compressor cycles less but has longer run times. Thermal energy that builds up in the food during the cooling cycle is called thermal inertia. Food stays cold longer and at a more consistent temperature.

Because of this thermal inertia, the thermostat set points can be raised and still maintain the temperature desired. With the raised set points, the compressor runs about 10% to 30% less.

For example, by using eCube® as a cycle control mechanism, refrigeration cycles last longer but can be reduced by as much as 85%. For example, a dairy case cycles 3 minutes on, 2 minutes off = 12 cycles per hour. With eCube®, the cycles change to 8 minutes on, 7 minutes off = 4 cycles per hour; a 66.7% reduction in starts. As the start-up of a refrigerator compressor uses 3 times more power (i.e. start-up 12 amps, run 4 amps) considerable energy savings are achieved. In addition, the more efficient refrigeration cycle leads to a more efficient unit, which then leads to a colder storage area. Consequently, by re-adjusting the thermostat back to its normal temperature settings, there are further substantial energy savings, without compromising food safety and quality.

Energy savings payback on the eCube® is about 1.5 to 2 years.

ENERGY MANAGEMENT SYSTEMS

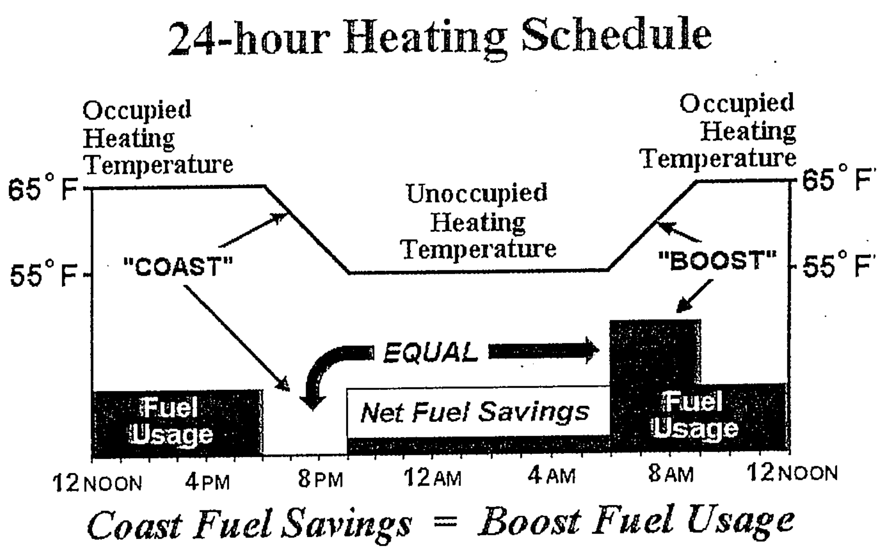
An energy management system or a building management system is a computer controlled system installed in a building to control and monitor the building's mechanical and electrical equipment such as ventilation, lighting, power systems, fire systems, and security systems. The energy management system is made up of hardware and software, configured to maximize the efficiency of the equipment and reduce utility costs.

At a minimum, an energy management system is to manage the environment within a building and to control the temperature, carbon dioxide levels, and humidity. As a core function, the system will control heating and cooling, manage the systems that distribute the air throughout the building by operating fans or open and closing dampers and mix the air to achieve the desired room temperatures. Systems can also monitor human generated CO2 levels mixing outside air with inside conditioned air to increase the amount of oxygen while minimizing heating or cooling losses.

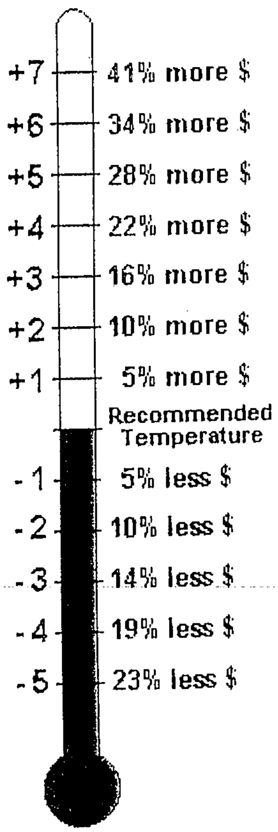
Systems linked to the energy management system typically represent from 40% to 75% of the building's energy usage.

Controlling the Temperatures

Most areas of a building tend to be overheated or over cooled. Trimming the temperature set points by 2 degrees can save 10%. Recommendations for heating temperatures for various building areas are shown in the graphic. Most of the temperatures apply to occupied building areas; a reduction of 55 degrees is recommended when areas are unoccupied for at least eight hours. Studies show that half of the savings available are achieved in the first 5-degree setback. Even minor temperature setback can produce substantial savings.



Heating requirements in buildings will vary with the type of activity being conducted. For example, the recommended heating temperature for offices is 68 degrees. However, cooler temperatures are often possible in other areas such as computer rooms, corridors, and storage rooms. The idea is to keep the temperature as low as possible while still maintaining comfort for the occupants. As the graphic indicates, savings can be quite substantial when lower temperatures are kept. As shown, you will pay a premium of 22% by heating at 72 degrees than the recommended 68 degrees. Likewise, you could save 14% by dialing down from 68 degrees to 65 degrees.



Heating and cooling temperatures would be controlled by an energy management system. Space would be controlled by a preset program depending on occupancy and comfort levels. Controlling the temperature, humidity, and outside are ventilation and intake would be a significant component of the system.

Comfort levels are a combination of temperature, humidity, and CO2 levels which validate the need for an energy management system to assist in controlling temperatures and scheduling cooldowns for unoccupied times in the buildings. The graphic above, 24-Hour Heating Schedule illustrates how energy can be saved during unoccupied times, the times when heating is not necessary or required for anyone's comfort.

BUILDING AREA	Recommended Temperature °F
Office / Library	68 °F
Conference Room	68 °F
Computer Room	65 °F
Restrooms	65 °F
Corridors	62 °F
Unoccupied Areas	55 °F

CO2 Sensors

One of the most energy efficient measures a facility can use is the CO2 sensor. The CO2 sensor is used for monitoring the quality of air in a room. Typically, outside air is introduced to a space when the outside air unit is turned on and it runs on an ongoing basis, bringing in fresh air that must be conditioned (heated or cooled) regardless if that outside air is needed or required. The typical illustration is the gym. If there are 30 people using the gym, there is not a need to exchange the air because the gym has a large volume of air and the 30 people will not make a real difference in introducing CO2 to the air. However, if several hundred spectators are in the gym, the amount of CO2 rises drastically and the CO2 sensor will tell the heating, cooling, and air exchange equipment, outside air is needed and the correct amount of fresh air can be introduced to the area. When the proper level has been reached the equipment is turned off until needed again.

None of the KBIC buildings has CO2 sensors. This is one measure that should be implemented immediately.

Operating Schedules

As part of an energy management system, operating schedules of buildings need to be considered to have the building adequately heated and cooled at certain times of the day. Once established these schedules will dictate the operation of the equipment by the energy management system. Be aware that schedules will change over time and the energy management system needs to be modified also for these changes.

Tuning Up the Energy Management System

Scheduling changes as noted above will impact on the operation of the energy management system. Equipment will change also. Just through normal use, sensors may have to calibrated, adjusted, or tuned up to assure they are operating properly. This area is ripe for energy savings and cost control associated with properly operating controls can contribute a significant amount to savings.

ENVRONMENTAL IMPACT

Environmental impact of water conservation can be substantial and this is only one segment of energy conservation. When taking into consideration natural gas and electricity and the opportunities of energy conservation measures in these areas, the environmental impacts of an energy management program can be very significant.

If the energy upgrades were made only in the Ojibwa Motel and Restaurant by just changing the shower heads and faucets in the motel and restaurant, there would be a reduction in natural gas of 464 ccf or the equivalent of planting 16 trees. It would also eliminate 5,596 pounds of CO2 emissions. Also four pounds of nitrous oxide would be removed from the environment.

Electricity and Gas Efficiency Environmental Impact

The Keweenaw Bay Indian Community uses approximately 6,300,000 kwh and 190,000 therms of natural gas per year. Using these consumption levels as average usage and assuming a very attainable level of energy consumption reduction of 10%, the following environmental impact would result.

◊ ***320 tons of carbon dioxide (CO2) would be eliminated from the environment from a 10% reduction in electric usage.***

◊ ***101 tons of carbon dioxide (CO2) would be eliminated from the environment from a 10% reduction in natural gas usage.***

By offsetting emissions, the impact would be similar to:

◊ ***3,816 fully mature trees planted.***

◊ ***1,168,387 miles not driven by an average passenger car.***

◊ ***82 passenger cars off the road for one year.***

Water Efficiency Environmental Impact

If water efficiency upgrades were made to the Ojibwa Motel, restaurant, Four Seasons Inn, 20 various buildings run by the tribe and the casino, 1,036 ccf of natural gas could be eliminated, **12,494 pounds of CO2 emissions would be eliminated** and five pounds of nitrous oxide would be eliminated. Those are annual figures. Each year the KBIC would be improving the environment by these pollutant reductions.

Elimination of Pollutants

The last section of this report contains a Cost / Payback Analysis of lighting measures that could be made to improve efficiency. Within this section there is a pollution eliminated calculation. The numbers are based in lighting retrofits to existing T12 lamps and incandescent lamps. The amount of pollution that is eliminated is dependent upon the new equipment and the hours of use. Taking the fewest hours for the lighting improvements cited, **16,286 pounds of pollution would be eliminated if these improvements were made on an annual basis. A more realistic number would be in the 25,000 pound range because of the extended hours of operation.**

A note on mercury in compact fluorescent lamps (CFLs)

CFLs do contain a very small amount of mercury. It is sealed within the glass tubing and is about the size of the period at the end of this sentence. It would take more than 100 CFLs to collect enough mercury to equal the amount contained in one older thermometer.

FINANCING THE PROJECT

As with any investment, an energy project must meet a desired rate of return for the investor. Considering the rate of return for an energy project and comparing it to other rates of return for the other investment options, the potential energy project must stand on its own financial merits. Often, energy projects are not regarded as the core business and investment in these projects gets overlooked in favor of investing in other aspects of the business. For example, with the gaming and hospitality industry, that business may invest in more slot machines or expand the restaurant. The slot machines may yield a return on investment of 25% and the restaurant may offer a return on investment of 15%. Replacing exist lighting with new lighting technology may yield a return on investment of 35%. Although not the core business, the lighting project will yield a better rate of return.

The payback period is the time required to recover the capital investment out of the earnings or savings. Divide the initial investment of the energy improvements by the dollar savings of the improvements will yield the payback period. In simple terms, if something has a return on investment of 25% the payback is four years. If an energy improvement has a payback of three years, the return on investment is 33%.

Not considered in this formula are the savings that will be generated in future years beyond the payback of the initial investment. Also not considered is the cost of the utility. If the cost of gas, electricity, or water increases, the payback period is shortened and the return on investment is improved.

A prime consideration in financing an energy project is the rate of return. If your project has a three year payback, it is like investing your money and getting a 33% return on that money.

NOTE: We will not make any recommendations regarding how to finance an energy efficiency project but will offer suggestions on how to accomplish the financing. Depending on the equipment or procedure to be financed is an internal decision of the Keweenaw Bay Indian Community. However, most of the recommendations made in this report will have a significantly better return on investment than any other investment. In some cases, the return on investment could approach 500% for a year. Most improvements will have a great return on investment.

Internally financed or Borrowed Money – Depending on the cash position of the entity and the interest rates invested money is obtaining and the interest available for financing, an internally financed project may be ideally suited for energy upgrades. Money borrowed at 6% and invested in an energy project returning 15% or 20% would be a wise decision. Another alternative would be to use funds currently invested at lower rates and invest in your own facilities with an energy project and pay yourself the higher interest realized with lower utility costs.

Performance contract – Depending on the size of the project and the energy savings involved, a performance contract may be a viable alternative to other forms of financing. In its simplest form, a performance contract guarantees funds for a project from future energy savings. The obligation to service the debt is known, based on planable and unavoidable costs of heating, cooling, and illuminating buildings.

Although a very good way to finance energy conservation projects, for a performance contract to be attractive to an energy services company, the project must be of a fairly large scope to be viable for the energy services company to participate in the project. Generally performance contract projects less the a half million dollars would not be feasible. Since the Keweenaw Bay Indian Community does not have a project in that category, this may not be the best course of action to finance energy conservation upgrades to the facilities.

Government funding or grants – At the present time, the federal government is investing a significant amount in energy efficiency and energy conservation. A government grant for this purpose or government funding for such projects may be another viable source for financing.

***Utility rebates* – Utility companies are currently offering incentives and rebates for energy upgrades for the purchase and installation of new equipment. These rebates are available NOW.** Utility companies have only a limited supply of power or fuel to offer their customers. They have found that it is cheaper to offer rebates to customers to reduce their consumption than it is to fine new sources for power or fuel to sell to the customer. Thus, the utility companies are offering rebates as an incentive for their customers to reduce their consumption. Check with each utility company before the upgrades are made to determine what information will be required by the utility company for rebate payment.

Summary

We are confident that the KBIC finance and accounting departments know how much a visitor to the casino, the restaurant, the motel, or any of the other money making operations of the Keweenaw Bay Indian Community must spend to reap a dollar of profit. We would be out of our realm to attempt to say with any level of accuracy or certainty that for every three dollars spent on the casino floor or for every five dollars spent in the restaurant, one dollar stays with the KBIC as profit. There is a number out there that would signify those ratios. However, for energy efficiency, every dollar saved in energy improvements is a dollar that stays with the Keweenaw Bay Indian Community. Long after those paybacks have been realized, that money stays in your coffers as opposed to being paid to the utility company.

The energy projects or energy conservation opportunities of the KBIC are, for the most part, not major renovations that would require an outside contractor. This is a good thing. The improvements can be made by current staff or local suppliers.

DEVELOP A PLAN OF ATTACK

There is a great opportunity to reduce your energy expenditures and save a significant amount of money. There are several ways to accomplish this. You could have a committee develop a plan, develop a strategy to carry out the plan, have all of the departments buy into the plan, put a group in charge of carrying that plan out, and have follow up meetings to see how the plan worked out. That is one way to approach this opportunity.

Now for the realistic, common sense approach that will yield much better results, much sooner, and much more effectively. I believe the KBIC has an energy committee. All the work can be done through this committee with involvement from the maintenance staff, all of whom appeared to us to very qualified and also with the help of someone to monitor the results.

If the plan laid out below is followed, you will have completed a very successful energy efficiency upgrading program. The items addressed with this upgrading program are only essential items, geared to save energy and reduce costs with the least amount of effort and interruption to any ongoing operations.

- Use the list of Energy Conservation Measures, ECMs, listed in this report and work towards implementing each measure. That list is on the following pages. The measures should be implemented in that order to get the biggest bang for the buck.
- One person should be responsible for implementing all of the energy conservation measures to make sure everything is accomplished. Clay VanBuren assisted us with the tour of the facilities. His knowledge and expertise would be the ideal fit for this job. As a suggestion, we realize Clay has other duties, probably more pressing than upgrading energy measures. However, this work of upgrading the equipment is putting money directly in the bank for the KBIC. Because the savings dollars will be quite substantial, it would be in the best interest of the KBIC that he be given leeway to assign others to his regular jobs or even to hire extra personnel to do his work while he concentrates on completing the energy upgrades.
- Finally, in order to validate the project and verify the savings, someone should monitor the utility costs and compare to previous

costs to assure savings are being realized. I would recommend Char Spruce for this job. Char had provided us with a vast amount of previous utility data that she had compiled and prepared in several reports. This information proved very valuable to us in evaluating costs and consumption. Because of her previous experience with these same accounts she would be a natural for this job.

ENERGY CONSERVATION MEASURES (ECM) – MECHANICAL RECOMMENDATIONS

With most comprehensive energy efficiency projects, the mechanical segment is the most costly and thus should be given the most attention. To this end, we have segregated the recommendations for the mechanical energy conservation measures and listed them below in order of payback, the shortest payback being listed first.

As an example of how the cost is paid back, as noted in the Financing section of this report, an ECM with a 2 year payback would be like investing your money and receiving a 50% return on that investment. The Energy Conservation Measures for the Mechanical Equipment that are listed below are in order of quickest payback (simple payback) based on the Return On Investment. Cost of the ECM is quoted high so as to include labor and other incidental costs.

The list is an ambitious list and not meant to be done all at once but to be used for improvements that would be made immediately and for improvements over the next several years.

Energy Conservation Measures - Mechanical Equipment					
	Facility	Energy Conservation Measure (ECM)	Cost of ECM		Estimated ROI - yrs
EMC 1	Caretaker Cottage	Install programmable thermostat	$	250	0.9
EMC 2	Commodity Foods	Install programmable thermostats	$	500	0.9
EMC 3	Hatchery New Bldg	Install programmable thermostats	$	500	0.9
EMC 4	KBIC	Install programmable thermostats	$	1,500	0.9
EMC 5	Maint Building	Install programmable thermostat	$	250	0.9
EMC 6	Maintenance Garage	Install programmable thermostat	$	250	0.9
EMC 7	New Day	Install programmable thermostats	$	500	0.9
EMC 8	Planning and Development	Install programmable thermostat	$	250	0.9
EMC 9	Pubilc Works	Install programmable thermostat	$	250	0.9
EMC 10	PW Garage	Install programmable thermostat	$	250	0.9

Energy Conservation Measures - Mechanical Equipment						
Facility			Energy Conservation Measure (ECM)	Cost of		Estimated
EMC 11	Social Services		Install programmable thermostats	$ 1,000		0.9
EMC 12	Tub Craft		Install programmable thermostats	$ 750		0.9
EMC 13	Tub Craft		Install programmable thermostat	$ 250		0.9
EMC 14	USDA		Install programmable thermostats	$ 500		0.9
EMC 15	Casino		Install (6) vending Misers on vending machines	$ 1,800		1.2
EMC 16	Community College		Install (3) vending Misers on vending machines	$ 900		1.2
EMC 17	Four Seasons		Install (2) vending Misers on vending machines	$ 600		1.2
EMC 18	Maint Building		Install (1) vending Miser on vending machine	$ 300		1.2
EMC 19	Marquette Casino		Install (3) vending Misers on vending machines	$ 900		1.2
EMC 20	Senior Center		Install (1) vending Miser on vending machine	$ 300		1.2
EMC 21	Big Garage		Install (2) eCube refigeration temperature sensors	$ 1,100		1.3
EMC 22	Bingo Hall		Install (3) eCube refigeration temperature sensors	$ 1,650		1.3
EMC 23	Casino		Install (11) eCube refigeration temperature sensors on cooler	$ 5,500		1.3
EMC 24	Commodity Foods		Install (4) eCube refigeration temperature sensors	$ 2,200		1.3
EMC 25	Community College		Install (2) eCube refigeration temperature sensors	$ 1,100		1.3
EMC 26	ECEC		Install (2) eCube refigeration temperature sensors	$ 1,100		1.3
EMC 27	KBIC		Install (3) eCube refigeration temperature sensors	$ 1,650		1.3
EMC 28	Marquette Casino		Install (4) eCube refigeration temperature sensors on coolers and freezers	$ 2,200		1.3
EMC 29	New Day		Install (2) eCube refigeration temperature sensors	$ 1,100		1.3
EMC 30	Senior Center		Install (2) eCube refigeration temperature sensors	$ 1,100		1.3
EMC 31	The Pines		Install (6) eCube refigeration temperature sensors	$ 3,300		1.3
EMC 32	Four Seasons		Install boiler outdoor reset control	$ 900		1.5
EMC 33	New Day		Install boiler outdoor reset	$ 1,000		1.5
EMC 34	Tribal Center		Install Outdoor reset controls on boilers	$ 1,200		1.5
EMC 35	Hatchery New Bldg		VFD's on Pump Motors	$ 3,600		2.1
EMC 36	Lighthouse		Programmable Thermostat with automatic setback	$ 250		2.4
EMC 37	Radio Station		(2) Programmable Thermostats	$ 500		3.2
EMC 38	Casino		Install (8) Global Plasma Solutions IAQ equipment on RTU's	$ 29,000		4.8
EMC 39	Marquette Casino		Install (4) Global Plasma Solutions IAQ equipment on RTU's	$ 14,500		4.8
EMC 40	Social Services		Replace furnaces with new high efficiency furnaces	$ 4,000		5.1

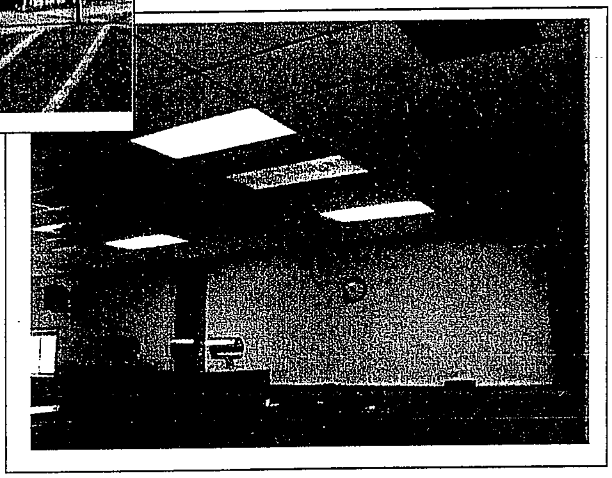
Energy Conservation Measures - Mechanical Equipment				
Facility		Energy Conservation Measure (ECM)	Cost of ECM	Estimated ROI - yrs
EMC 41	Casino	Replace 15 Ton Trane RTU	$ 12,000	6.2
EMC 42	Marquette Casino	Replace (2) 15 Ton Carrier RTU's	$ 24,000	6.2
EMC 43	Bingo Hall	Install (2) Global Plasma Solutions IAQ equipment on RTU's	$ 7,250	6.5
EMC 44	Court	Replace Window A/C units with new ductless split units	$ 7,500	6.5
EMC 45	Marquette Casino	Replace window A/C unit in kitchen with new ductless split unit	$ 4,500	6.5
EMC 46	Maint Building	Replace small wall AC units with high efficiency units	$ 2,900	6.8
EMC 47	Commodity Foods	Replace furnace with high efficiency furnace	$ 2,000	7.5
EMC 48	Cultural Center	Replace furnace with high efficiency furnace	$ 2,000	7.5
EMC 49	New Day	Replace (2) furnaces with high efficiency furnaces	$ 4,000	7.5
EMC 50	Police	Replace (2) furnaces with high efficiency furnaces	$ 4,000	7.5
EMC 51	Senior Center	Replace (2) furnaces with high efficiency furnaces	$ 4,000	7.5
EMC 52	Casino	Replace 20 Ton Trane RTU	$ 14,000	7.7
EMC 53	Big Garage	Replace chest freezers with new commercial reach-in's	$ 7,600	8.6
EMC 54	Bingo Hall	Replace residential freezers and refrigerator with commercial reach ins	$ 7,600	8.6
EMC 55	Casino	Replace residential freezers with commercial reach-in's	$ 3,800	8.6
EMC 56	Community College	Install (4)Global Plasma Solutions IAQ equipment on RTU and AHU's	$ 14,500	8.6
EMC 57	ECEC	Install (3)Global Plasma Solutions IAQ equipment on ERV and AHU's	$ 10,875	8.6
EMC 58	Four Seasons	Replace water heaters with new high efficiency water heaters	$ 9,500	8.6
EMC 59	Health Center	Install Global Plasma Solutions IAQ equipment on VAV system	$ 4,000	8.6
EMC 60	KBIC	Install (6) Global Plasma Solutions IAQ equipment on RTU and	$ 3,600	8.6
EMC 61	Marquette Casino	Install (1) Global Plasma Solutions unit in break room	$ 1,800	8.6
EMC 62	Marquette Casino	Replace residential freezers with commercial reach-in's	$ 3,800	8.6
EMC 63	The Pines	Install Global Plasma Solutions IAQ equipment on AHU to reduce outdoor air	$ 900	8.6
EMC 64	Tribal Center	Install (4) Global Plasma Solutions IAQ equipment on RTU and AHU's	$ 12,800	8.6
EMC 65	New Day	Replace water heaters with new High Efficiency	$ 3,000	9.4
EMC 66	Bingo Hall	Install BMS system intergated into Casino DDC System	$ 9,000	9.6
EMC 67	Casino	Install DDC Building management system for casino RTU's	$ 45,250	9.6
EMC 68	ECEC	Install BMS system intergated into Casino DDC System	$ 14,000	9.6
EMC 69	Marquette Casino	Install DDC Building management system for casino RTU's	$ 29,000	9.6

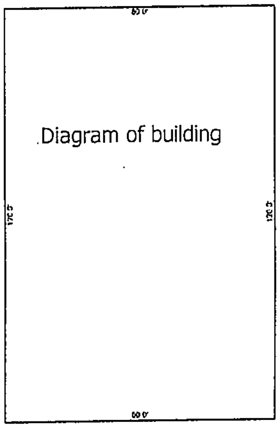
Energy Conservation Measures - Mechanical Equipment				
Facility		Energy Conservation Measure (ECM)	Cost of ECM	Estimated ROI - yrs
EMC 70	Tribal Center	Integrate BMS into new Casio DDC System	$ 16,000	9.6
EMC 71	Bingo Hall	Complete Test and Balance of systems	$ 2,000	10.0
EMC 72	Casino	Complete Test and Balance of systems	$ 10,000	10.0
EMC 73	Community College	Complete Test and Balance of systems	$ 4,500	10.0
EMC 74	ECEC	Complete Test and Balance of systems	$ 3,500	10.0
EMC 75	Health Center	Complete Test and Balance of VAV system	$ 3,600	10.0
EMC 76	KBIC	Complete Test and Balance of systems	$ 4,000	10.0
EMC 77	Marquette Casino	Complete Test and Balance of systems	$ 6,500	10.0
EMC 78	Social Services	Replace water heater with new water heater	$ 500	10.0
EMC 79	The Pines	Complete Test and Balance of AHU	$ 1,000	10.0
EMC 80	Tribal Center	Complete Test and Balance of systems	$ 4,500	10.0
EMC 81	Court	Replace water heater with new high efficiency water heater	$ 900	10.2
EMC 82	Cultural Center	Replace water heater with new high efficiency water heater	$ 500	10.2
EMC 83	KBIC	Replace (1) Furnace with new high efficiency furnace	$ 2,000	10.4
EMC 84	Tub Craft	Replace (3) unit heaters with new high efficiency units	$ 12,000	12.0
EMC 85	Tub Craft	Replace (1) unit heaters with new high efficiency units	$ 4,000	12.0
EMC 86	Casino	Replace unit heater behind the lanes with high efficiency units	$ 4,000	12.3
EMC 87	Bingo Hall	Replace (2) RTU's with new RTU's	$ 24,000	12.7
EMC 88	Commodity Foods	Replace AC with high efficiency air conditioning	$ 2,400	12.8
EMC 89	New Day	Replace AC with high efficiency air conditioning	$ 4,800	12.8
EMC 90	Police	Replace AC with high efficiency air conditioning	$ 4,800	12.8
EMC 91	Senior Center	Replace AC with high efficiency air conditioning	$ 4,800	12.8
EMC 92	Social Services	Replace A/C condensers with new high efficiency	$ 4,800	12.8
EMC 93	Social Services	Replace cooling only unit with new high efficiency	$ 2,400	12.8
EMC 94	Casino	Install (40) Global Plasma Solutions IAQ equipment on hotel room PTAC units	$ 12,000	16.2
EMC 95	Four Seasons	Install (40) Global Plasma Solutions IAQ equipment	$ 12,000	16.2
EMC 96	Court	Replace boiler with new high efficiency boiler	$ 9,000	17.5
EMC 97	Four Seasons	Replace boiler with new high efficiency boiler	$ 12,000	17.5
EMC 98	Maint Building	Replace boiler with new high efficiency boiler	$ 9,500	17.5
EMC 99	New Day	Replace boilers with new high efficiency boilers	$ 17,500	17.5
EMC 100	Social Services	Replace boiler with new high efficiency boiler	$ 9,500	17.5
EMC 101	Tribal Center	Replace boiler with new high efficiency boiler	$ 17,500	17.5
EMC 102	KBIC	Install instantaneous water heater for the kitchen	$ 3,100	20.1

Keweenaw Bay Indian Community

INDIVIDUAL BUILDING PROFILES

Bingo Hall





The building is 9600 square feet. Building use is limited and it is used primarily for bingo a few nights a week.

Because the building is not occupied on an ongoing basis, some controls are needed to remove the human element from taking control of the building. To assure that lights are turned out and room temperatures are at the minimum when the building is unoccupied, equipment controls can be utilized. Also, occupancy sensors would be beneficial because of the not consistent schedule of the building.

Mechanical

Replace (2) Roof Top Units

Existing rooftop units have reached their maximum life expectancy and have a poor Seasonal Energy Efficiency Rating (SEER). There units also have R-22 refrigerant which is being phased out by the EPA and will soon no longer be manufactured. Replace existing inefficient rooftop unit with high efficient Carrier 12 SEER rooftop units with the new R-410A refrigerant.

Install (2) Global Plasma Solutions Indoor Air Quality Equipment on RTU's

The existing Heating, Air Conditioning and Ventilation systems continuously recirculate tobacco smoke and other indoor contaminants throughout the Bingo Hall and other occupied areas of the casino.

Adding GPS' needlepoint bi-polar ionization system to the existing facility will provide the best indoor air quality possible. Smokers and non-smokers will once and for all be able to coexist peacefully. No more smoke complaints, longer gaming by patrons, a better work environment for employees. In addition to this the outdoor air introduced into the space can be reduced to create additional energy savings

Install (3) eCube Refrigeration Temperature Sensors

Replace Residential Freezers and Refrigerator with Commercial Reach-Ins

Replace existing residential type refrigeration equipment with Energy Star Commercial grade refrigeration equipment.

Install Building Management System Integrated into Casino DDC System

The existing heating, air conditioning, and ventilation controls throughout each of the tribal buildings vary from simple thermostats on the wall to pneumatics, and various Direct Digital Controls (DDC). We recommend the installation of a web based open protocol DDC system that can provide building HVAC integration with the following features.

- Motor Variable Frequency Drives
- Time of Day Scheduling
- HVAC Equipment set points
- CO_2 monitoring and ventilation
- HVAC Alarm sequence
- Energy optimization

- Remote alarm and scheduling capabilities
- HVAC Equipment status
- HVAC Trend logs
- HVAC Equipment graphics
- Warm Weather shut down for boilers and pumps
- Outdoor reset controls

Complete Test and Balance of Systems

Heating, ventilating and air conditioning systems utilize automatic controls to attain proper fluids and air flow for heating, cooling and ventilation in any building. Documentation and adherence to the above procedures are essential in order for the various HVAC system components to operate in synchronization and in accordance with design intent.

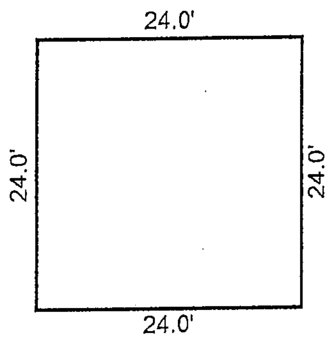
Test and Balance (TAB) procedures utilized to verify that HVAC and related systems operate and perform as per design intent. Properly functioning systems contribute to energy savings and occupant's comfort, health and safety.

- TEST: To determine the quantitative performance of equipment.
- ADJUST: To proportion flows of fluids (air & water) to specified design quantities.
- BALANCE: To regulate the specified fluid flow rate at the terminal equipment.

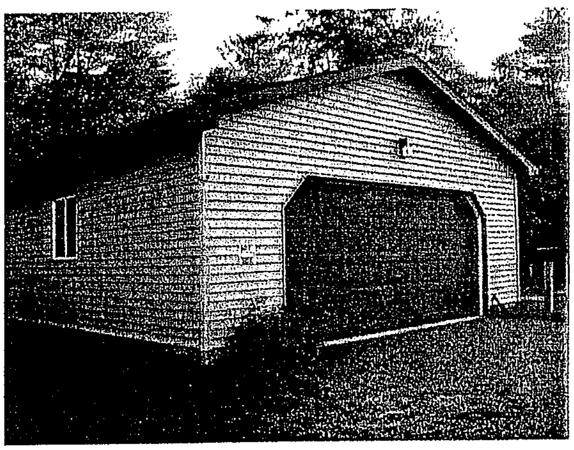
Energy Conservation Measures recommended:

- Install water conservation flow moderators on kitchen and bathroom sinks.
- Install programmable thermostats to better control space heating and temperatures.
- Install occupancy sensors to control lights in rooms with irregular use such as restrooms, storage areas, and offices.
- The present T12 lamps and magnetic ballasts should be replaced with T8 lamps and electronic ballasts.
- Install Carbon Dioxide sensors to monitor the amount of CO2 in the air in order to keep at the necessary levels, the amount of unconditioned outside air introduced into the building.
- Install timers or photocells on outdoor lighting in order to turn the lights off during daylight hours.
- Consider reducing the size of the domestic hot water tank by installing a point of use tank or a waterless hot water system. The hot water demands in the building are much lower than the supply.
- Install eCube® on refrigeration and freezer equipment to reduce number of cycles, eliminate spiking of temperatures by evening out cooling temperatures, and extend the life of the compressor.
- Replace RTU's.
- Install Global Plasma Solutions IAQ equipment on RTU's.
- Replace residential freezers with commercial reach-in's.
- Install BMS system integrated into Casino DDC System.
- Complete Test and Balance of systems.

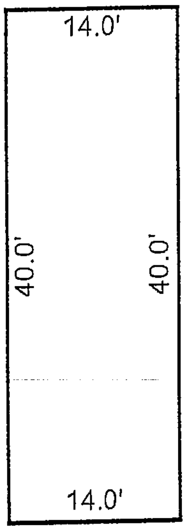
Caretaker Garage

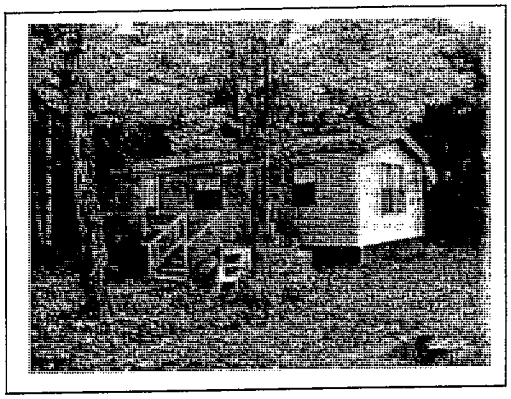


The building is 576 square feet. Building use is limited and it is used primarily for storage.



Caretaker Trailer



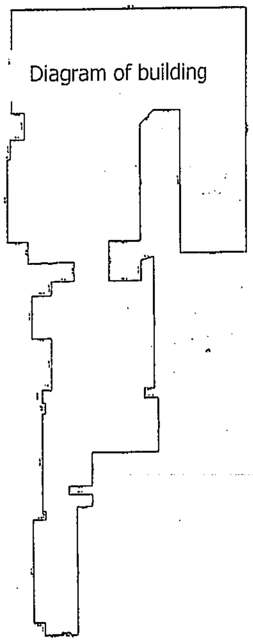


The building is 560 square feet. The building is used by the marina caretaker as a residence.

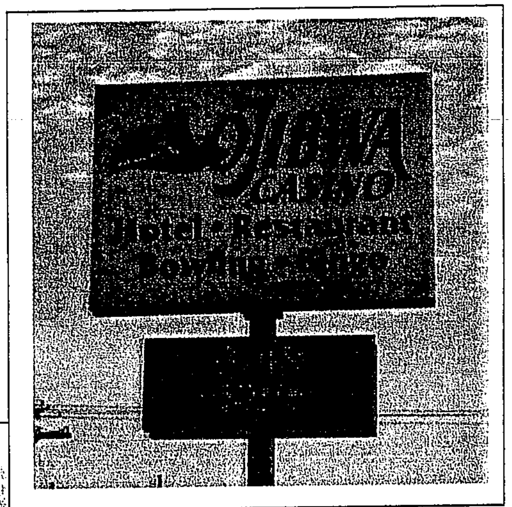
Energy Conservation Measures recommended:

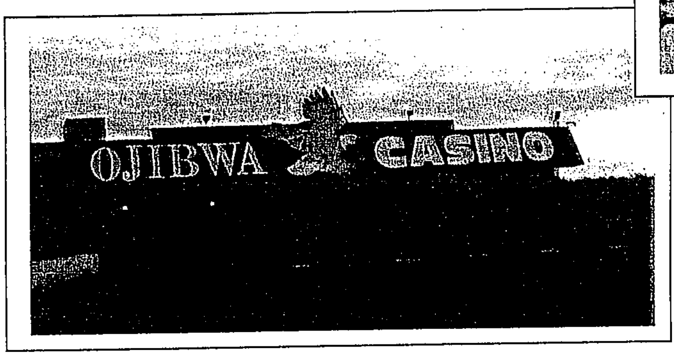
- Install water conservation flow moderators on kitchen and bathroom sink faucets.
- The domestic hot water tank could be wrapped in an insulation blanket for better thermal efficiency.
- Skirting should be installed around the bottom of the residence to protect the floor from cold, to keep animals away from pipes and electrical wires, and for protection for the bottom of the trailer.
- Install programmable thermostats to better control space heating and cooling in specific areas and allowing for night set back of room temperatures.

Casino / Bowling Alley / Lounge



The building is 53,543 square feet. The building houses the casino, restaurant, motel, pool, lounge, and bowling alley as well as some offices. This section of the report deals with only the casino and the bowling alley/lounge areas. The rest of the building is discussed elsewhere in this report.





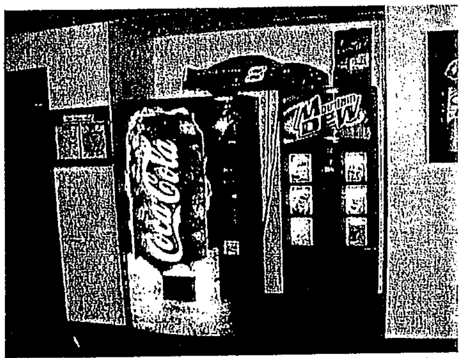
Water Conservation

The casino complex building is the largest building in this energy efficiency report and offers some great opportunities for energy conservation and reducing energy costs. As noted, this section of the report discusses only the "front" part of the building.

As with most of the other buildings, water conservation will be the fastest payback item in an energy upgrade. The cost is low and the payback is almost immediate. This upgrade addresses primarily the bathroom faucets and toilets and urinals with flushometer valves. See Water Analysis Study 4 for more details on water conservation in the casino.

Pop Machines

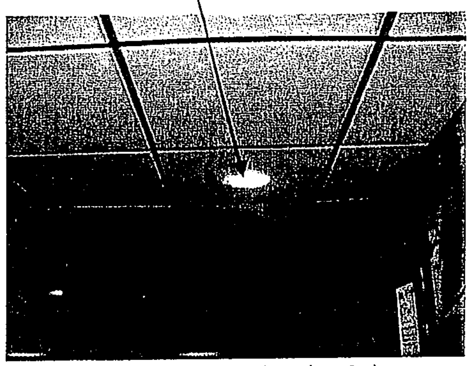
The next quickest payback will be an occupancy sensor or VendMiser attachment on the vending machines. Newer pop machines as those shown at the left in the lounge are big consumers of electricity. The light, which is actually a heater, is inside of the pop machine which is actually a refrigerator. As the compressor tries to cool the product in the machine, the light heats up the inside of the machine, counterproductive to the object of cooling the pop.



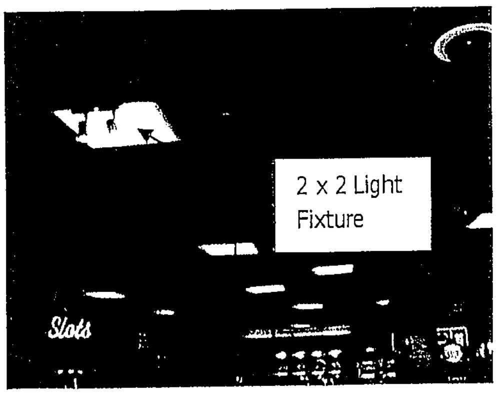
A VendMiser or similar device will turn the light off in the machine, allow the compressor to cycle as it should and have the machine work without the light constantly on. As there is motion, someone walking by, the light goes on, working like an occupancy sensor.

Lighting

Incandescent ceiling "can" lights



Many of the cans or round lights in the lounge ceiling are using incandescent 65 watt bulbs. The light is sufficient, however a compact fluorescent lamp in the same type of glass bulb would be far more efficient. The CFL replacement would be a 13 watt, having the same light and would have a much longer life, reducing maintenance. As a note of interest, the cans in the hall leading from the casino to the restaurant/motel have CFL lamps. Also in the bowling alley, there are T12 U tubes in 2x2 fixtures. Perhaps it should be considered to retrofit the 2x2 fixtures with a 2x4 fixture using standard T8 lamps, saving energy and also savings the expense of replacing the costly U tubes.



The lighting wall packs on the exterior walls should be fitted with a timer or photocell to turn the lights on at night and turn them off in the morning. Many times, as is evidenced by some of the wall packs on the casino exterior walls, the lights stay on 24 hours a day, 7 days a week.

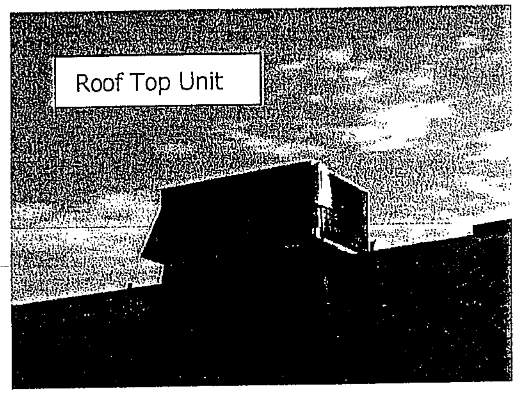
CO2 Sensor

Depending on the number of people on the casino floor, a carbon dioxide sensor could be an improvement to the air exchange in the casino. We did not request occupancy numbers and maybe they would not be available to determine the necessity for a CO_2 sensor. Depending on if new or existing air exchange equipment was used this may be something to be considered.

Mechanical

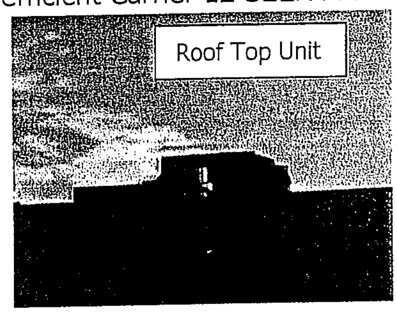
Replace 20 Ton Trane Roof Top Unit (RTU)

Replace 15 Ton Trane Roof Top Unit (RTU)



Existing rooftop units have reached their maximum life expectancy and have a poor Seasonal Energy Efficiency Rating (SEER). There units also have R-22 refrigerant which is being phased out by the EPA and will soon no longer be manufactured.

Replace existing inefficient rooftop units with high efficient Carrier 12 SEER rooftop units with the new R-410A refrigerant.



Install (8) Global Plasma Solutions Indoor Air Quality Equipment on RTU's

The existing Heating, Air Conditioning and Ventilation systems continuously recirculate tobacco smoke and other indoor contaminants throughout the casino and other occupied areas of the casino.

Adding GPS' needlepoint bi-polar ionization system to the existing facility will provide the best indoor air quality possible. Smokers and non-smokers will once and for all be able to coexist peacefully. No more smoke complaints, longer gaming by patrons, a better work environment for employees. In addition to this the outdoor air introduced into the space can be reduced to create additional energy savings.

Install (40) Global Plasma Solutions Indoor Air Quality Equipment on Motel Room PTAC Units

The existing Hotel Room Heating and Air Conditioning units (PTAC units) continuously recirculate stagnate indoor air which include smoke, bacteria, viruses, and odors throughout the space.

Adding GPS' needlepoint bi-polar ionization system to the existing PTAC units will provide the best indoor air quality possible by eliminating these indoor air contaminants. This will result in rooms that smell fresh and clean, creating a more pleasant stay for your guests. In addition to this the outdoor air introduced into the space can be reduced to create additional energy savings.

Install (11) eCube Refrigeration Temperature Sensors on Coolers and Freezers

See explanation of the eCube on page 24 of this report.

Install (6) VendMisers on Vending Machines

The existing Vending machines have a refrigerant circuit that operates off from an internal thermostat and exterior illumination that is on 24 hours a day. The Vending Miser is an external device that maximizes energy efficiency using occupancy based technology by operating the external lights only when someone approaches the machine. It also limits the compressor cycles and run times while still maintaining cold temperatures for the product.

Install Direct Digital Control (DDC) Building Management System for Casino RTU's

The existing heating, air conditioning, and ventilation controls throughout each of the tribal buildings vary from simple thermostats on the wall to pneumatics, and various Direct Digital Controls (DDC).

We recommend the installation of a web based open protocol DDC system that can provide building HVAC integration with the following features.

- Motor Variable Frequency Drives
- Time of Day Scheduling
- HVAC Equipment set points
- CO2 monitoring and ventilation
- HVAC Alarm sequence
- Energy optimization
- Remote alarm and scheduling capabilities
- HVAC Equipment status
- HVAC Trend logs
- HVAC Equipment graphics
- Warm Weather shut down for boilers and pumps

- Outdoor reset controls

Replace Residential Freezers with Commercial Reach-Ins

Replace existing residential type refrigeration equipment with Energy Star Commercial grade refrigeration equipment.

Replace Unit Heater Behind the Lanes with High Efficiency Units

Replace existing inefficient natural draft unit heater with a new power vented high efficiency unit.

Complete Test and Balance of Systems

Heating, ventilating and air conditioning systems utilize automatic controls to attain proper fluids and air flow for heating, cooling and ventilation in any building. Documentation and adherence to the above procedures are essential in order for the various HVAC system components to operate in synchronization and in accordance with design intent.

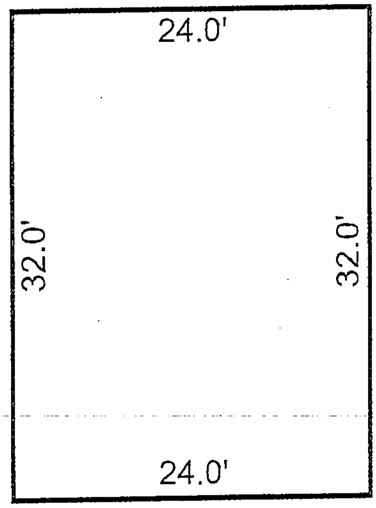
Test and Balance (TAB) procedures utilized to verify that HVAC and related systems operate and perform as per design intent. Properly functioning systems contribute to energy savings and occupant's comfort, health and safety.

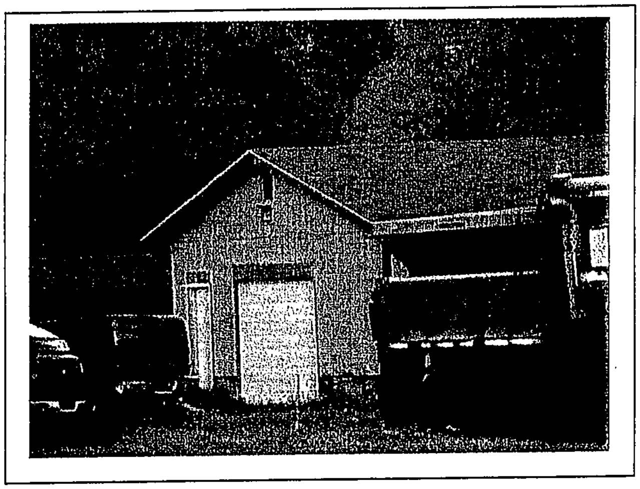
- TEST: To determine the quantitative performance of equipment.
- ADJUST: To proportion flows of fluids (air & water) to specified design quantities.
- BALANCE: To regulate the specified fluid flow rate at the terminal equipment.

Energy Conservation Measures recommended:

- Install water conservation flow moderators on kitchen and bathroom sinks.
- Install a VendMiser or similar sensor or on/off control to regulate pop machine operation.
- Install programmable thermostats to better control space heating and cooling in specific areas and allowing for night set back of room temperatures.
- Install occupancy sensors to control lights in rooms with irregular use such as restrooms, storage areas, and offices.
- The present T12 lamps and magnetic ballasts should be replaced with T8 lamps and electronic ballasts.
- Install timers or photocells on outdoor lighting to turn it off during daylight hours.
- Check for air infiltration around windows and doors and caulk or fill areas allowing outside air.
- Install door seals or weather stripping around doors to prohibit air leakage.
- Install eCube® on refrigeration and freezer equipment to reduce number of cycles, eliminate spiking of temperatures by evening out cooling temperatures, and extend the life of the compressor.
- Replace 20 Ton Trane RTU.
- Replace 15 Ton Trane RTU.
- Install Global Plasma Solutions IAQ equipment on RTU's.
- Install Global Plasma Solutions IAQ equipment on motel room PTAC units.
- Install DDC building management system.
- Replace residential freezers with commercial reach-in's.
- Replace unit heater behind the lanes with high efficiency units.
- Complete Test and Balance of systems.

Casino Garage



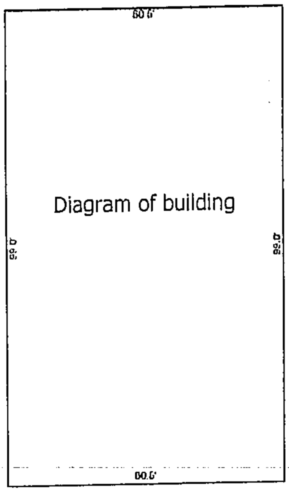


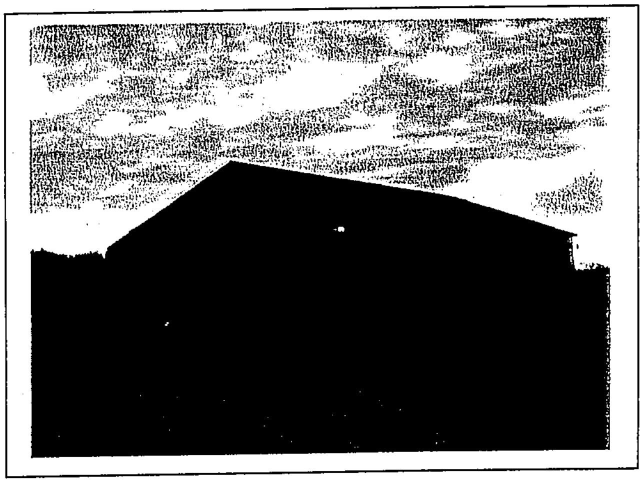
This 768 square foot garage is used primarily for storage.

Energy Conservation Measures recommended:

- Install occupancy sensors to control lights in rooms with irregular use such as restrooms, storage areas, and offices.
- Install timers or photocells on outdoor lighting in order to turn the lights off during daylight hours.

Casino Maintenance Garage



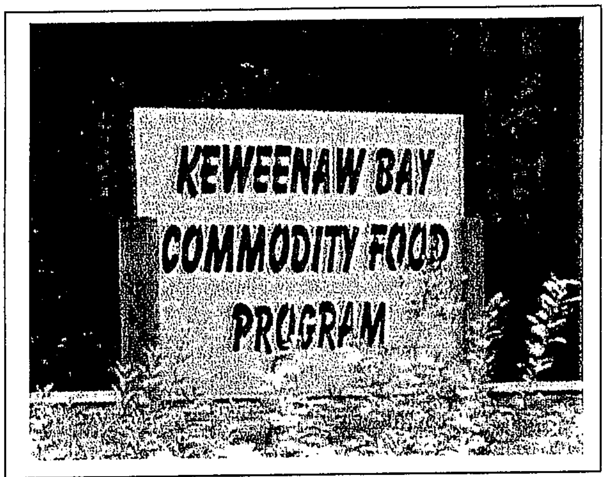


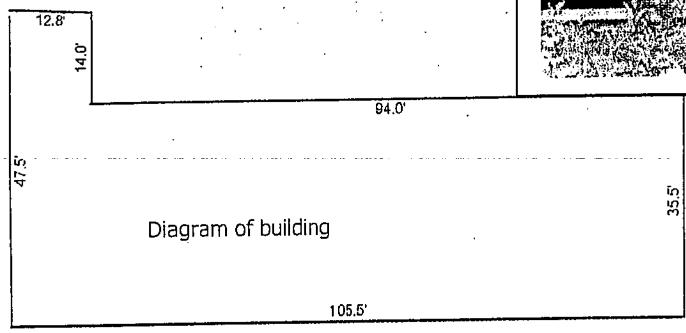
This 5980 square foot building is used primarily as a storage garage.

Energy Conservation Measures recommended:

- Install programmable thermostats to better control space heating and cooling in specific areas and allowing for night set back of room temperatures.
- Install occupancy sensors to control lights in rooms with irregular use such as restrooms, storage areas, and offices.
- The present T12 lamps and magnetic ballasts, if used in the building, should be replaced with T8 lamps and electronic ballasts.
- Install timers or photocells on outdoor lighting in order to turn the lights off during daylight hours.
- Check for air infiltration around windows and doors and caulk or fill areas allowing outside air.
- Install door seals or weather stripping around doors to prohibit air leakage.

Commodity Foods

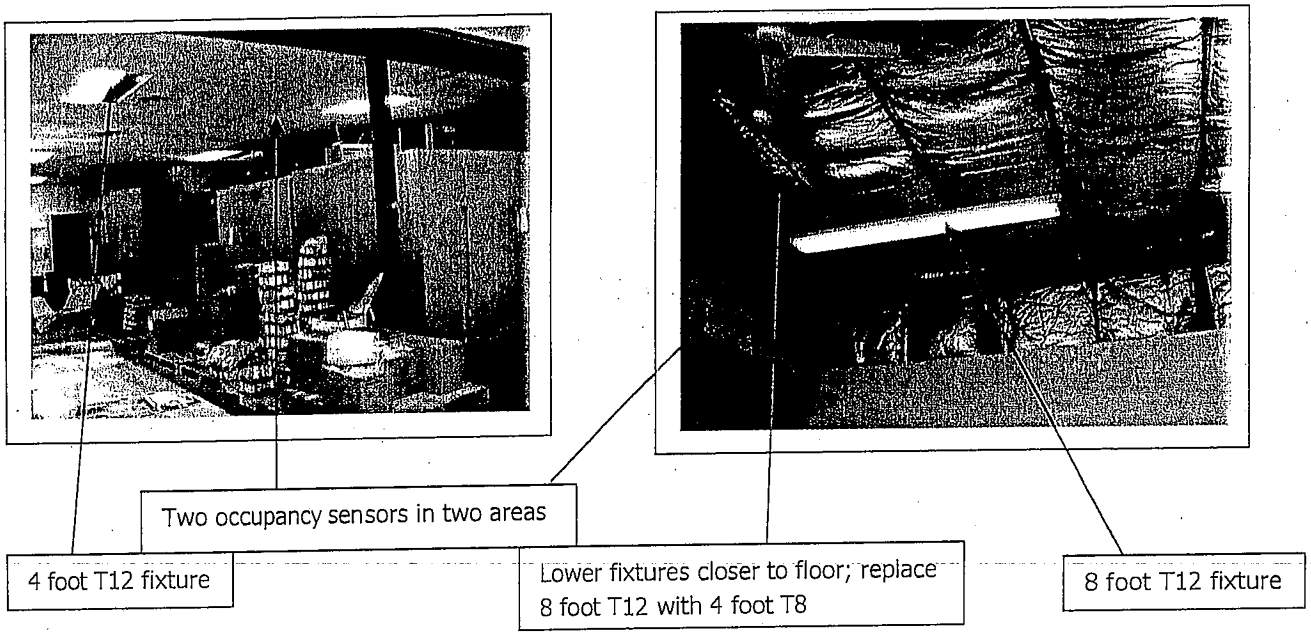




This 3924 square foot structure is used to store, separate, and distribute food. The building has a number of energy conservation opportunities.

The lighting fixtures are old and the lamps and ballasts are old technology. Improvements could be made in the type of lights and the positioning of the fixtures. Current lighting is T12 with magnetic ballasts. Some of the lamps are 8 foot T12 lights. This should be replaced with T8 lamps and electronic ballasts. Lighting should be placed closer to the work; fixtures on high ceilings should be lowered, all lamps should be 4 foot fluorescent replacing old 4 foot and also replacing the 8 foot lamps and fixtures. Standardization will allow less lamp stocking and easier replacement.

Occupancy sensors should be installed in the warehouse and in the offices and bathrooms. There should be a couple of occupancy sensors in the warehouse, one for the area nearest the entry door and one at the far end where the high ceilings are. This would provide light for someone entering the building but not causing all the lights to go on every time there is movement in the warehouse.



The domestic water heater is a 50 gallon unit made for heavy use. All that is needed for this building is a point of use or tankless domestic water heater. Since hand washing is about the only use for hot water, storage of hot water made and kept continuously is a significant waste of energy. The hot water tank should be replaced.

Because the use of the building is generally only business hours and then it is sometimes sporadic, a programmable thermostat should be used to control heating in the building especially when it is unoccupied.

As with all buildings with large exterior doors or smaller entry doors with much use, these doors are good candidates for door seals or some type of weather stripping. Other vented access on the walls should also be checked for air infiltration.

One other note, 3 phase power may be considered because of the load within the building.

Mechanical

Install (4) eCube Refrigeration Temperature Sensors

Install Programmable Thermostats

The existing thermostat maintains the same set point 24 hours a day unless manually turned down at night when someone remembers. We recommend the installation of a programmable thermostat that will automatically be set back to a lower temperature each night and weekends to conserve energy and reduce hours of operation for the heating and air conditioning equipment.

Replace Furnace with High Efficiency Furnace

The existing furnaces are standard efficiency that have reached the end of their useful life.

We recommend the installation of high efficiency 95% efficient furnaces. These furnaces will have a multi stage burner with an ECM variable speed blower to deliver just the correct amount of heat to the space based on design loads.

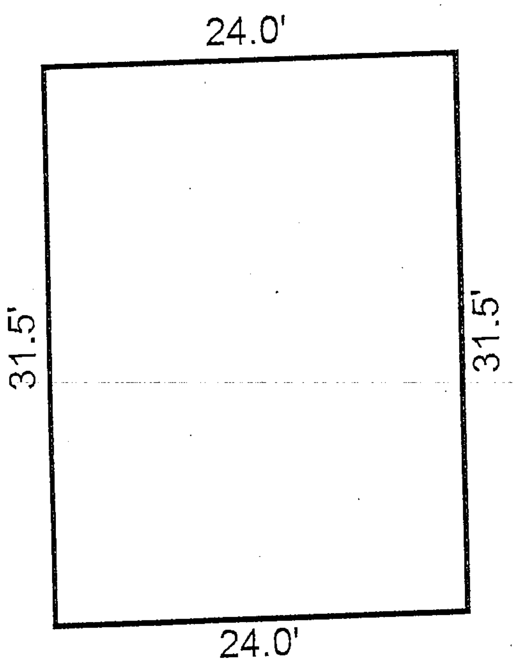
Replace Air Conditioning with High Efficient Air Conditioning

The existing air conditioning condensers are standard efficiency that have reached the end of their useful life. These units also contain R-22 refrigerant which has been phased out of production by the EPA. We recommend installing higher efficiency 14 SEER air conditioning condensers that contain R-410A refrigerant.

Energy Conservation Measures recommended:

- Install water conservation flow moderators on kitchen and bathroom sink faucets.
- Install programmable thermostats to better control space heating and cooling in specific areas and allowing for night set back of room temperatures.
- Install occupancy sensors to control lights in rooms with irregular use such as restrooms, storage areas, and offices.
- The present T12 lamps and magnetic ballasts should be replaced with T8 lamps and electronic ballasts.
- Install timers or photocells on outdoor lighting in order to turn the lights off during daylight hours.
- Consider reducing the size of the domestic hot water tank by installing a point of use tank or a waterless hot water system. The hot water demands in the building are much lower than the supply.
- Check for air infiltration around windows and doors and caulk or fill areas allowing outside air.
- Install door seals or weather stripping around doors to prohibit air leakage.
- Install eCube® on refrigeration and freezer equipment to reduce number of cycles, eliminate spiking of temperatures by evening out cooling temperatures, and extend the life of the compressor.
- Replace furnaces with new high efficiency furnace.
- Replace A/C with new high efficiency air conditioning.

Commodity Food Garage



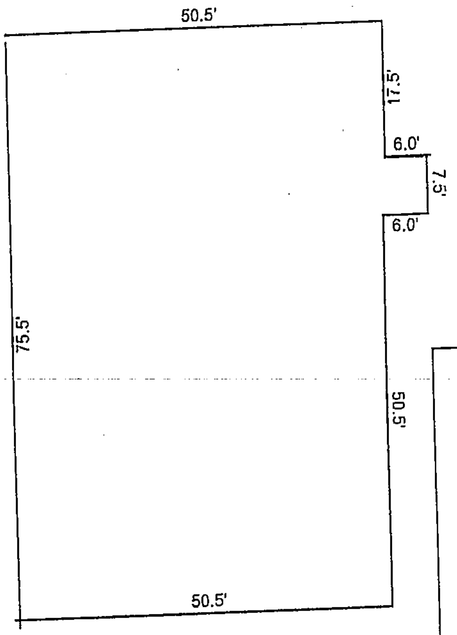
This 756 square foot building is used primarily for storage.

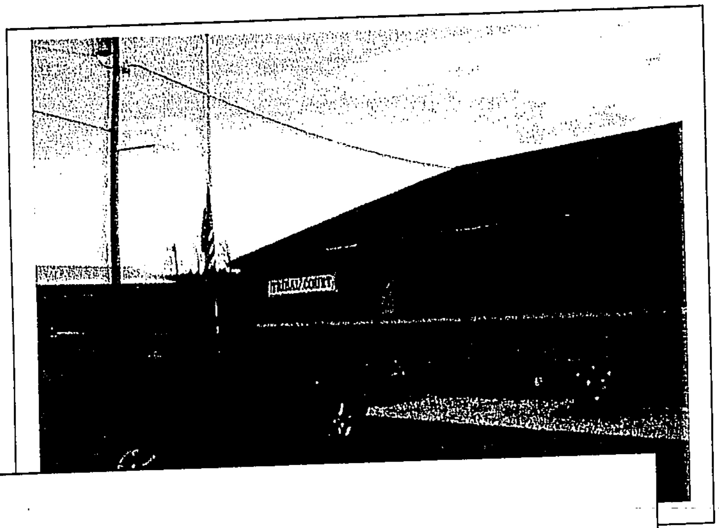
Lighting should be upgraded to T8.

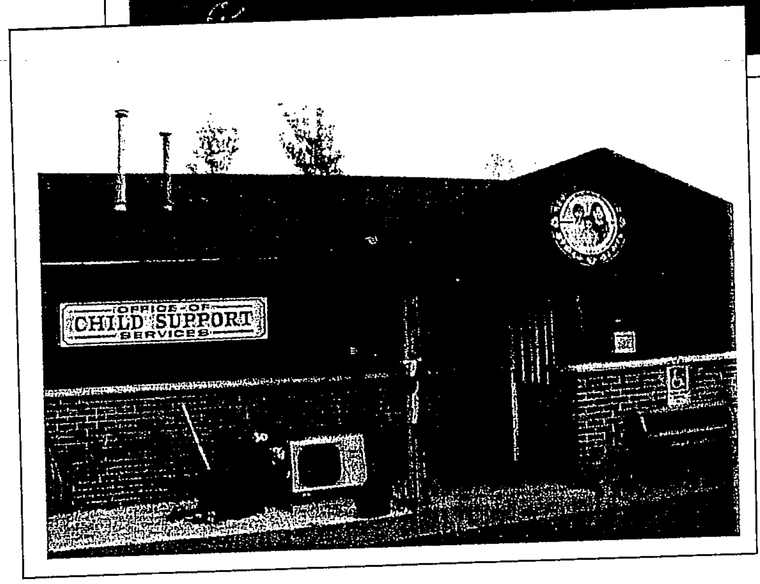
Energy Conservation Measures recommended:

- The present T12 lamps and magnetic ballasts should be replaced with T8 lamps and electronic ballasts.

Court / Child Support







This 3858 square foot building is a public building with offices and larger rooms.

This building has older T12 lighting that should be replaced with T8 and electronic ballasts.

The domestic water heater should be downsized using a point of use or tankless model to conserve energy. Other than hand washing, there is no great demand for hot water.

Mechanical

Replace Water Heater with New High Efficient Water Heater

The existing water heater produces hot water for domestic use. This water heater likely has a layer of scale developed in the bottom of the tank preventing the proper heat transfer to the domestic water. We recommend the installation of high efficiency power vented water heater.

Replace Boiler with High Efficiency Boiler

Replace the existing inefficient boilers with new 95% high efficiency condensing boilers. The new boilers would have integrated modulating boiler control for gas burner turn down and modulation. This function allows for outdoor reset control and warm weather shut down.

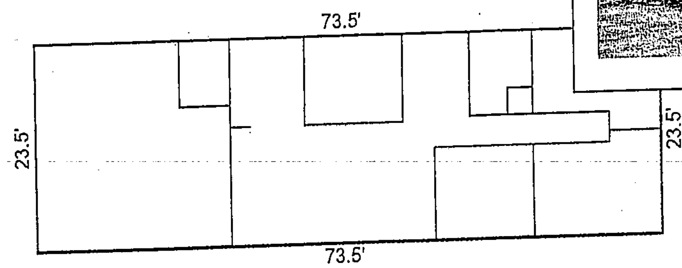
Replace Window Air Conditioning Units with New Ductless Split Units

The existing air conditioning system consists of multiple window units. These units are very inefficient and have a very short useful life. We recommend the installation of a high efficient multi-zone ductless air conditioning unit.

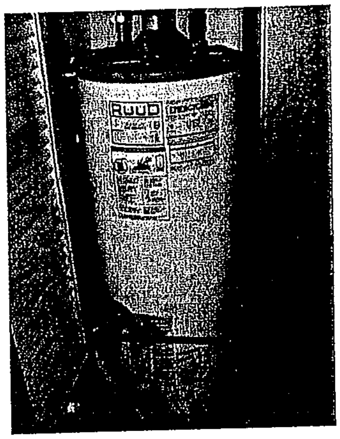
Energy Conservation Measures recommended:

- Install water conservation flow moderators on kitchen and bathroom sink faucets.
- Install programmable thermostats to better control space heating and cooling in specific areas and allowing for night set back of room temperatures.
- Install occupancy sensors to control lights in rooms with irregular use such as restrooms, storage areas, and offices.
- The present T12 lamps and magnetic ballasts should be replaced with T8 lamps and electronic ballasts.
- Consider reducing the size of the domestic hot water tank by installing a point of use tank or a waterless hot water system. The hot water demands in the building are much lower than the supply.
- Replace water heater with new high efficiency water heater.
- Replace window air conditioning with new ductless split system.
- Replace Boiler with new High Efficiency Boiler.

Cultural Building



This1727 square foot building has a variety of uses for the KBIC.



The primary energy concern of this building is the oversized domestic hot water tank. A point of use or a tankless system would be more beneficial that the large water heater now in use.

Mechanical

Replace Furnace with High Efficiency Furnace

The existing furnaces are standard efficiency that have reached the end of their useful life. We recommend the installation of high efficiency 95% efficient furnaces. These furnaces will have a multi stage burner with an ECM variable speed blower to deliver just the correct amount of heat to the space based on design loads.

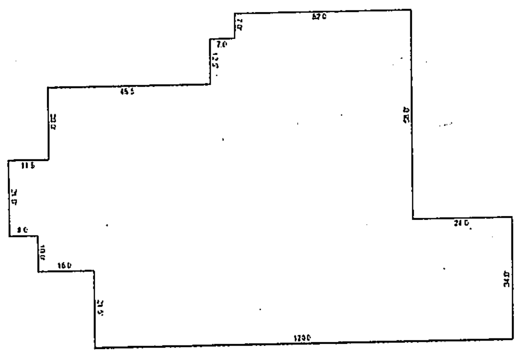
Replace Water Heater with New High Efficiency Water Heater

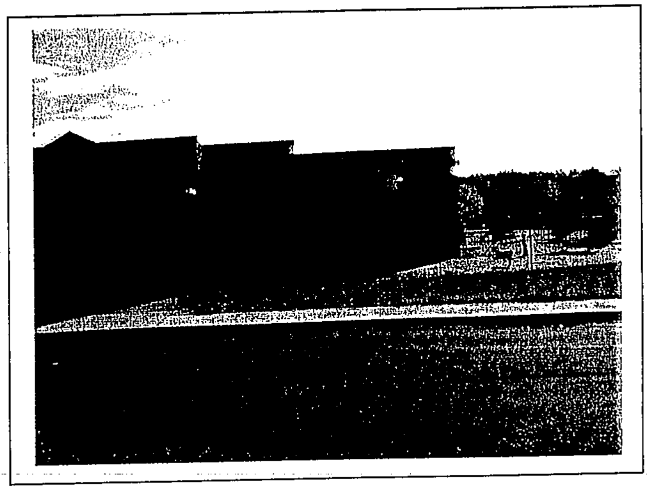
The existing water heater produces hot water for domestic use. This water heater likely has a layer of scale developed in the bottom of the tank preventing the proper heat transfer to the domestic water. We recommend the installation of high efficiency power vented water heater.

Energy Conservation Measures recommended:

- Install water conservation flow moderators on kitchen and bathroom sink faucets.
- Consider reducing the size of the domestic hot water tank by installing a point of use tank or a waterless hot water system. The hot water demands in the building are much lower than the supply.
- Replace water heater with new high efficiency water heater.
- Replace furnace with new high efficiency furnace.

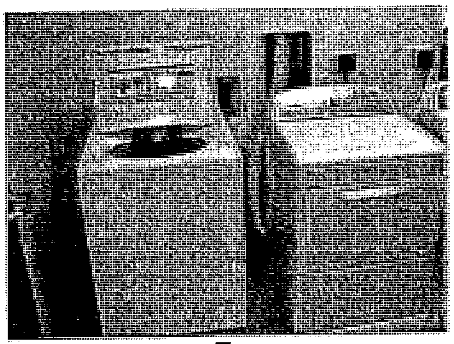
ECEC – Early Childhood Education Center





This 9500 square foot facility is used for child care. The building is new construction and was opened within the last year. It is a beautiful building with modern features and an excellent child care and education center. We have no recommendations for improvements except to install flow moderators on the faucets in the bathrooms.

We were very happy to see the newest in washers, a top load energy efficient machine. We commend you for your choice. See the write up about these washers in the front section of this report.



Mechanical

Install (3) Global Plasma Solutions Indoor Air Quality Equipment on Energy Recovery Ventilators (ERV) and Air Handling Units (AHU)

The existing Heating, Air Conditioning and Ventilation systems continuously recirculate mold, bacteria, viruses, and other indoor contaminants throughout the Community College and other occupied areas.

Adding GPS' needlepoint bi-polar ionization system to the existing facility will provide the best indoor air quality possible. In addition to this the outdoor air introduced into the space can be reduced to create additional energy savings.

Install Building Management System Integrated into Casino DDC System

The existing heating, air conditioning, and ventilation controls throughout each of the tribal buildings vary from simple thermostats on the wall to pneumatics, and various Direct Digital Controls (DDC). We recommend the installation of a web based open protocol DDC system that can provide building HVAC integration with the following features.

- Motor Variable Frequency Drives
- Time of Day Scheduling
- HVAC Equipment set points
- CO2 monitoring and ventilation
- HVAC Alarm sequence
- Energy optimization
- Remote alarm and scheduling capabilities
- HVAC Equipment status
- HVAC Trend logs
- HVAC Equipment graphics
- Warm Weather shut down for boilers and pumps
- Outdoor reset controls

Install (2) eCube Refrigeration Temperature Sensors

Complete Test and Balance of Systems

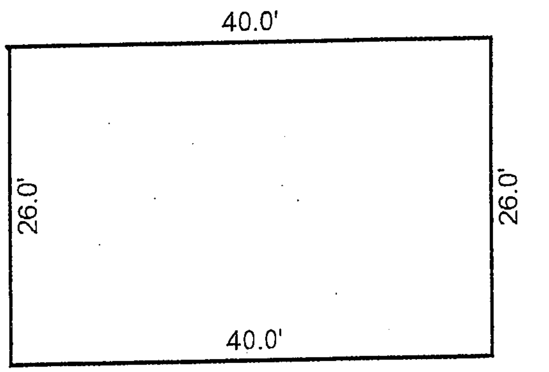
Heating, ventilating and air conditioning systems utilize automatic controls to attain proper fluids and air flow for heating, cooling and ventilation in any building. Documentation and adherence to the above procedures are essential in order for the various HVAC system components to operate in synchronization and in accordance with design intent. Test and Balance (TAB) procedures utilized to verify that HVAC and related systems operate and perform as per design intent. Properly functioning systems contribute to energy savings and occupant's comfort, health and safety.

- TEST: To determine the quantitative performance of equipment.
- ADJUST: To proportion flows of fluids (air & water) to specified design quantities.
- BALANCE: To regulate the specified fluid flow rate at the terminal equipment.

Energy Conservation Measures recommended:

- Install water conservation flow moderators on kitchen and bathroom sink faucets.
- Install eCube® on refrigeration and freezer equipment to reduce number of cycles, eliminate spiking of temperatures by evening out cooling temperatures, and extend the life of the compressor.
- Install Global Plasma Solutions IAQ equipment on ERV's.
- Install BMS system integrated into Casino DDC System.
- Complete Test and Balance of systems.

Fish Building

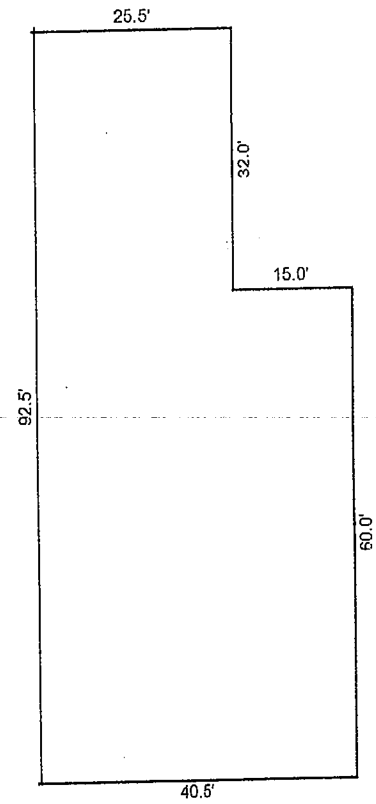


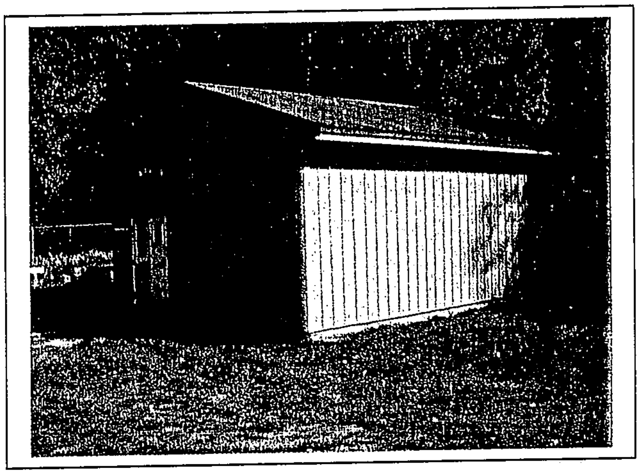
This 1040 square foot building's use is limited to fish tanks. Because this building has sporadic use, the only recommendations would be to upgrade the lighting, using T8 lamps and converting any 8 foot T12 fixtures to 4 foot T8 fixtures. Also, occupancy sensors should be installed if there is a problem with lights left on.

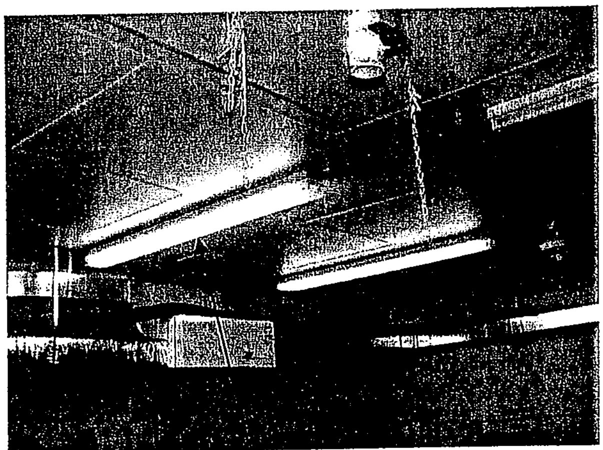
Energy Conservation Measures recommended:

- Install occupancy sensors to control lights in rooms with irregular use such as restrooms, storage areas, and offices.
- The present T12 lamps and magnetic ballasts should be replaced with T8 lamps and electronic ballasts.

Fish Hatchery Building







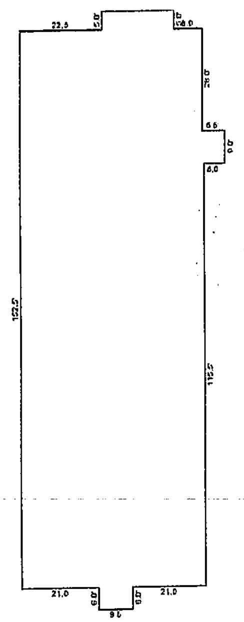
As is the case with the Fish Building, this 3240 square foot building's use is limited to fish tanks. Because this building has sporadic use, the only recommendations would be to upgrade the lighting, using T8 lamps and converting any 8 foot T12 fixtures to 4 foot T8 fixtures. Also, occupancy sensors should be installed if there is a problem with lights left on.

8 foot T12 lamps should be replaced with 4 foot T8 lamps

Energy Conservation Measures recommended:

- Install occupancy sensors to control lights in rooms with irregular use such as restrooms, storage areas, and offices.
- The present T12 lamps and magnetic ballasts should be replaced with T8 lamps and electronic ballasts.

Four Seasons Inn

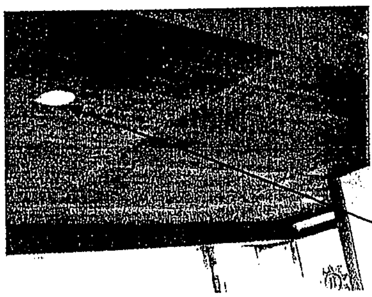


This 8013 square foot motel has 39 guest rooms located across the street from the casino complex building.

The motel was neat and clean and the guest rooms were in good shape. We noticed the guest rooms had circular compact fluourscent lights in the lamps in the rooooms, a good sign of energy conservation.

The bathroom faucets and shower heads in the guest rooms should be upgrades to energy efficient fixtures including .5 gallon per minute flow moderators on the faucets and 1.5 gallon per minute shower heads. Presently the sink faucets are about 2+ gallons per minute and some of the shower heads were releasing at 3+ gallons per minute. When installing lower flow devices on the faucets and shower heads, not only is water being saved, natural gas is being saved by reducing the amount of hot water required because of lower flow levels.

The pop machine in the lobby should be fitted with a VendMiser or some type of occupancy sensor to control the energy consumption of the machine. A VendMiser will operate the machine as it is intended, however, the light will be turned off unless there is motion in the area of the machine.



At the time of our visit, the canopy lights at the front entrance were on during the day. A timer or photocell should be installed on outside lights to assure they are off during daylight hours. Most of the lighting in the motel was energy efficient with the exception of the registration area which was T12. That lighting should be upgrades to T8.

Canopy lights on during the day

Mechanical

Replace Boiler with New High Efficiency Boiler

Replace the existing inefficient boilers with new 95% high efficiency condensing boilers. The new boilers would have integrated modulating boiler control for gas burner turn down and modulation. This function allows for outdoor reset control and warm weather shut down.

Install Boiler Outdoor Reset Control

If new boilers are not installed it is recommended that Outdoor Reset Controls be added to the existing boilers.

Outdoor Reset controls respond to changes in weather by changing the boiler water temperature circulating throughout the building. It sends out cooler water to the system during the warmer outdoor temperatures. And sends warmer water to the building in cooler outdoor temperatures. What the outdoor reset does is regulate the amount of energy entering the building based on the outdoor temperature by changing the boiler water temperature. This will provide almost perfect equilibrium where the energy entering the building is equivalent to the energy escaping. The result is a steady indoor temperature across the year and significant saving on fuel.

Replace Water Heaters with New High Efficient Water Heaters

The existing water heaters produce hot water for domestic showers, and hand washing in the hotel rooms and laundry. These water heaters likely have a layer of scale developed in the bottom of the tanks preventing the proper heat transfer to the domestic water. We recommend the installation of high efficiency power vented commercial water heaters.

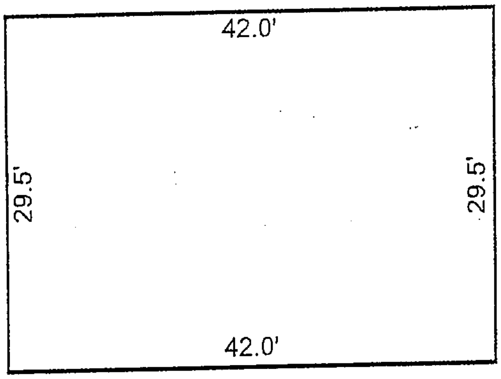
Install (40) Global Plasma Solutions Indoor Air Quality Equipment

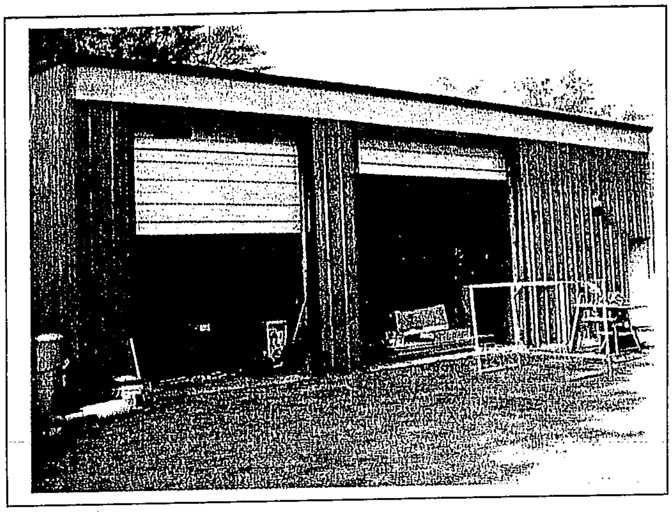
The existing Hotel Room Heating and Air Conditioning units (PTAC units) continuously recirculate stagnate indoor air which include smoke, bacteria, viruses, and odors throughout the space. Adding GPS' needlepoint bi-polar ionization system to the existing PTAC units will provide the best indoor air quality possible by eliminating these indoor air contaminants. This will result in rooms that smell fresh and clean, creating a more pleasant stay for your guests. In addition to this the outdoor air introduced into the space can be reduced to create additional energy savings.

Energy Conservation Measures recommended:

- Install water conservation flow moderators on kitchen and bathroom sinks.
- Install a VendMiser or similar sensor or on/off control to regulate pop machine operation.
- The present T12 lamps and magnetic ballasts should be replaced with T8 lamps and electronic ballasts.
- Install timers or photocells on outdoor lighting to turn it off during daylight hours.
- Install Global Plasma Solutions IAQ equipment on motel room PTAC units.
- Replace Boiler with new High Efficiency Boiler.
- Replace water heater with new high efficiency water heater.
- Install Outdoor reset controls on boilers.

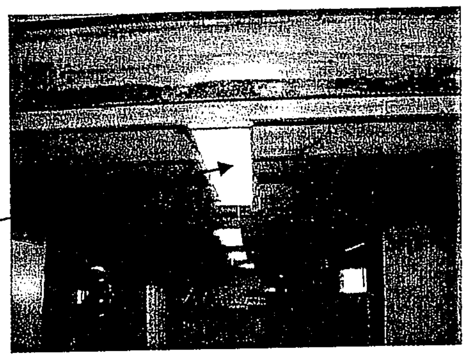
Hatchery Big Garage





The 1239 square foot garage is used for a variety of work. Inside and outside construction projects, storage, and other purposes. The garage is a basic structure and is not heated. The only energy efficiency recommendation would be to upgrade the lighting from T12 to T8.

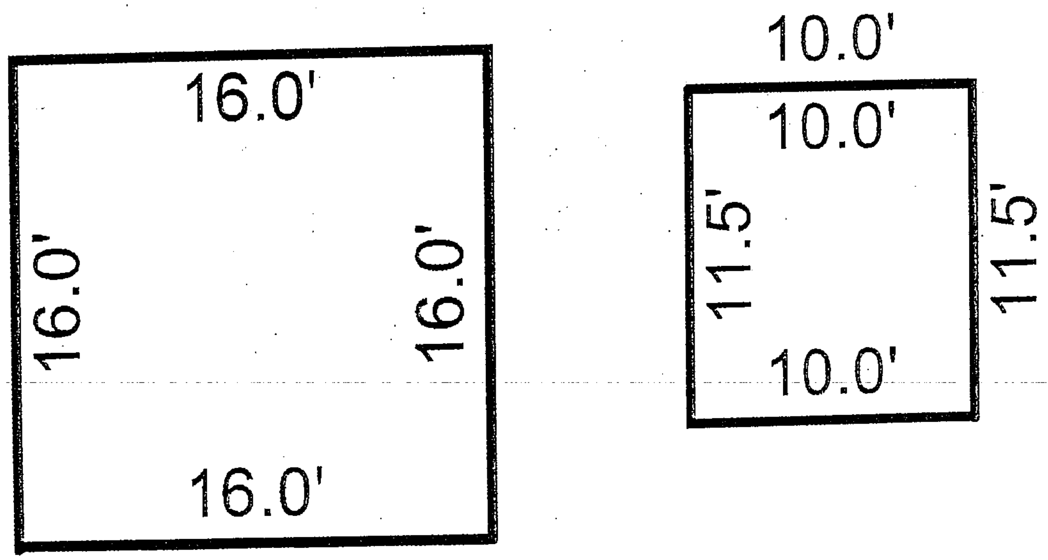
Replace T12 lighting with T8 fixtures



Energy Conservation Measures recommended:

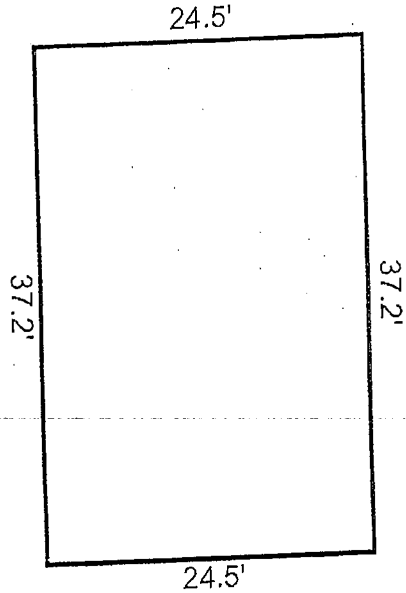
- The present T12 lamps and magnetic ballasts should be replaced with T8 lamps and electronic ballasts.

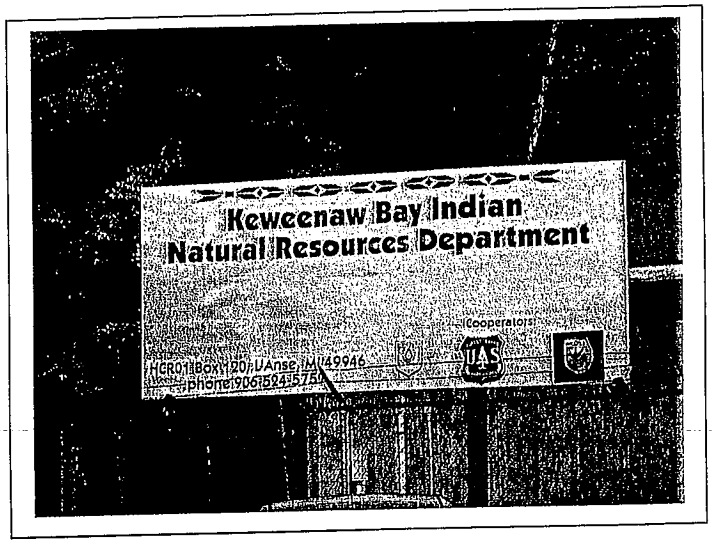
Hatchery Shed & Hatchery Shed 2



These sheds are used solely for storage and no energy recommendations are being made.

Hatchery New Office Building





The 912 square foot office building is part of the Natural Resources complex. This building houses several offices. The building has upgraded lighting technology, using T8 lamps and electronic ballasts. Propane is used for heat. The only recommendations to be made would be to install water conserving devices on the bathroom faucets.

Mechanical

Install Programmable Thermostats

The existing thermostat maintains the same set point 24 hours a day unless manually turned down at night when someone remembers. We recommend the installation of a programmable thermostat that will automatically be set back to a lower temperature each night and weekends to conserve energy and reduce hours of operation for the heating and air conditioning equipment.

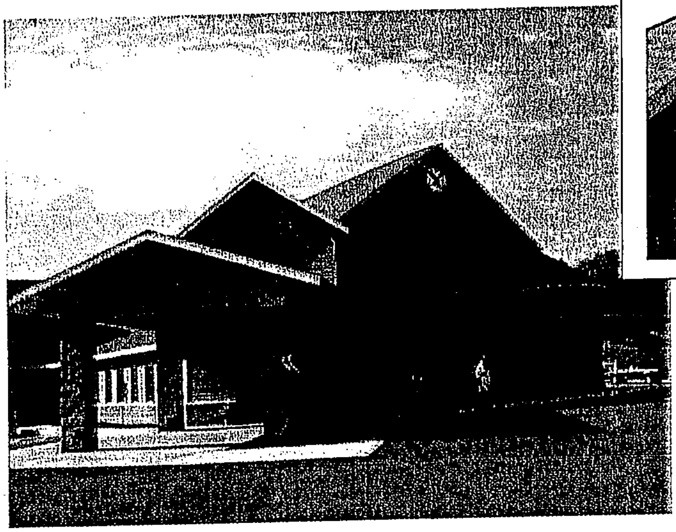
Install Variable Frequency Drives (VFD) on Motors

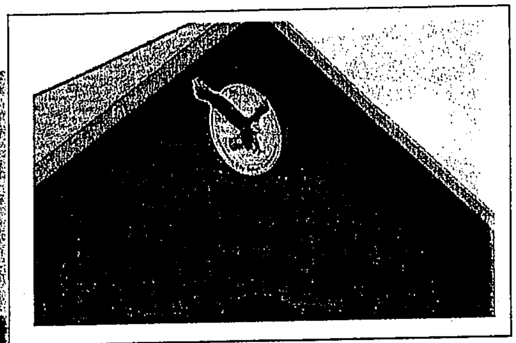
The existing pump motors are single speed constant volume. Single-speed drives start motors abruptly, subjecting the motor to high torque and current surges up to 10 times the full-load current. Variable frequency drives offer a soft start, gradually ramping up a motor to operating speed. The variable frequency lessens mechanical and electrical stress on the motors and can reduce maintenance and repair costs as well as to extend the motor life. Variable frequency drives also allows more control of processes such as water distribution, and aeration Energy savings from variable-frequency drives can be significant. Even a small reduction in motor speed can reduce a pump's energy use by as much as 50%.

Energy Conservation Measures recommended:

- Install water conservation flow moderators on kitchen and bathroom sinks.
- Install programmable thermostats to better control space heating and cooling in specific areas and allowing for night set back of room temperatures.
- VFD's on Pump Motors.

Health Center

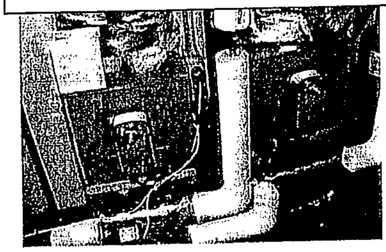




The KBIC Department of Health and Human Services is an impressive building. With heavy foot traffic, it is very useful addition to the community. The building is relatively new with many up to date energy efficient innovations.

The heating system is a VAV (variable air volume) that is designed to vary the air flow to comfort levels. In discussions with staff and employees in the building, this system could use some adjustments to level out the temperatures at various times of day and in different areas of the building.

Current Energy Management System



The building does have an energy management system (EMS) however it does not appear to be operating as it should. The present system uses timers which seemed as if they were not set properly. We would recommend a new digital energy management system. This system would be very cost effective in that energy savings for leveling out temperatures would reduce gas consumption, thus savings a significant amount of utility costs. The comfort level for the occupants would also be improved. The system should include programmable thermostats.

Various types of lighting is found throughout the building. Most of the lighting was energy efficient however most of the can lighting in the ceiling was incandescent bulbs which should be replaced with compact fluorescent lamps. The building does have some occupancy sensors but other occupancy sensors should be installed in several areas including offices and bathrooms.

As with all the other buildings in this report, the water faucets in the bathrooms, workrooms, and patient examination rooms should be upgraded with water conservation flow moderators.

Mechanical

Install Global Plasma Solutions Indoor Air Quality Equipment on Variable Air Volume (VAV) System to Reduce Outdoor Air

The existing Heating, Air Conditioning and Ventilation systems continuously recirculate mold, Bacteria, viruses, and other indoor contaminants throughout the Health Center and other occupied areas. Adding GPS' needlepoint bi-polar ionization system to the existing facility will provide cleaner and healthier environment and provide the best indoor air quality possible. In addition to this the outdoor air introduced into the space can be reduced to create additional energy savings.

Complete Test and Balance of VAV System

Heating, ventilating and air conditioning systems utilize automatic controls to attain proper fluids and air flow for heating, cooling and ventilation in any building. Documentation and adherence to the above procedures are essential in order for the various HVAC system components to operate in synchronization and in accordance with design intent.

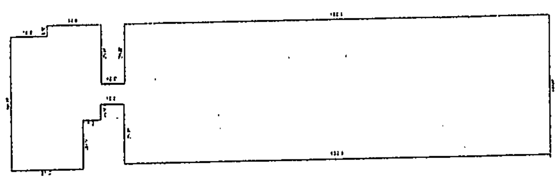
Test and Balance (TAB) procedures utilized to verify that HVAC and related systems operate and perform as per design intent. Properly functioning systems contribute to energy savings and occupant's comfort, health and safety

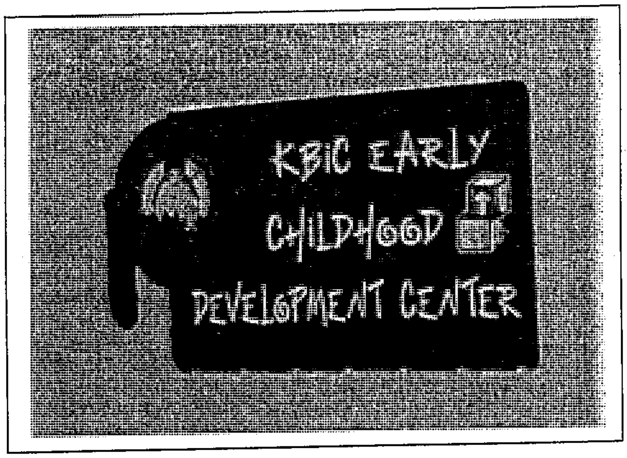
- TEST: To determine the quantitative performance of equipment.
- ADJUST: To proportion flows of fluids (air & water) to specified design quantities.
- BALANCE: To regulate the specified fluid flow rate at the terminal equipment

Energy Conservation Measures recommended:

- Install water conservation flow moderators on kitchen and bathroom sinks.
- Install programmable thermostats to better control space heating and cooling in specific areas and allowing for night set back of room temperatures.
- Install occupancy sensors to control lights in rooms with irregular use such as restrooms, storage areas, and offices.
- The present T12 lamps and magnetic ballasts should be replaced with T8 lamps and electronic ballasts.
- Upgrade or replace the current energy management system with a digital system.
- Install Global Plasma Solutions IAQ equipment on VAV system.
- Complete Test and Balance of systems.

KBIC Headstart

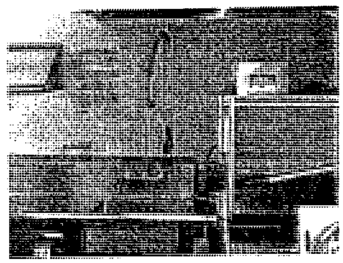




This large building, approximately 12,000 square feet, is used exclusively as a childhood development center. It is a well maintained and attractive building.

Any older lighting should be upgraded to T8 or compact fluorescent lamps. Occupancy sensors should also be considered in rooms with sporadic use.

Programmable thermostats should be installed so as to allow for night set back but have the school warmed in the morning by the time the children arrive. See the write up on night set backs at the beginning of this report.



With the number of students and adults using the school, a significant amount can be saved on installation of water conservation flow moderators in the kitchen and bathroom sinks. The sprayer in the kitchen should also be replaced with an energy efficient model. See the Water Analysis Study 5 at the front of this report for cost savings of t his measure.

Most of the hot water is used for hand washing alone. The domestic hot water heater could be downsized or replaced with a point of service or tankless heater.

Mechanical

Replace (1) Furnace with New High Efficiency Furnace

The existing furnaces are standard efficiency that have reached the end their useful life. We recommend the installation of high efficiency 95% efficient furnaces. These furnaces will have a multi stage burner with an ECM variable speed blower to deliver just the correct amount of heat to the space based on design loads.

Install (6) Global Plasma Solutions Indoor Air Quality Equipment on Roof Top Units and Air Handling Units

The existing KBIC Heating and Air Conditioning units continuously recirculate stagnate indoor air which include volatile organic compounds, bacteria, viruses, and odors throughout the space. Adding GPS' needlepoint bi-polar ionization system to the existing HVAC units will provide the best indoor air quality possible by eliminating these indoor air contaminants. This will result in a cleaner and healthier environment for the students and staff that occupy the facility. In addition to this the outdoor air introduced into the space can be reduced to create additional energy savings.

Install Programmable Thermostats

The existing thermostat maintains the same set point 24 hours a day unless manually turned down at night when someone remembers. We recommend the installation of a programmable thermostat that will automatically be set back to a lower temperature each night and weekends to conserve energy and reduce hours of operation for the heating and air conditioning equipment.

Install (3) eCube Refrigeration Temperature Sensors

Install Instantaneous Water Heater for the Kitchen

Currently the hot water that supplies the kitchen travels a long distance from the existing domestic hot water heater which stores hot water in its tank. Due to the distance that the water has to travel it takes a considerable amount of time for hot water to reach its destination. This results in wasted energy from the water that is left in the piping and the amount of water wasted by running the water for a considerable length of time. It is our recommendation that an instantaneous water heater be installed at or near the kitchen to handle just the hot water required for the kitchen.

Complete Test and Balance of Systems

Heating, ventilating and air conditioning systems utilize automatic controls to attain proper fluids and air flow for heating, cooling and ventilation in any building. Documentation and adherence to the above procedures are essential in order for the various HVAC system components to operate in synchronization and in accordance with design intent.

Test and Balance (TAB) procedures utilized to verify that HVAC and related systems operate and perform as per design intent. Properly functioning systems contribute to energy savings and occupant's comfort, health and safety.

- TEST: To determine the quantitative performance of equipment.
- ADJUST: To proportion flows of fluids (air & water) to specified design quantities.
- BALANCE: To regulate the specified fluid flow rate at the terminal equipment.

Energy Conservation Measures recommended:

- Install water conservation flow moderators on kitchen and bathroom sinks.
- Install programmable thermostats to better control space heating and cooling in specific areas and allowing for night set back of room temperatures.
- Install occupancy sensors to control lights in rooms with irregular use such as restrooms, storage areas, and offices.
- The present T12 lamps and magnetic ballasts should be replaced with T8 lamps and electronic ballasts.
- Replace sprayer in kitchen with new, high pressure low water sprayer.
- Consider reducing the size of the domestic hot water tank by installing a point of use tank or a waterless hot water system. The hot water demands in the building are much lower than the supply.
- Install eCube® on refrigeration and freezer equipment to reduce number of cycles, eliminate spiking of temperatures by evening out cooling temperatures, and extend the life of the compressor.
- Replace furnace with new high efficiency furnace.
- Install Global Plasma Solutions IAQ equipment on RTU's.
- Complete Test and Balance of systems.
- Install instantaneous water heater for the kitchen.

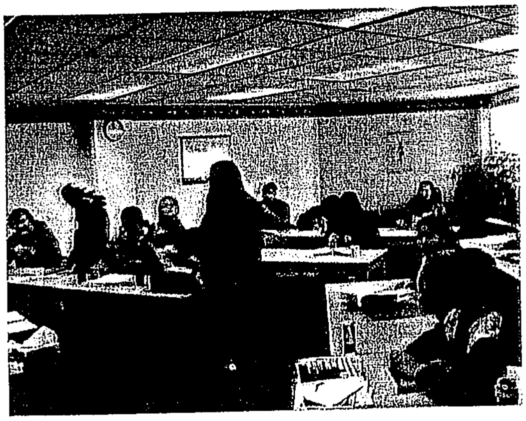
Library and Community College

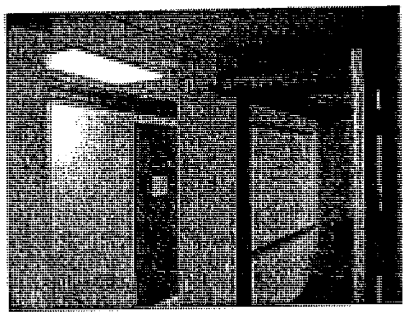
This downtown building is shared by the library and the community college. From an energy standpoint, the building is in very good shape. The boilers are relatively new, the lighting is T8, and Exit signs use new technology. The rooms are bright and some daylighting is used where there are windows.

The only recommendation would be to upgrade the bathroom faucets with flow restrictors.

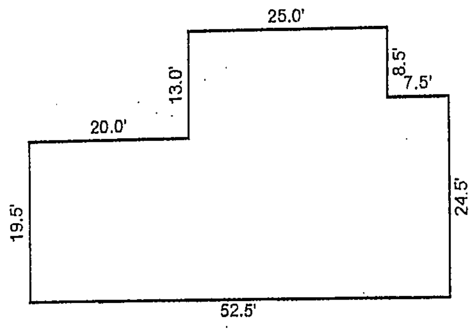
Energy Conservation Measures recommended:

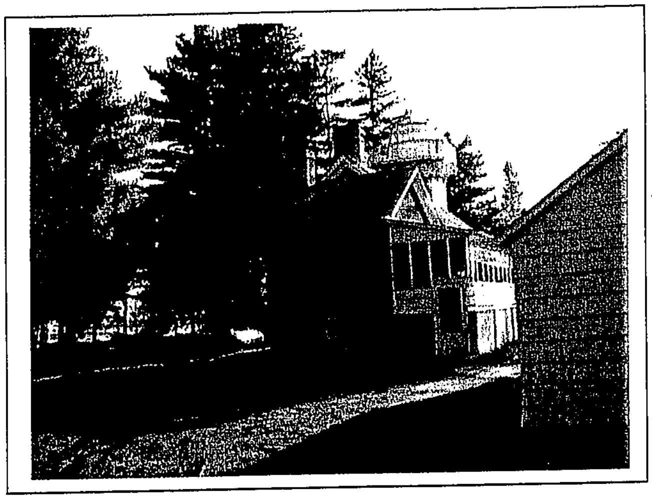
- Install water conservation flow moderators on kitchen and bathroom sinks.





Lighthouse

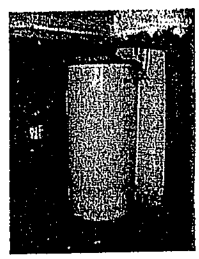




The Lighthouse is a very unique structure having a beautiful view of the lake. The building has limited use and the use is sporadic. The building itself is very old but the energy consuming equipment is newer.

There did not appear to be a thermostat in the building. Because the occupancy is so sporadic, the only recommendations would be to install programmable thermostat with an automatic setback so the heat is not on after the visitors have gone. Install thermostats with a two hour on/off where the boiler can be given a boost for a two hour cycle of heat and then the boiler is shut down.

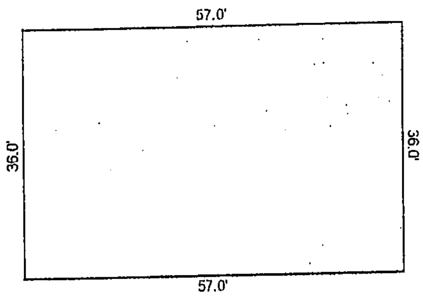
The domestic hot water heater is large. Very little hot water is used, so the demand is low. Consider a point of service or tankless water heater.

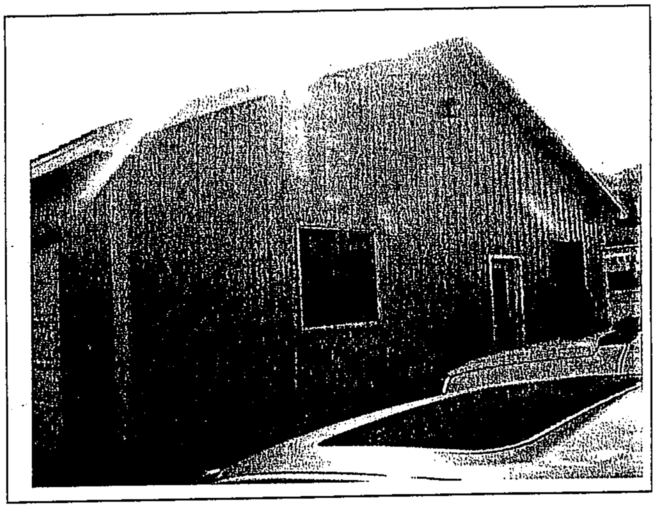


Energy Conservation Measures recommended:

- Install programmable thermostats to better control space heating and cooling in specific areas and allowing for night set back of room temperatures.
- Consider reducing the size of the domestic hot water tank by installing a point of use tank or a waterless hot water system. The hot water demands in the building are much lower than the supply.

Maintenance Building





This 2052 square foot building is used as a maintenance shop and office area. The garage is used to store materials and to work on projects. The building has infloor heat which is a great application for this type of building and for this use of a building.

The building has older lighting which should be converted to T8 lamps and electronic ballasts. Because the workers come and go quite often, occupancy sensors should be installed to control the lights during times of the building not being occupied.

Programmable thermostats should be installed to assure heat is turned down in the evening and is off throughout the night. Heat can automatically come on in the morning and have the shop heated by the time the workers arrive.

He vending machine should have a VendMiser installed to regulate the energy use.

The garage door should be sealed to fill in the gaps around the sides and bottom of the door. Several types of seals or weather stripping are available depending on the size of the gaps. We would recommend a door brush seal. That type of seal would have the longest life and it stays pliable in all types of weather.

Mechanical

Replace Small Wall Air Conditioning Units with High Efficiency Ductless Split Unit

The existing air conditioning system consists of multiple window units. These units are very inefficient and have a very short useful life. We recommend the installation of a high efficient multi-zone ductless air conditioning unit.

Replace Boiler with New High Efficiency Boiler

Replace the existing inefficient boiler with new 95% high efficiency condensing boiler. The new boiler would have integrated modulating boiler control for gas burner turn down and modulation. This function allows for outdoor reset control and warm weather shut down.

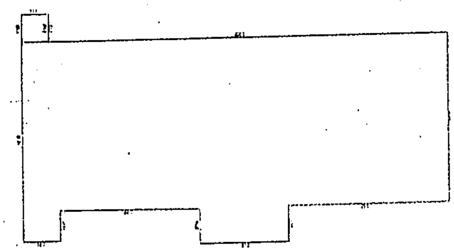
Install Programmable Thermostats

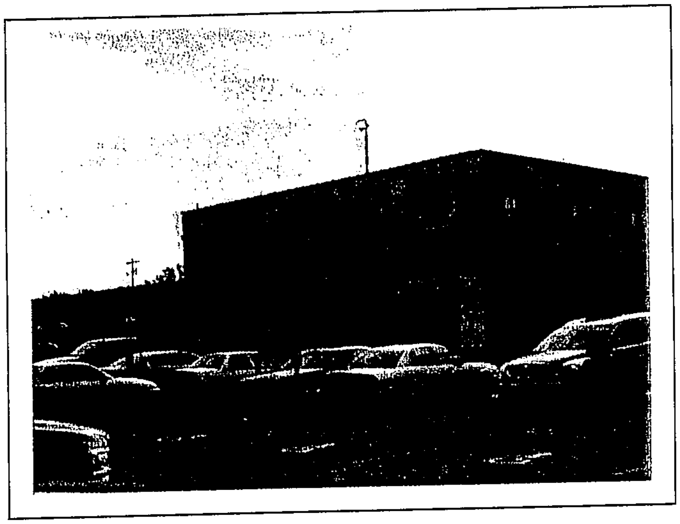
The existing thermostat maintains the same set point 24 hours a day unless manually turned down at night when someone remembers. We recommend the installation of a programmable thermostat that will automatically be set back to a lower temperature each night and weekends to conserve energy and reduce hours of operation for the heating and air conditioning equipment.

Energy Conservation Measures recommended:

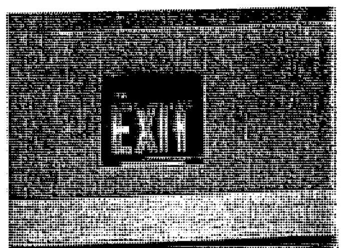
- Install water conservation flow moderators on kitchen and bathroom sinks.
- Install a VendMiser or similar sensor or on/off control to regulate pop machine operation.
- Install programmable thermostats to better control space heating and cooling in specific areas and allowing for night set back of room temperatures.
- Install occupancy sensors to control lights in rooms with irregular use such as restrooms, storage areas, and offices.
- The present T12 lamps and magnetic ballasts should be replaced with T8 lamps and electronic ballasts.
- Install door seals or weather stripping around doors to prohibit air leakage.
- Replace boiler with new high efficiency boiler.
- Replace window air conditioning with new ductless split system.

Marquette Casino

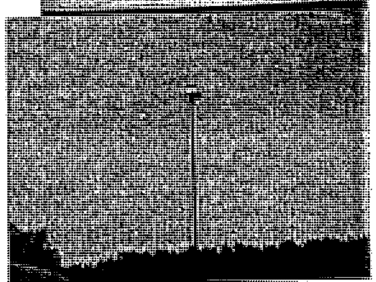




The Marquette casino is 16,400 square feet.

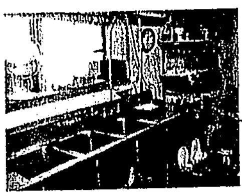


As with other KBIC facilities, lighting needs to be updated from T12 to T8. In conjunction with the lighting, occupancy sensors should be installed in areas where use is sporadic such as bathrooms, storage rooms, employee break rooms, and other similar rooms. Older Exit signs should be replace with LED Exit signs which cost less to operate and have a longer life.



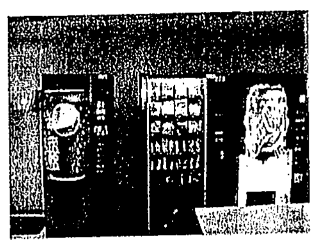
Also in the lighting area, timers or photocells should be installed on the outdoor street lights in the parking lot and also on any exterior wall packs on the walls of the buildings. During our visit in the middle of the afternoon, parking lot lights were on.

Water conservation measures should also be implemented. Flow moderators on the bathroom faucets, Conservacaps on the toilets with flushometers, and other kitchen faucets should all be upgraded to energy efficient fixtures.



The sprayer in the kitchen area should be replaced with an energy efficient sprayer.

Kitchen sprayer should be replaced



A VendMiser should be installed on the pop machine in the employee break area.

Mechanical

Replace (2) 15 Ton Carrier Roof Top Units

Existing rooftop units have reached their maximum life expectancy and have a poor Seasonal Energy Efficiency Rating (SEER). There units also have R-22 refrigerant which is being phased out by the EPA and will soon no longer be manufactured. Replace existing inefficient rooftop units with high efficient Carrier 12 SEER rooftop units with the new R-410A refrigerant on RTU's.

Install (1) Global Plasma Solutions (GPS) Unit in Break Room and (4) GPS Units on the Existing Roof Top Units

The existing Heating, Air Conditioning and Ventilation systems continuously recirculate tobacco smoke and other indoor contaminants throughout the casino and other occupied areas of the casino. Adding GPS' needlepoint bi-polar ionization system to the existing facility will provide the best indoor air quality possible. Smokers and non-smokers will once and for all be able to coexist peacefully. No more smoke complaints, longer gaming by patrons, a better work environment for employees. In addition to this the outdoor air introduced into the space can be reduced to create additional energy savings.

Install (4) eCube Refrigeration Temperature Sensors on Coolers and Freezers

Install (3) VendMisers on Vending Machines

The existing Vending machines have a refrigerant circuit that operates off from an internal thermostat and exterior illumination that is on 24 hours a day. The Vending Miser is an external device that maximizes energy efficiency using occupancy based technology by operating the external lights only when someone walks by.

Install DDC Building Management System for Casino RTU's

The existing heating, air conditioning, and ventilation controls throughout each of the tribal buildings vary from simple thermostats on the wall to pneumatics, and various Direct Digital Controls (DDC).

We recommend the installation of a web based open protocol DDC system that can provide building HVAC integration with the following features.

- Motor Variable Frequency Drives
- Time of Day Scheduling
- HVAC Equipment set points

- CO_2 monitoring and ventilation
- HVAC Alarm sequence
- Energy optimization
- Remote alarm and scheduling capabilities
- HVAC Equipment status
- HVAC Trend logs
- HVAC Equipment graphics
- Warm Weather shut down for boilers and pumps
- Outdoor reset controls

Replace Residential Freezers with Commercial Reach Ins

Replace Window Air Conditioning in Kitchen with New Ductless Split Unit

Complete Test and Balance of Systems

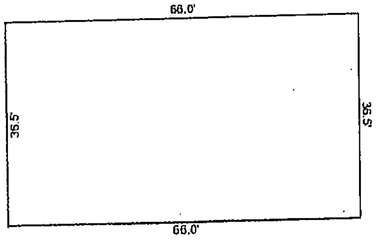
Heating, ventilating and air conditioning systems utilize automatic controls to attain proper fluids and air flow for heating, cooling and ventilation in any building. Documentation and adherence to the above procedures are essential in order for the various HVAC system components to operate in synchronization and in accordance with design intent. Test and Balance (TAB) procedures utilized to verify that HVAC and related systems operate and perform as per design intent. Properly functioning systems contribute to energy savings and occupant's comfort, health and safety

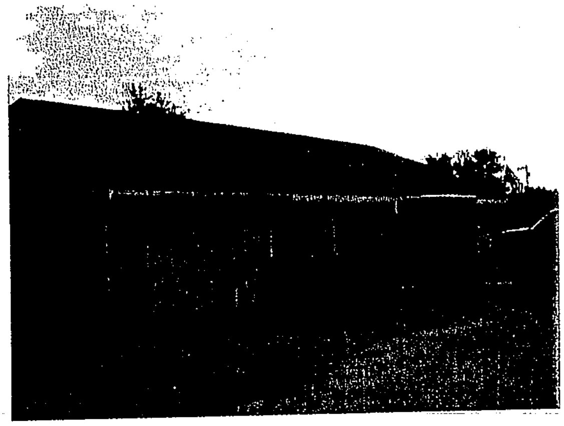
- TEST: To determine the quantitative performance of equipment.
- ADJUST: To proportion flows of fluids (air & water) to specified design quantities.
- BALANCE: To regulate the specified fluid flow rate at the terminal equipment

Energy Conservation Measures recommended:

- Install water conservation flow moderators on kitchen and bathroom sinks.
- Install a VendMiser or similar sensor or on/off control to regulate pop machine operation.
- Install occupancy sensors to control lights in rooms with irregular use such as restrooms, storage areas, and offices.
- The present T12 lamps and magnetic ballasts should be replaced with T8 lamps and electronic ballasts.
- Install timers or photocells on outdoor lighting to turn it off during daylight hours.
- Install eCube® on refrigeration and freezer equipment to reduce number of cycles, eliminate spiking of temperatures by evening out cooling temperatures, and extend the life of the compressor.
- Replace (2) 15 Ton Carrier RTU's.
- Install Global Plasma Solutions IAQ equipment on RTU's.
- Install Global Plasma Solutions unit in break room.
- Install DDC building management system for the casino RTU's.
- Replace residential freezers with commercial reach-in's.
- Replace window air conditioning with new ductless split system.
- Complete Test and Balance of systems.

Marquette Community Center





The Marquette Community Center, a 2409 square foot building, is a relatively new structure located behind the Marquette casino.

Being a new building, not much can be recommended to improve energy efficiency. The boiler is in good shape and is rated as 90% efficiency.

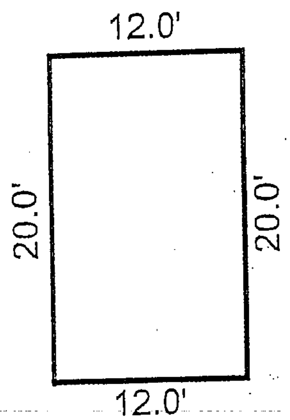
Lighting could be upgraded to T8 from the current T12 lighting now in the building. Water conservation fixtures could be installed in the facility's bathrooms.

The building has irregular use and to prevent wasting electricity, occupancy sensors to be installed to control the lighting.

Energy Conservation Measures recommended:

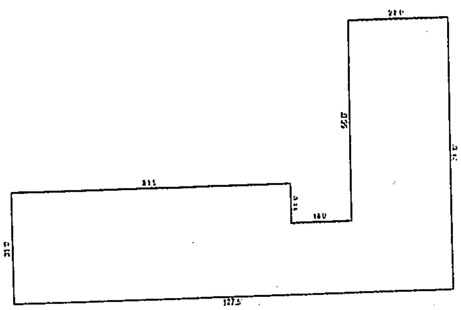
- Install water conservation flow moderators on kitchen and bathroom sinks.
- Install occupancy sensors to control lights in rooms with irregular use such as restrooms, storage areas, and offices.
- The present T12 lamps and magnetic ballasts should be replaced with T8 lamps and electronic ballasts.

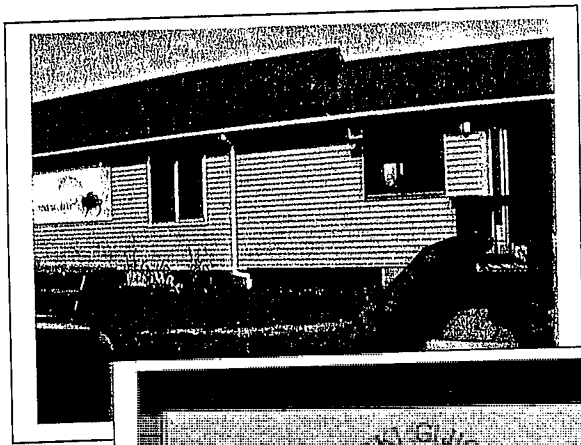
Marquette Pump House



No recommendations.

New Day

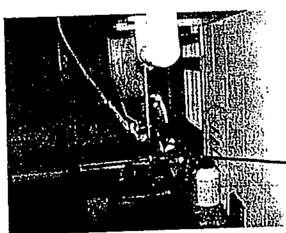




New Day is a residential treatment center.

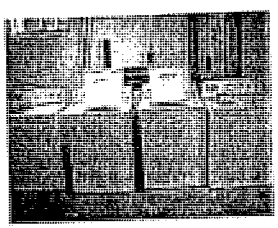
The 5015 square foot facility has a kitchen, offices, bedrooms, common rooms, and other rooms.

In areas where lighting being used is T12 lamps, these should be upgraded to T8. Occupancy sensors should be considered in lesser used areas of the facility.



Water conservation fixtures should be installed on bathroom faucets, shower heads, and kitchen sink faucets. The kitchen sprayer should be replaced with an energy efficient sprayer.

The pop machine should be fitted with a VendMiser to reduce electrical consumption.



The washers are older and should be replaced with ENERGY STAR top load or front load models. The newer washers use less water, less detergent, spin clothes dryer, and are gentler on wear and tear with the clothes. They also require less maintenance.

Mechanical

Replace Water Heaters with New High Efficiency Water Heaters

The existing water heaters produce hot water for domestic showers, and hand washing in the hotel rooms and laundry. These water heaters likely have a layer of scale developed in the bottom of the tanks preventing the proper heat transfer to the domestic water. We recommend the installation of high efficiency power vented commercial water heaters.

Replace Boilers with High Efficiency Boilers

Replace the existing inefficient boiler with new 95% high efficiency condensing boiler. The new boiler would have integrated modulating boiler control for gas burner turn down and modulation. This function allows for outdoor reset control and warm weather shut down.

Install Boiler Outdoor Reset

If new boilers are not installed it is recommended that Outdoor Reset Controls be added to the existing boilers.

Outdoor Reset controls respond to changes in weather by changing the boiler water temperature circulating throughout the building. It sends out cooler water to the system during the warmer outdoor temperatures and sends warmer water to the building in cooler outdoor temperatures. What the outdoor reset does is regulate the amount of energy entering the building based on the outdoor temperature by changing the boiler water temperature. This will provide almost perfect equilibrium where the energy entering the building is equivalent to the energy escaping. The result is a steady indoor temperature across the year and significant saving on fuel.

Replace (2) furnaces with High Efficiency Furnaces

The existing furnaces are standard efficiency that have reached the end of their useful life. We recommend the installation of high efficiency 95% efficient furnaces. These furnaces will have a multi stage burner with an ECM variable speed blower to deliver just the correct amount of heat to the space based on design loads.

Replace Air Conditioning with High Efficiency Air Conditioning

The existing air conditioning condensers are standard efficiency that have reached the end of their useful life. These units also contain R-22 refrigerant which has been phased out of production by the EPA. We recommend installing higher efficiency 14 SEER air conditioning condensers that contain R-410A refrigerant

Install (2) eCube Refrigeration Temperature Sensors

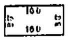
Install Programmable Thermostats

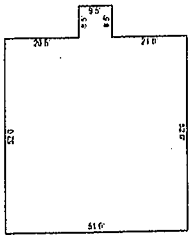
The existing thermostat maintains the same set point 24 hours a day unless manually turned down at night when someone remembers. We recommend the installation of a programmable thermostat that will automatically be set back to a lower temperature each night and weekends to conserve energy and reduce hours of operation for the heating and air conditioning equipment.

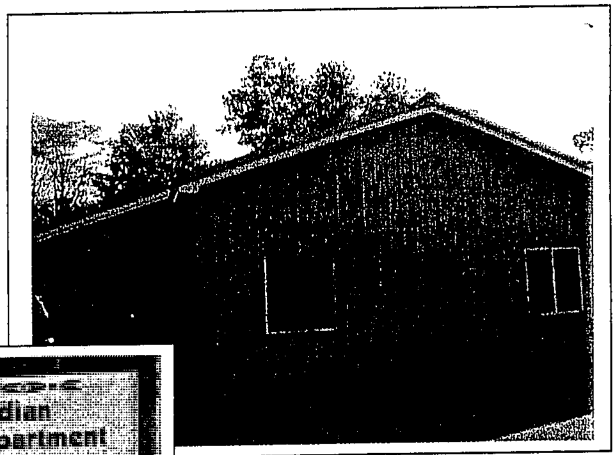
Energy Conservation Measures recommended:

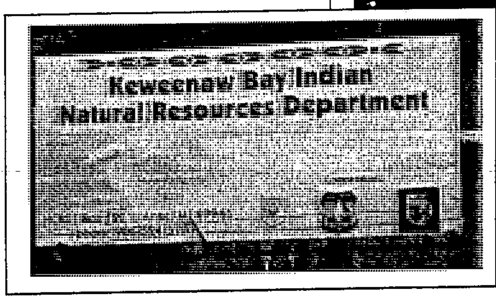
- Install water conservation flow moderators on kitchen and bathroom sinks.
- Install a VendMiser or similar sensor or on/off control to regulate pop machine operation.
- Install programmable thermostats to better control space heating and cooling in specific areas and allowing for night set back of room temperatures.
- Install occupancy sensors to control lights in rooms with irregular use such as restrooms, storage areas, and offices.
- The present T12 lamps and magnetic ballasts should be replaced with T8 lamps and electronic ballasts.
- Energy efficient ENERGY STAR washers should replace older washers. New washers can be either front load or top load models.
- Install Outdoor reset controls on boilers.
- Replace boiler with new high efficiency boiler.
- Replace water heater with new high efficiency water heater.
- Replace furnaces with new high efficiency furnaces.
- Replace A/C with new high efficiency air conditioning.

NRCS









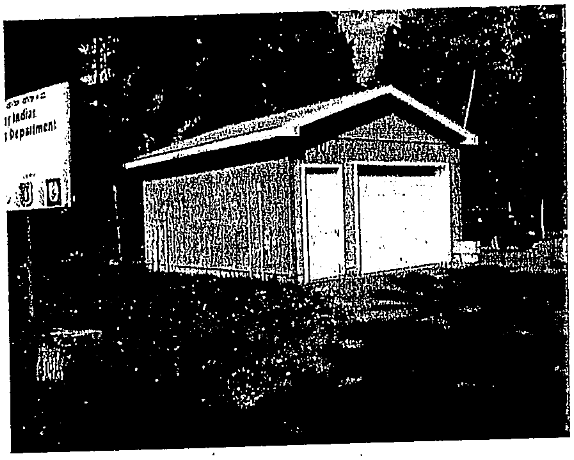
The Natural Resources buildiing is newer building housing offices and a room (garage) with vats for fish to inhabit. From an energy standpoint, the building is in good shape. Lighting in the garage or the fish area should be updated to T8 lamps.

It was mentioned that the Natural Resources Department was looking into putting into operation, two 15 hp motors to be used as pumps. If these motors have been installed and if it has not been done as of yet, variable frequency drives should be used to control the motor operation.

Energy Conservation Measures recommended:

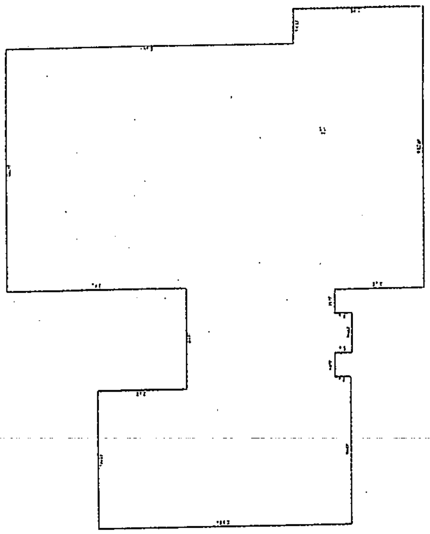
- Install water conservation flow moderators on kitchen and bathroom sinks.
- The present T12 lamps and magnetic ballasts should be replaced with T8 lamps and electronic ballasts.
- Consider installing variable speed drives on motors over ½ hp to reduce the amount of energy needed for operation and to extend the life of the motor.

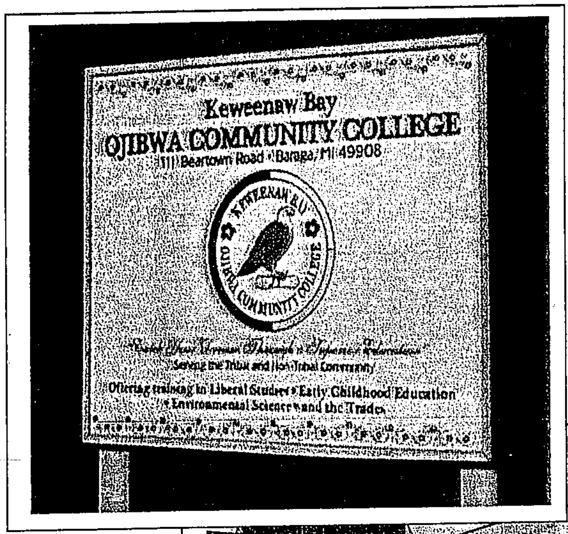
Natural Resources Garage



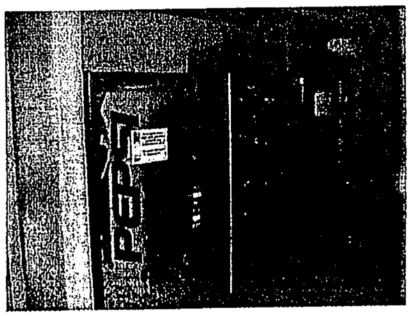
The Natural Resources Garage houses a generator. There are no energy recommendations.

OCC – Ojibwa Community College





The Ojibwa Community College is a beautiful new building located behind the casino complex. The heating system is state of the art and well maintained. Lighting fixtures use the newest technology and all other operations are working in an energy efficient manner.



As we toured the building, we commented on the pop machine with the lights turned off. We commend the maintenance personnel for doing this energy saving accomplishment.

Mechanical

Install (4) Global Plasma Solutions Indoor Air Quality Equipment

The existing KBIC Heating and Air Conditioning units continuously recirculate stagnate indoor air which include volatile organic compounds, bacteria, viruses, and odors throughout the space. Adding GPS' needlepoint bi-polar ionization system to the existing HVAC units will provide the best indoor air quality possible by eliminating these indoor air contaminants. This will result in a cleaner and healthier environment for the students and staff that occupy the facility. In addition to this the outdoor air introduced into the space can be reduced to create additional energy savings.

Install (3) VendMisers on Vending Machines

The existing Vending machines have a refrigerant circuit that operates off from an internal thermostat and exterior illumination that is on 24 hours a day. The Vending Miser is an external device that maximizes energy efficiency using occupancy based technology by operating the external lights only when someone approaches the machine. It also limits the compressor cycles and run times while still maintaining cold temperatures for the product.

Complete Test and Balance of Systems

Heating, ventilating and air conditioning systems utilize automatic controls to attain proper fluids and air flow for heating, cooling and ventilation in any building. Documentation and adherence to the above procedures are essential in order for the various HVAC system components to operate in synchronization and in accordance with design intent.

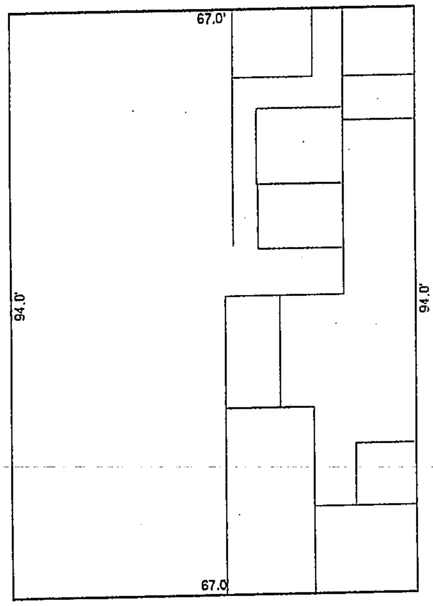
Test and Balance (TAB) procedures utilized to verify that HVAC and related systems operate and perform as per design intent. Properly functioning systems contribute to energy savings and occupant's comfort, health and safety.

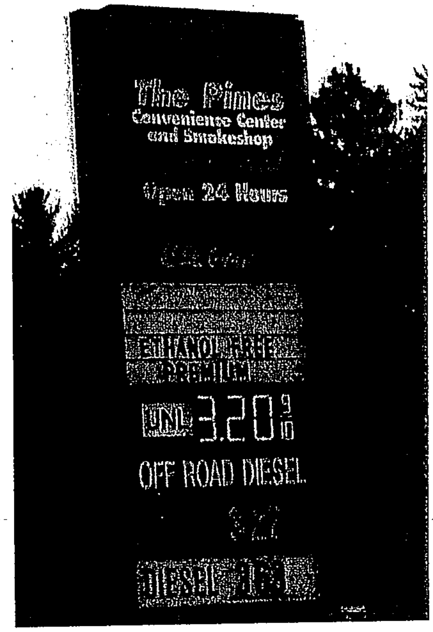
- TEST: To determine the quantitative performance of equipment.
- ADJUST: To proportion flows of fluids (air & water) to specified design quantities.
- BALANCE: To regulate the specified fluid flow rate at the terminal equipment.

Energy Conservation Measures recommended:

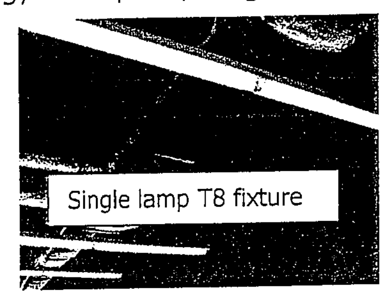
- Install water conservation flow moderators on kitchen and bathroom sinks.
- Install Global Plasma Solutions IAQ equipment.
- Complete Test and Balance of systems.

The Pines





The Pines convenience store and gas station is, from an energy standpoint, in good shape. Most of the lighting is T8 lamps with electronic ballasts. In the storage areas, T8 lamps are used in a single lamp fixture, saving energy and providing ample light for the task. This is a great example of energy efficiency.

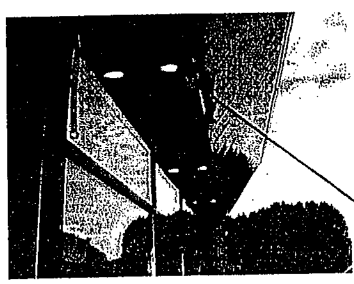


Single lamp T8 fixture

Lighting should be updated in the coolers where T12 lamps are being used. These should be upgraded to T8 lamps. Outside the building on the perimeter overhang roof, there are a number of cans using compact fluorescent lamps. Using the CFLs is great but the lights should be put on a timer so they are off during daylight hours.

Timers or photocells should be installed to control the lights on the underside of the canopy over the gas pumps. These lights are big energy wasters if left on during daylight hours.

Water conservation equipment should be installed on the bathroom faucets.



CFL in cans and canopy lights should be on a timer

Mechanical

Install (6) eCube Refrigeration Temperature Sensors

Install Global Plasma Solutions indoor air quality equipment on air handling unit to reduce outdoor air.

Complete Test and Balance of Air Handling Unit

Heating, ventilating and air conditioning systems utilize automatic controls to attain proper fluids and air flow for heating, cooling and ventilation in any building. Documentation and adherence to the above procedures are essential in order for the various HVAC system components to operate in synchronization and in accordance with design intent.

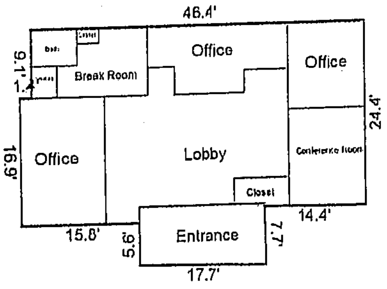
Test and Balance (TAB) procedures utilized to verify that HVAC and related systems operate and perform as per design intent. Properly functioning systems contribute to energy savings and occupant's comfort, health and safety.

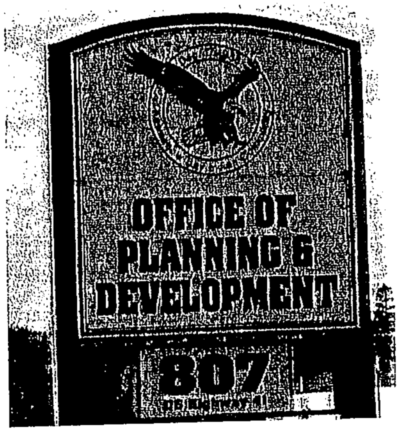
- TEST: To determine the quantitative performance of equipment.
- ADJUST: To proportion flows of fluids (air & water) to specified design quantities.
- BALANCE: To regulate the specified fluid flow rate at the terminal equipment.

Energy Conservation Measures recommended:

- Install water conservation flow moderators on kitchen and bathroom sinks.
- Install occupancy sensors to control lights in rooms with irregular use such as restrooms, storage areas, and offices.
- The present T12 lamps and magnetic ballasts should be replaced with T8 lamps and electronic ballasts.
- Install timers or photocells on outdoor lighting to turn it off during daylight hours.
- Install eCube® on refrigeration and freezer equipment to reduce number of cycles, eliminate spiking of temperatures by evening out cooling temperatures, and extend the life of the compressor.
- Complete Test and Balance of systems.
- Install Global Plasma Solutions IAQ equipment on AHU.

Planning and Development





This 1330 square foot building houses several offices. Recommendations for energy efficiency would include updating current T12 lighting to T8 lighting and electronic ballasts. Along with the lighting, occupancy sensors should be installed as well. Water conservation equipment should be installed in the bathroom.

Mechanical

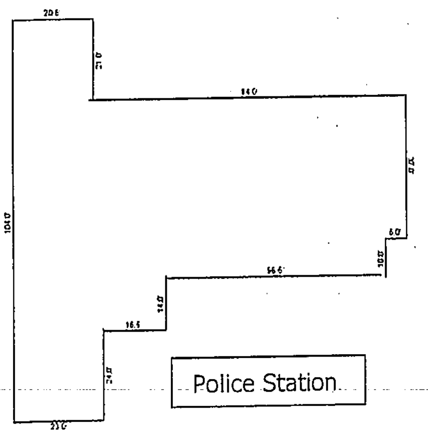
Install Programmable Thermostats

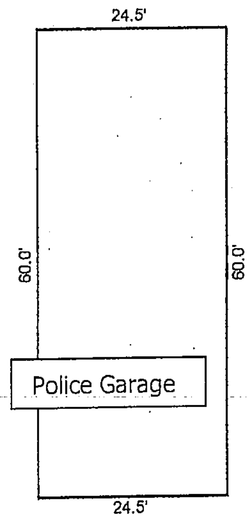
The existing thermostat maintains the same set point 24 hours a day unless manually turned down at night when someone remembers. We recommend the installation of a programmable thermostat that will automatically be set back to a lower temperature each night and weekends to conserve energy and reduce hours of operation for the heating and air conditioning equipment.

Energy Conservation Measures recommended:

- Install water conservation flow moderators on kitchen and bathroom sinks.
- Install programmable thermostats to better control space heating and cooling in specific areas and allowing for night set back of room temperatures.
- Install occupancy sensors to control lights in rooms with irregular use such as restrooms, storage areas, and offices.
- The present T12 lamps and magnetic ballasts should be replaced with T8 lamps and electronic ballasts.

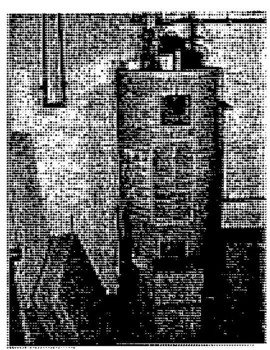
Police Station / Police Garage





The Police Station and garage are connected and comprise 7463 square feet of space. Also included on this property is a garage used for storage of confiscated items. This garage is not heated nor does it have electrical servicing it. We commend the police chief for this diligent action in energy efficiency. We were glad to hear about this proactive move on his part.

Although connected, we will look at the two buildings individually for energy efficiency measures. Since the garage is only used for vehicle storage, the garage should be kept at a minimum temperature and the lights on only when someone is in the garage. This could be accomplished with a programmable thermostat for the temperature and an occupancy sensor to control the lights. Lighting in the garage should be updated removing the T12 lamps and fixtures and replacing them with T8 lamps.



The police station should have water conserving flow moderators installed on the bathroom faucets. Because some areas of the station (offices) are only used during the day, programmable thermostats should be installed as well as occupancy sensors to control the lighting. All lighting should be upgraded to T8 lighting and compact fluorescent lamps. Some of the exterior lighting, the wall packs, were on during the day. These lights should have timers or photocells installed to control the on/off function.

The domestic water heater in the garage that services the station should be downsized. This is a big tank and the only use for hot water is hand washing. You may want to consider a point of use domestic hot water heater. Door seals should also be installed to prevent outside air infiltration in both the station and the garage.

Mechanical

Replace (2) Furnaces with High Efficiency Furnaces

The existing furnaces are standard efficiency that have reached the end of their useful life. We recommend the installation of high efficiency 95% efficient furnaces. These furnaces will have a multi stage burner with an ECM variable speed blower to deliver just the correct amount of heat to the space based on design loads.

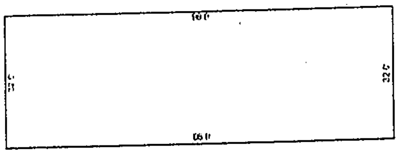
Replace Air Conditioning with High Efficiency Air Conditioning

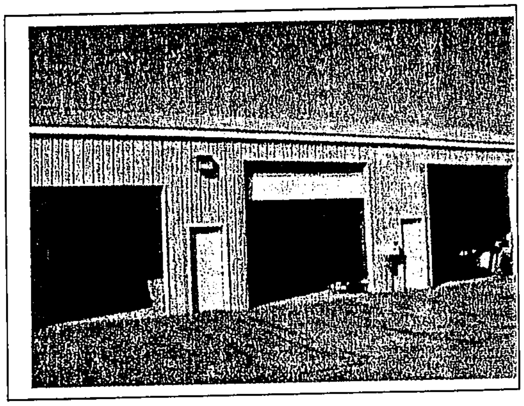
The existing air conditioning condensers are standard efficiency that have reached the end of their useful life. These units also contain R-22 refrigerant which has been phased out of production by the EPA. We recommend installing higher efficiency 14 SEER air conditioning condensers that contain R-410A refrigerant.

Energy Conservation Measures recommended:

- Install water conservation flow moderators on kitchen and bathroom sinks.
- Install programmable thermostats to better control space heating and cooling in specific areas and allowing for night set back of room temperatures.
- Install occupancy sensors to control lights in rooms with irregular use such as restrooms, storage areas, and offices.
- The present T12 lamps and magnetic ballasts should be replaced with T8 lamps and electronic ballasts.
- Consider reducing the size of the domestic hot water tank by installing a point of use tank or a waterless hot water system. The hot water demands in the building are much lower than the supply.
- Install timers or photocells on outdoor lighting to turn it off during daylight hours.
- Install door seals or weather stripping around doors to prohibit air leakage.
- Replace furnaces with new high efficiency furnaces.
- Replace A/C with new high efficiency air conditioning.

Public Works Garage

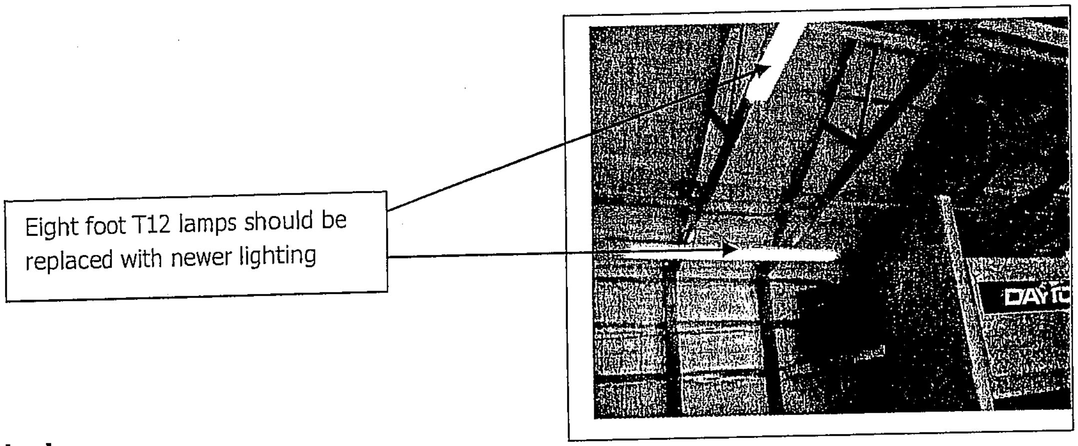




The public works garage is used for work and for storage. At the time of our visit, natural gas had not yet been installed.

The interior of the building has sprayed on insulation. This should be a great benefit once a heating system is installed in the building.

The lighting is eight foot T12 fixtures. This should be replaced with four foot T8 lamps.



Mechanical

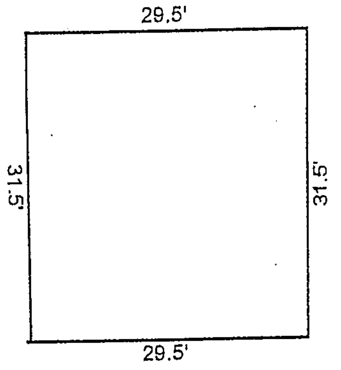
Install Programmable Thermostats

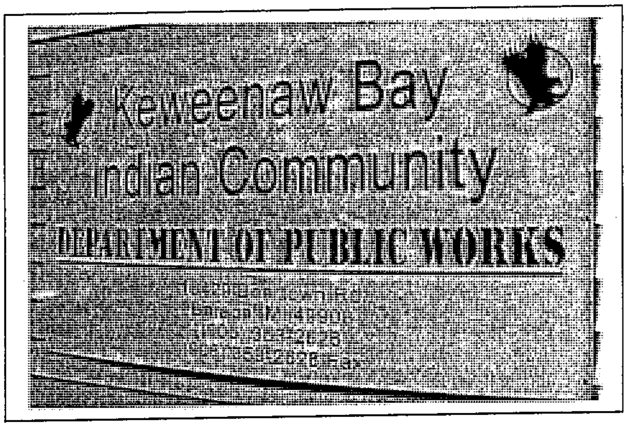
The existing thermostat maintains the same set point 24 hours a day unless manually turned down at night when someone remembers. We recommend the installation of a programmable thermostat that will automatically be set back to a lower temperature each night and weekends to conserve energy and reduce hours of operation for the heating and air conditioning equipment.

Energy Conservation Measures recommended:

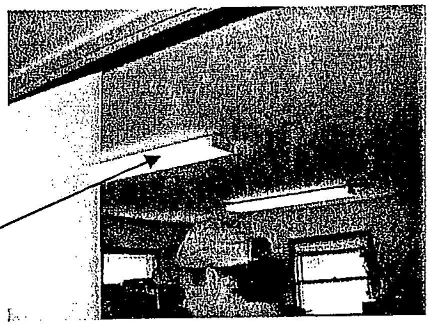
- The present T12 lamps and magnetic ballasts should be replaced with T8 lamps and electronic ballasts.
- Install programmable thermostats to better control space heating and cooling in specific areas and allowing for night set back of room temperatures.

Public Works Office





The Public Works office is a 3136 square foot building housing several offices. The building is in good shape and just a few energy improvements are needed. The bathroom sink faucets should have energy efficient flow moderators installed. The T12 lighting should be replace with T8 lighting. Occupancy sensors should be installed in the offices and a programmable thermostat should be installed to allow for night set back and for temperatures to be controlled during on hours.



T12 lamps should be replaced with newer lighting

Mechanical

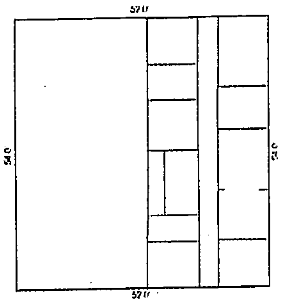
Install Programmable Thermostats

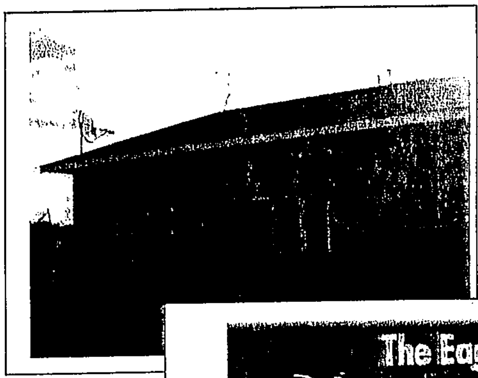
The existing thermostat maintains the same set point 24 hours a day unless manually turned down at night when someone remembers. We recommend the installation of a programmable thermostat that will automatically be set back to a lower temperature each night and weekends to conserve energy and reduce hours of operation for the heating and air conditioning equipment.

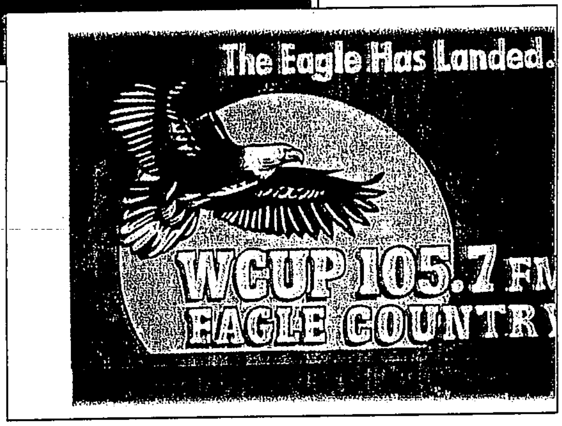
Energy Conservation Measures recommended:

- Install water conservation flow moderators on kitchen and bathroom sinks.
- Install programmable thermostats to better control space heating and cooling in specific areas and allowing for night set back of room temperatures.
- Install occupancy sensors to control lights in rooms with irregular use such as restrooms, storage areas, and offices.
- The present T12 lamps and magnetic ballasts should be replaced with T8 lamps and electronic ballasts.

Radio Station



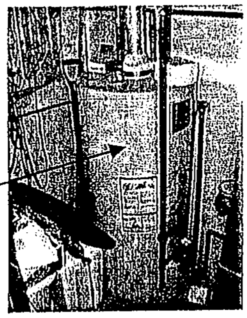




The radio station is housed in a 2808 square foot building with the radio station using only half of the square footage; the other half being occupied by a doctor's office.

As with many of the other KBIC buildings, the bathroom faucet should be fitted with flow moderators, the lighting should be upgraded from T12 to T8 lighting with occupancy sensors installed to control lighting time. Programmable thermostats should be installed to control temperatures and enable night set back when needed.

The domestic hot water is used primarily for hand washing so the domestic hot water tank should be reduced in size or a point of use hot water system be installed to replace the current oversized system.



Reduce size of domestic hot water tank

Mechanical

Install Programmable Thermostats

The existing thermostat maintains the same set point 24 hours a day unless manually turned down at night when someone remembers. We recommend the installation of a programmable thermostat that will automatically be set back to a lower temperature each night and weekends to conserve energy and reduce hours of operation for the heating and air conditioning equipment.

Energy Conservation Measures recommended:

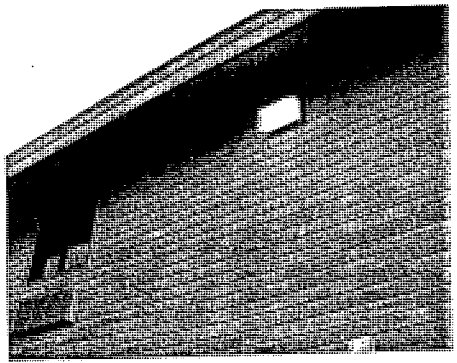
- Install water conservation flow moderators on kitchen and bathroom sinks.
- Install programmable thermostats to better control space heating and cooling in specific areas and allowing for night set back of room temperatures.
- Install occupancy sensors to control lights in rooms with irregular use such as restrooms, storage areas, and offices.
- Consider reducing the size of the domestic hot water tank by installing a point of use tank or a waterless hot water system. The hot water demands in the building are much lower than the supply.

Restaurant / Ojibwa Motel / Pool

The motel, restaurant, and pool are part of the casino complex building, located in the rear of the building. The motel has many good features and much has already been done regarding energy efficiency. The pool area is very modern and has a new Modine heater. There does not appear to be a moisture problem; the glass walls were clear of any condensation. The motel rooms were also in very good shape, clean and bright. The lamps in the rooms had energy efficient compact fluorescent lamps and the hallway lights were energy efficient as well. This is a good move since this lighting is on 24 hours a day. The hallways and stairs were well lit.

The vending machine in the hallway should be fitted with a VendMiser or some similar type of occupancy sensor.

Outside wall packs lighting the exterior of the building should be put on timers or photocells installed to turn the lights on and off during the night and day. Several of the wall packs were on 24 hours a day.



Regarding the water usage, the bathroom sinks in the motel were running about 2 gallons per minute and showers were running about 3+ gallons per minute. Flow moderators should be installed on the faucets and lower flow shower heads should be installed in the showers. See the Water Savings Analysis Study 1 in the front section of this report for an analysis of the water savings and cost savings potential of these upgrades.

The sprayer in the restaurant kitchen should be replaced as well. The sprayer appears to be broken and does not turn off. See Water Savings Analysis Study 5 for details on cost savings for a new sprayer.

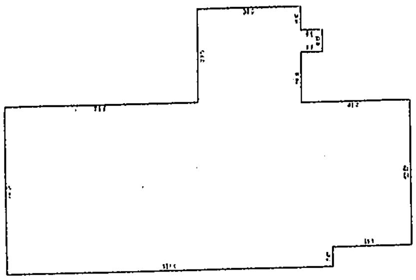
Mechanical

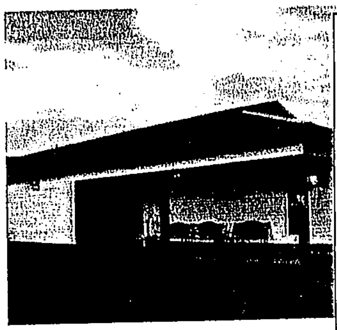
Recommendations for mechanical, heating, and cooling for the Restaurant, Motel, and Pool are listed under the Casino section of this report.

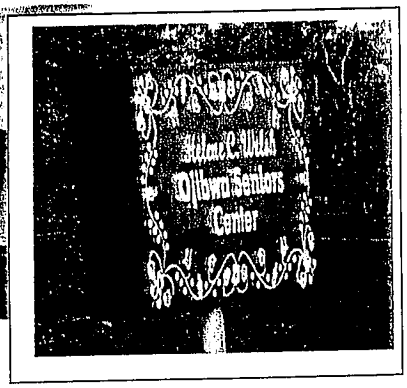
Energy Conservation Measures recommended:

- Install water conservation flow moderators on kitchen and bathroom sink faucets.
- Install a VendMiser or similar sensor or on/off control to regulate pop machine operation.
- Install occupancy sensors to control lights in rooms with irregular use such as restrooms, storage areas, and offices.
- Install timers or photocells on outdoor lighting in order to turn the lights off during daylight hours.
- Check for air infiltration around windows and doors and caulk or fill areas allowing outside air.
- Install door seals or weather stripping around doors to prohibit air leakage.
- Install eCube® on refrigeration and freezer equipment to reduce number of cycles, eliminate spiking of temperatures by evening out cooling temperatures, and extend the life of the compressor.

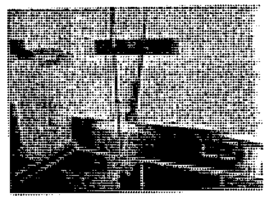
Senior Community Center



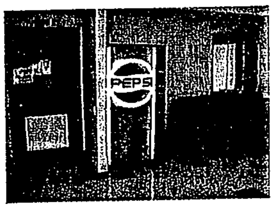




The Senior Community Center in Baraga is a 10,116 square foot building with a modern kitchen, attractive entry, and overall, a very well maintained building. Several energy conservation opportunities are in the building.

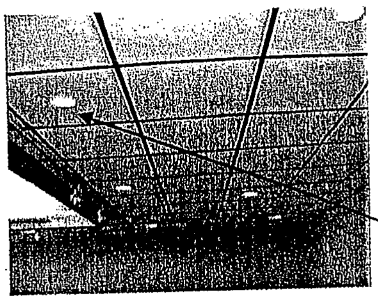


As with other buildings, all water faucets, both kitchen and bathroom, should be fitted with flow moderators to conserve water. The kitchen sink sprayer should be replaced with a high efficiency sprayer.



The pop machine in the entry hallway should have a VendMiser or some similar type of occupancy sensor to control the lighting of the machine. Vending machines consume a great deal of electricity and using a VendMiser is an excellent opportunity to reduce that consumption.

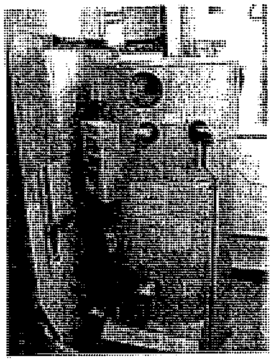
The building has sporadic use and use at different times of day. Programmable thermostats would allow control of the heat in certain areas of the building.



Incandescent bulbs in ceiling cans should be replaced with CFLs

Some of the lighting is newer technology using T8 lamps, however some of the lighting is T12 lamps, magnetic ballasts, and older fixtures. That lighting should be upgraded as should the incandescent bulbs in the can lights in the ceiling upgraded to compact fluorescent bulbs.

Timers or photocells should also be installed on outside lighting to turn the lights on and off during daylight hours.



The domestic hot water heater is very much oversized. In use at the current time is a 80 gallon hot water tank. Hot water use is at most limited to dish washing in the kitchen. For this purpose, a tankless hot water heater, a point of use hot water heater, or a much small hot water heater could be used without any negative effects or loss of hot water at times when it is needed. Downsizing the domestic hot water will save a significant amount of money.

Mechanical

Replace (2) Furnaces with High Efficiency Furnaces

The existing furnaces are standard efficiency that have reached the end of their useful life. We recommend the installation of high efficiency 95% efficient furnaces. These furnaces will have a multi stage burner with an ECM variable speed blower to deliver just the correct amount of heat to the space based on design loads.

Replace Air Conditioning with High Efficiency Air Conditioning

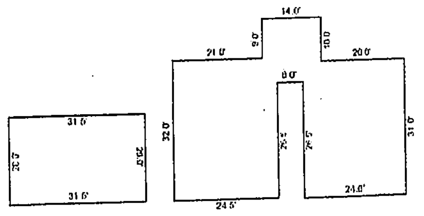
The existing air conditioning condensers are standard efficiency that have reached the end of their useful life. These units also contain R-22 refrigerant which has been phased out of production by the EPA. We recommend installing higher efficiency 14 SEER air conditioning condensers that contain R-410A refrigerant.

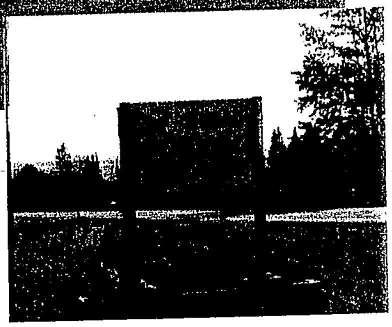
Install (2) eCube Refrigeration Temperature Sensors

Energy Conservation Measures recommended:

- Install water conservation flow moderators on kitchen and bathroom sinks.
- Install a VendMiser or similar sensor or on/off control to regulate pop machine operation.
- Install programmable thermostats to better control space heating and cooling in specific areas and allowing for night set back of room temperatures.
- Install occupancy sensors to control lights in rooms with irregular use such as restrooms, storage areas, and offices.
- The present T12 lamps and magnetic ballasts should be replaced with T8 lamps and electronic ballasts.
- Consider reducing the size of the domestic hot water tank by installing a point of use tank or a waterless hot water system. The hot water demands in the building are much lower than the supply.
- Install timers or photocells on outdoor lighting to turn it off during daylight hours.
- Install eCube® on refrigeration and freezer equipment to reduce number of cycles, eliminate spiking of temperatures by evening out cooling temperatures, and extend the life of the compressor.
- Replace furnaces with new high efficiency furnaces.
- Replace A/C with new high efficiency air conditioning.

Social Services





The 2300 square foot Social Services complex appears to have been several residential units converted into offices. The offices seem well suited to the conversion.

Flow moderators should be installed in the bathroom sink faucets. Programmable thermostats and occupancy sensors will reduce heating and lighting costs. The T12 lighting should be replaced with T8 lighting. The domestic hot water tank should be downsized.

Mechanical

Replace furnaces with New High Efficiency Furnaces

The existing furnaces are standard efficiency that have about reached their useful life. We recommend the installation of high efficiency 95% efficient furnaces. These furnaces will have a multi stage burner with an ECM variable speed blower to deliver just the correct amount of heat to the space based on design loads.

Replace Air Conditioner Condensers with New High Efficiency Condensers

The existing air conditioning condensers are standard efficiency that have reached their useful life. These units also contain R-22 refrigerant which has been phased out of production by the EPA. We recommend installing higher efficiency 14 SEER air conditioning condensers that contain R-410A refrigerant.

Replace Boiler with New High Efficiency Boiler

Replace the existing inefficient boiler with new 95% high efficiency condensing boiler. The new boiler would have integrated modulating boiler control for gas burner turn down and modulation. This function allows for outdoor reset control and warm weather shut down.

Replace Water Heater with New Water Heater

The existing water heater has reached the end of its useful life and most likely has a significant layer of sediment that has reduced its ability for heat transfer. We recommend the installation of a new Energy Star water heater.

Replace Cooling Only Unit with New High Efficiency Unit

The existing air conditioning condensers are standard efficiency that have reached their useful life. These units also contain R-22 refrigerant which has been phased out of production by the EPA. We recommend installing higher efficiency 14 SEER air conditioning condensers that contain R-410A refrigerant.

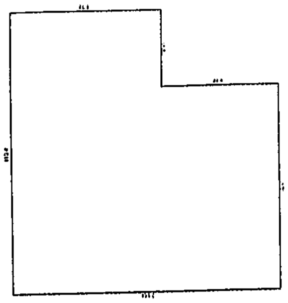
Install Programmable Thermostats

The existing thermostat maintains the same set point 24 hours a day unless manually turned down at night when someone remembers. We recommend the installation of a programmable thermostat that will automatically be set back to a lower temperature each night and weekends to conserve energy and reduce hours of operation for the heating and air conditioning equipment.

Energy Conservation Measures recommended:

- Install water conservation flow moderators on kitchen and bathroom sinks.
- Install programmable thermostats to better control space heating and cooling in specific areas and allowing for night set back of room temperatures.
- Install occupancy sensors to control lights in rooms with irregular use such as restrooms, storage areas, and offices.
- The present T12 lamps and magnetic ballasts should be replaced with T8 lamps and electronic ballasts.
- Consider reducing the size of the domestic hot water tank by installing a point of use tank or a waterless hot water system. The hot water demands in the building are much lower than the supply.
- Replace A/C condensers with new high efficiency air conditioning.
- Replace furnaces with new high efficiency furnaces.
- Replace Boiler with new High Efficiency Boiler.
- Replace water heater with new high efficiency water heater.
- Replace cooling only unit with new high efficiency unit.

Tribal Center



The Tribal Center is a 10,535 square foot building with extensive use, both by employees and the public. Energy upgrades to this facility will reap significant savings.

The bathroom sink faucets and any other faucets (breakrooms, etc.) should have flow moderators installed to reduce the consumption of water.

Most of the lighting appears to be T8 lighting which is good, especially with the hours of use experienced in the offices. Occupancy sensors should be installed in the offices for controlling the on/off of the lights.

Significant savings can be realized by turning back the thermostat in office buildings. The chart at the beginning of this report shows that by dialing back five degrees for the overnight, a 23% savings will be realized for that period. The building is brought back to normal temperature before the employees arrive in the morning and no one suffers any discomfort and energy savings are realized.

Timers or photocells should be installed on the outside lighting, the wall packs, to turn that lighting off during the day. Several wall packs were on during our visit.

The domestic hot water heater is oversized for the demand in this building. For this building, a tankless hot water heater, a point of use hot water heater, or a much small hot water heater could be used. Downsizing the domestic hot water will save a significant amount of money.

Mechanical

Install New High Efficient Boilers

Replace the existing inefficient boilers with new 94.6% high efficiency condensing boilers. The new boilers would have integrated modulating boiler control for gas burner turn down and modulation ratio. This function allows for outdoor reset control and warm weather shut down.

Install Outdoor Reset Controls on Boiler

If new boilers are not installed it is recommended that Outdoor Reset Controls be added to the existing boilers.

Outdoor Reset controls respond to changes in weather by changing the boiler water temperature circulating throughout the building. It sends out cooler water to the system during the warmer outdoor temperatures and sends warmer water to the building in cooler outdoor temperatures. The outdoor reset regulates the amount of energy entering the building based on the outdoor temperature by changing the boiler water temperature. This will provide almost perfect equilibrium where the energy entering the building is equivalent to the energy escaping. The result is a steady indoor temperature across the year and significant saving on fuel.

Integrate the Building Management System into a New Casio DDC System

The existing heating, air conditioning, and ventilation controls throughout each of the tribal buildings vary from simple thermostats on the wall to pneumatics and various Direct Digital Controls (DDC). We recommend the installation of a web based open protocol DDC system that can provide building HVAC integration with the following features.

- Motor Variable Frequency Drives
- Time of Day Scheduling
- HVAC Equipment set points
- CO2 monitoring and ventilation
- HVAC Alarm sequence
- Energy optimization
- Remote alarm and scheduling capabilities
- HVAC Equipment status
- HVAC Trend logs
- HVAC Equipment graphics

- Warm Weather shut down for boilers and pumps.
- Outdoor reset controls

Install (4) Global Plasma Solutions Internal Air Quality Equipment on RTU's and AHU's

The existing Heating, Air Conditioning and Ventilation systems continuously recirculate tobacco smoke and other indoor contaminants throughout the casino and other occupied areas of the casino. Adding GPS' needlepoint bi-polar ionization system to the existing facility will provide the best indoor air quality possible. Smokers and non-smokers will once and for all be able to coexist peacefully. No more smoke complaints, longer gaming by patrons, a better work environment for employees. In addition to this the outdoor air introduced into the space can be reduced to create additional energy savings.

Complete Test and Balance of Systems

Heating, ventilating and air conditioning systems utilize automatic controls to attain proper fluids and air flow for heating, cooling and ventilation in any building. Documentation and adherence to the above procedures are essential in order for the various HVAC system components to operate in synchronization and in accordance with design intent.

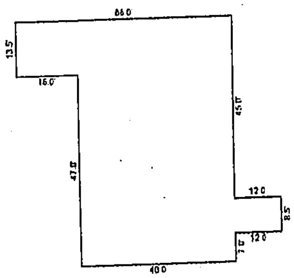
Test and Balance (TAB) procedures utilized to verify that HVAC and related systems operate and perform as per design intent. Properly functioning systems contribute to energy savings and occupant's comfort, health and safety

- TEST: To determine the quantitative performance of equipment.
- ADJUST: To proportion flows of fluids (air & water) to specified design quantities.
- BALANCE: To regulate the specified fluid flow rate at the terminal equipment.

Energy Conservation Measures recommended:

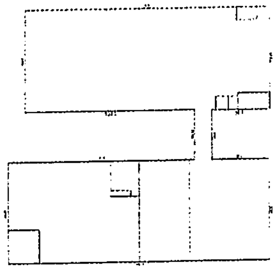
- Install water conservation flow moderators on kitchen and bathroom sinks.
- Install programmable thermostats to better control space heating and cooling in specific areas and allowing for night set back of room temperatures.
- Install occupancy sensors to control lights in rooms with irregular use such as restrooms, storage areas, and offices.
- Consider reducing the size of the domestic hot water tank by installing a point of use tank or a waterless hot water system. The hot water demands in the building are much lower than the supply.
- Install timers or photocells on outdoor lighting to turn it off during daylight hours.
- Use the energy management system to a greater degree in controlling the building's environment.
- Install new High Efficiency Boilers.
- Install Outdoor reset controls on boilers.
- Integrate BMS into new Casio DDC System.
- Install Global Plasma Solutions IAQ equipment on RTU's.

Tribal Construction



No recommendations.

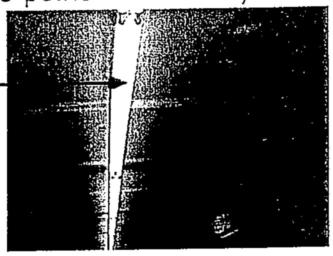
Tub Craft



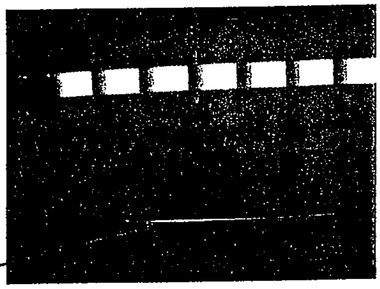
The two buildings known as Tub Craft North and Tub Craft South are 19,080 square feet. Both buildings have irregular use and are primarily used for heated (low heat) storage.

Significant upgrades would be necessary to bring these buildings up to point where they would be suitable.

T12 lighting should be replaced with T8 lighting

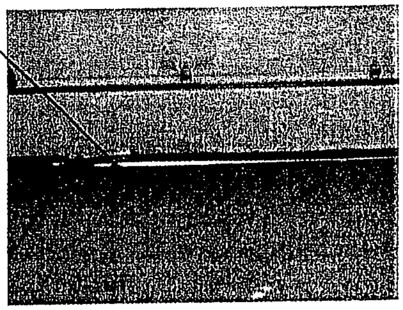


Occupancy sensors should be installed to control the lighting. Because of the sporadic visits to the building, lights can be left on indefinitely. Lighting should also be upgraded from T12 to T8 lighting. Timers or photocells should be installed on the outdoor lighting. Some of the outdoor lighting is on 24/7.

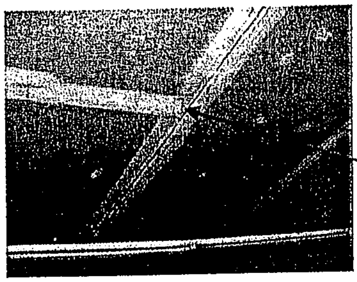


Because the building has limited use as a storage facility and the building is being heated, the garage doors and smaller entry doors should have door seals or weather stripping put on them. Gaps around these doors are quite evident.

Door seals or weather stripping should be installed to cover gaps



There are roof leaks which is letting in water and the water is damaging the ceiling inside of the building. The water is on the drywall ceiling and is splitting the drywall seams. If not repaired, the ceiling will eventually cave in.



Water coming in from roof leaks is splitting the drywall ceiling

Mechanical

Replace (4) Unit Heaters with New High Efficient Heaters

The existing unit heaters are standard efficiency natural draft unit heaters. We recommend the installation of new higher efficiency power vent unit heaters.

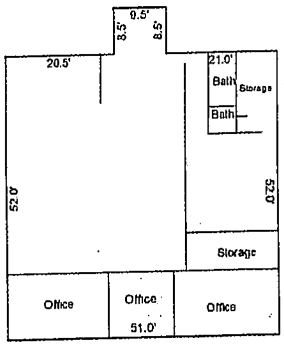
Install Programmable Thermostats

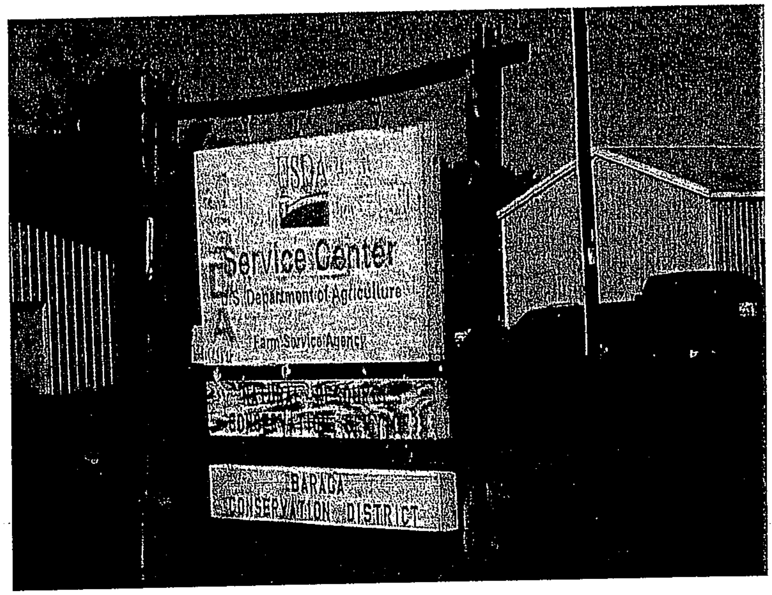
The existing thermostat maintains the same set point 24 hours a day unless manually turned down at night when someone remembers. We recommend the installation of a programmable thermostat that will automatically be set back to a lower temperature each night and weekends to conserve energy and reduce hours of operation for the heating and air conditioning equipment.

Energy Conservation Measures recommended:

- Install occupancy sensors to control lights in rooms with irregular use such as restrooms, storage areas, and offices.
- The present T12 lamps and magnetic ballasts should be replaced with T8 lamps and electronic ballasts.
- Install timers or photocells on outdoor lighting to turn it off during daylight hours.
- Check for air infiltration around windows and doors and caulk or fill areas allowing outside air.
- Install door seals or weather stripping around doors to prohibit air leakage.
- Install programmable thermostats to better control space heating and cooling in specific areas and allowing for night set back of room temperatures.
- Replace unit heaters with new high efficiency heaters.

USDA





This building is in excellent shape regarding energy. The building has T8 lighting and the furnace is 90+ efficient.

Mechanical

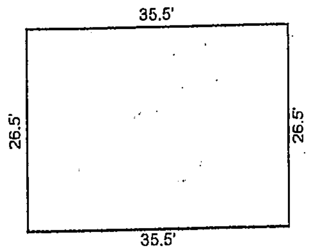
Install Programmable Thermostats

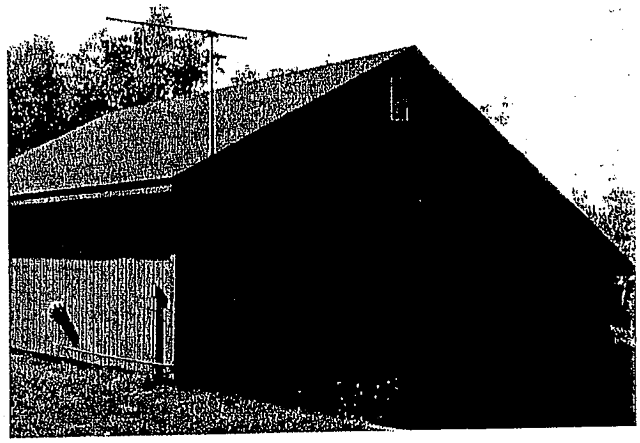
The existing thermostat maintains the same set point 24 hours a day unless manually turned down at night when someone remembers. We recommend the installation of a programmable thermostat that will automatically be set back to a lower temperature each night and weekends to conserve energy and reduce hours of operation for the heating and air conditioning equipment.

Energy Conservation Measures recommended:

- Install programmable thermostats to better control space heating and cooling in specific areas and allowing for night set back of room temperatures.

Zeba Pump House





We were not able to gain entry during our visit so we were not able to determine is the pump has a variable frequency drive (VFD). If there is no VFD, we would recommend installing a VFD to control the motor and to significantly reduce the electrical consumption.

Energy Conservation Measures recommended:

- Consider installing variable speed drives on motors over ½ hp to reduce the amount of energy needed for operation and to extend the life of the motor.

COST / PAYBACK ANALYSIS

The payback period is the time required to recover the capital investment out of the earnings or savings. Divide the initial investment of the energy improvements by the dollar savings of the improvements will yield the payback period. In simple terms, if something has a return on investment of 25% the payback is four years. If an energy improvement has a payback of three years, the return on investment is 33%.

Not considered in this formula are the savings that will be generated in future years beyond the payback of the initial investment. Also not considered is the cost of the utility. If the cost of gas, electricity, or water increases, the payback period is shortened and the return on investment is improved.

A prime consideration in financing an energy project is the rate of return. If your project has a three year payback, it is like investing your money and getting a 33% return on that money.

The following pages contain Cost / Payback Analyses for a number of different buildings. The number of fixtures was determined by actual count, however the number of fixtures can vary from what is quoted here.

Also, we made the assumption the existing lighting fixtures are using 40 watt lamps and would be replaced with 34 watt lamps. The cost of the new fixture was determined from a survey of various suppliers quoting a 2x4 3 lamp, 34 watt, electronic ballast fixture. The cost analysis does not consider the cost of labor to replace or retrofit the fixture. We have determined that the cost of labor to replace lamps and ballasts and repairs to the fixture leaving in the old lamps will approximately equal the cost of labor to replace the fixture. It is just as cost effective, if not more so, to swap out or completely replace a light fixture rather than removing the lamps, rewiring a new ballast, cleaning the fixture, and putting it all back together. This was the logic used to determine the cost / payback.

Where 8 foot T12 lamps are being used, we substituted two 4 foot lamps. The calculations between the savings for the two lamps are fairly close. Because we did not vary the fixtures currently in use (we used 180 watts for each of these fixtures) and the potential replacement fixtures (we used 90 watts as the replacement fixture), all the paybacks will be the same length of time ranging from 2.5 years for 8 hours per day of use to .8 years for 24 hour per day of use.

The figures in the following charts are based on various times of use as indicated on the charts. All savings figures are based on usage of 7 days per week and 52 weeks per year. Less usage should be adjusted downward.

The following chart shows the average cost per kWh for each of the buildings listed. This data is from the calendar year 2010 based on the monthly billing amounts. These are the amounts that are used in the Cost / Payback Analysis that follows in this section.

Average kWh Cost per Building		
Social Services	$	0.187
Public Works	$	0.222
Lanes, Lounge, Casino	$	0.130
Motel / Restaurant	$	0.103
Four Seasons	$	0.132
Bingo Hall	$	0.131
Police Station	$	0.139
Police Garage	$	0.162
Pines	$	0.131
College	$	0.131
Development Office	$	0.137
Senior Center	$	0.132
Health Center	$	0.131
Court	$	0.138
Marina	$	0.154
Radio Station - Baraga	$	0.135
Cultural Building	$	0.130
Tribal Center	$	0.154
Marquette Casino	$	0.137
Commodity Foods	$	0.158
Head Start	$	0.169
Natural Resources Hatchery	$	0.119

Cost / Payback Analysis

Building: Police Station

180	Current Fixture Wattage
90	New Fixture Wattage
$ 0.139	Utility Rate per KWH
5	Number of Fixtures (see below)

Assumptions:

Current Fixture: 4 lamp T12 40 watt lamps with magnetic ballast

New Fixture: 3 lamp T8 34 watt lamps with electronic ballast

$ 90.00 Cost of New Fixture

Annual Cost Savings	With lights on:	***Payback***	Eliminated Per Day Pounds of Pollution
$ 182.15	8 hours per day	2.5 years	5.40
$ 227.68	10 hours per day	2.0 years	6.75
$ 273.22	12 hours per day	1.6 years	8.10
$ 318.75	14 hours per day	1.4 years	9.45
$ 409.83	18 hours per day	1.1 years	12.15
$ 546.44	24 hours per day	0.8 years	16.20

Number of fixtures:		Converted to:	
6 - 4 foot 2 lamp	=	3	4 foot 3 lamp fixtures
2 - 4 foot 4 lamp	=	2	4 foot 3 lamp fixtures

Total fixtures to be replaced 5

Cost / Payback Analysis

Building: Child Support

180	Current Fixture Wattage
90	New Fixture Wattage
$ 0.138	Utility Rate per KWH
5	Number of Fixtures (see below)

Assumptions:

Current Fixture: 4 lamp T12 40 watt lamps with magnetic ballast

New Fixture: 3 lamp T8 34 watt lamps with electronic ballast

$ 90.00 Cost of New Fixture

Annual Cost Savings	With lights on:	***Payback***	Eliminated Per Day Pounds of Pollution
$ 180.84	8 hours per day	2.5 years	5.40
$ 226.04	10 hours per day	2.0 years	6.75
$ 271.25	12 hours per day	1.7 years	8.10
$ 316.46	14 hours per day	1.4 years	9.45
$ 406.88	18 hours per day	1.1 years	12.15
$ 542.51	24 hours per day	0.8 years	16.20

Number of fixtures:		Converted to:	
6 - 4 foot 2 lamp	=	3	4 foot 3 lamp fixtures
2 - 4 foot 4 lamp	=	2	4 foot 3 lamp fixtures

Total fixtures to be replaced.................. 5

Cost / Payback Analysis

Building: Court

180	Current Fixture Wattage
90	New Fixture Wattage
$ 0.138	Utility Rate per KWH
5	Number of Fixtures (see below)

Assumptions:

Current Fixture: 4 lamp T12 40 watt lamps with magnetic ballast

New Fixture: 3 lamp T8 34 watt lamps with electronic ballast

$ 90.00 Cost of New Fixture

Annual Cost Savings	With lights on:	*Payback*	Eliminated Per Day Pounds of Pollution
$ 180.84	8 hours per day	2.5 years	5.40
$ 226.04	10 hours per day	2.0 years	6.75
$ 271.25	12 hours per day	1.7 years	8.10
$ 316.46	14 hours per day	1.4 years	9.45
$ 406.88	18 hours per day	1.1 years	12.15
$ 542.51	24 hours per day	0.8 years	16.20

Number of fixtures: Converted to:

10 - 4 foot 2 lamp = 5 4 foot 3 lamp fixtures

Total fixtures to be replaced 5

Cost / Payback Analysis

Building: Health Center

180	Current Fixture Wattage
90	New Fixture Wattage
$ 0.131	Utility Rate per KWH
34	Number of Fixtures (see below)

Assumptions:

Current Fixture: 4 lamp T12 40 watt lamps with magnetic ballast

New Fixture: 3 lamp T8 34 watt lamps with electronic ballast

$ 90.00 Cost of New Fixture

Annual Cost Savings	With lights on:	***Payback***	Eliminated Per Day Pounds of Pollution
$ 1,167.30	8 hours per day	2.6 years	36.72
$ 1,459.13	10 hours per day	2.1 years	45.90
$ 1,750.96	12 hours per day	1.7 years	55.08
$ 2,042.78	14 hours per day	1.5 years	64.26
$ 2,626.43	18 hours per day	1.2 years	82.62
$ 3,501.91	24 hours per day	0.9 years	110.16

Number of fixtures:		Converted to:	
20 - 4 foot 2 lamp	=	10	4 foot 3 lamp fixtures
24 - 4 foot 4 lamp	=	24	4 foot 3 lamp fixtures

Total fixtures to be replaced.................. 34

Cost / Payback Analysis

Building: Health Center

65	Current Fixture Wattage
13	New Fixture Wattage
$ 0.131	Utility Rate per KWH
42	Number of Fixtures (see below)

Assumptions:

Current Fixture: 65 watt incandescent can ceiling lights

New Fixture: 13 watt compact flourescent lamps

$ 7.00 Cost of New Fixture

Annual Cost Savings	With lights on:	*Payback*	Eliminated Per Day Pounds of Pollution
$ 833.13	8 hours per day	0.4 years	26.21
$ 1,041.42	10 hours per day	0.3 years	32.76
$ 1,249.70	12 hours per day	0.2 years	39.31
$ 1,457.99	14 hours per day	0.2 years	45.86
$ 1,874.55	18 hours per day	0.2 years	58.97
$ 2,499.40	24 hours per day	0.1 years	78.62

Number of fixtures:
42 - 65 watt in ceiling incandescent can lights = Converted to: 42 13 watt CFL lamps

Total fixtures to be replaced................. 42

Cost / Payback Analysis

Building: Senior Center

180	Current Fixture Wattage
90	New Fixture Wattage
$ 0.132	Utility Rate per KWH
27	Number of Fixtures (see below)

Assumptions:

Current Fixture: 4 lamp T12 40 watt lamps with magnetic ballast

New Fixture: 3 lamp T8 34 watt lamps with electronic ballast

$ 90.00 Cost of New Fixture

Annual Cost Savings	With lights on:	*Payback*	Eliminated Per Day Pounds of Pollution
$ 934.05	8 hours per day	2.6 years	29.16
$ 1,167.57	10 hours per day	2.1 years	36.45
$ 1,401.08	12 hours per day	1.7 years	43.74
$ 1,634.59	14 hours per day	1.5 years	51.03
$ 2,101.62	18 hours per day	1.2 years	65.61
$ 2,802.16	24 hours per day	0.9 years	87.48

Number of fixtures:
27 - 4 foot 4 lamp = Converted to: 27 4 foot 3 lamp fixtures

Total fixtures to be replaced.................. 27

Cost / Payback Analysis

Building: Restaurant

65	Current Fixture Wattage
13	New Fixture Wattage
$ 0.103	Utility Rate per KWH
20	Number of Fixtures (see below)

Assumptions:

Current Fixture: 65 watt incandescent can ceiling lights

New Fixture: 13 watt compact flourescent lamps

$ 7.00 Cost of New Fixture

Annual Cost Savings	With lights on:	*Payback*	Eliminated Per Day Pounds of Pollution
$ 311.93	8 hours per day	0.4 years	12.48
$ 389.92	10 hours per day	0.4 years	15.60
$ 467.90	12 hours per day	0.3 years	18.72
$ 545.88	14 hours per day	0.3 years	21.84
$ 701.85	18 hours per day	0.2 years	28.08
$ 935.80	24 hours per day	0.1 years	37.44

Number of fixtures:
20 - 65 watt in ceiling incandescent can lights = Converted to: 20 13 watt CFL lamps

Total fixtures to be replaced................. 20

Cost / Payback Analysis

Building: Restaurant Hallway and Meeting Rooms

180	Current Fixture Wattage	
90	New Fixture Wattage	
$ 0.130	Utility Rate per KWH	
16	Number of Fixtures (see below)	

Assumptions:

Current Fixture: 4 lamp T12 40 watt lamps with magnetic ballast

New Fixture: 3 lamp T8 34 watt lamps with electronic ballast

$ 90.00 Cost of New Fixture

Annual Cost Savings	With lights on:	***Payback***	Eliminated Per Day Pounds of Pollution
$ 545.13	8 hours per day	2.6 years	17.28
$ 681.41	10 hours per day	2.1 years	21.60
$ 817.69	12 hours per day	1.8 years	25.92
$ 953.97	14 hours per day	1.5 years	30.24
$ 1,226.53	18 hours per day	1.2 years	38.88
$ 1,635.38	24 hours per day	0.9 years	51.84

Number of fixtures:
16 - 4 foot 4 lamp = Converted to: 16 4 foot 3 lamp fixtures

Total fixtures to be replaced.................. 16

Cost / Payback Analysis

Building: Restaurant Hallway and Meeting Rooms

65	Current Fixture Wattage	*Assumptions:* Current Fixture:	65 watt incandescent can ceiling lights
13	New Fixture Wattage	New Fixture:	13 watt compact flourescent lamps
$ 0.130	Utility Rate per KWH		
38	Number of Fixtures (see below)	$ 7.00	Cost of New Fixture

Annual Cost Savings	With lights on:	*Payback*	Eliminated Per Day Pounds of Pollution
$ 748.03	8 hours per day	0.4 years	23.71
$ 935.04	10 hours per day	0.3 years	29.64
$ 1,122.05	12 hours per day	0.2 years	35.57
$ 1,309.06	14 hours per day	0.2 years	41.50
$ 1,683.08	18 hours per day	0.2 years	53.35
$ 2,244.10	24 hours per day	0.1 years	71.14

Number of fixtures:		Converted to:	
38 - 65 watt in ceiling incandescent can lights	=	38	13 watt CFL lamps

Total fixtures to be replaced.................. 38

Cost / Payback Analysis

Building: Casino Area 30 & Hallway

100	Current Fixture Wattage
58	New Fixture Wattage
$ 0.130	Utility Rate per KWH
10	Number of Fixtures (see below)

Assumptions:

Current Fixture: 2 lamp T12 40 watt U tube lamps with magnetic ballast

New Fixture: 2 lamp T8 34 watt lamps with electronic ballast

$ 90.00 Cost of New Fixture

Annual Cost Savings	With lights on:	*Payback*	Eliminated Per Day Pounds of Pollution
$ 159.00	8 hours per day	5.7 years	5.04
$ 198.74	10 hours per day	4.5 years	6.30
$ 238.49	12 hours per day	3.8 years	7.56
$ 278.24	14 hours per day	3.2 years	8.82
$ 357.74	18 hours per day	2.5 years	11.34
$ 476.99	24 hours per day	1.9 years	15.12

Number of fixtures:
21 - 2 foot U tube = Converted to: 10 2 foot 2 lamp fixture

Total fixtures to be replaced.................. 10

Cost / Payback Analysis

Building: Casino Area 30 & Hallway

180	Current Fixture Wattage
90	New Fixture Wattage
$ 0.130	Utility Rate per KWH
7	Number of Fixtures (see below)

Assumptions:

Current Fixture: 4 lamp T12 40 watt lamps with magnetic ballast

New Fixture: 3 lamp T8 34 watt lamps with electronic ballast

$ 90.00 Cost of New Fixture

Annual Cost Savings	With lights on:	*Payback*	Eliminated Per Day Pounds of Pollution
$ 238.49	8 hours per day	2.6 years	7.56
$ 298.12	10 hours per day	2.1 years	9.45
$ 357.74	12 hours per day	1.8 years	11.34
$ 417.36	14 hours per day	1.5 years	13.23
$ 536.61	18 hours per day	1.2 years	17.01
$ 715.48	24 hours per day	0.9 years	22.68

Number of fixtures:		Converted to:	
2 - 4 foot 4 lamp	=	2	4 foot 3 lamp fixtures
16 - 8 foot 1 lamp	=	4	4 foot 3 lamp fixtures
2 - 4 foot 2 lamp	=	1	4 foot 3 lamp fixtures

Total fixtures to be replaced................. 7

Cost / Payback Analysis

Building: Lounge

65	Current Fixture Wattage
13	New Fixture Wattage
$ 0.130	Utility Rate per KWH
50	Number of Fixtures (see below)
$ 7.00	Cost of New Fixture

Assumptions:

Current Fixture: 65 watt incandescent can ceiling lights

New Fixture: 13 watt compact flourescent lamps

Annual Cost Savings	With lights on:	*Payback*	Eliminated Per Day Pounds of Pollution
$ 984.26	8 hours per day	0.4 years	31.20
$ 1,230.32	10 hours per day	0.3 years	39.00
$ 1,476.38	12 hours per day	0.2 years	46.80
$ 1,722.45	14 hours per day	0.2 years	54.60
$ 2,214.58	18 hours per day	0.2 years	70.20
$ 2,952.77	24 hours per day	0.1 years	93.60

Number of fixtures:		Converted to:
50 - 65 watt in ceiling incandescent can lights	=	50 13 watt CFL lamps

Total fixtures to be replaced.................. 50

Cost / Payback Analysis

Building: Casino - All Gaming Areas - Perimeter Wall Lighting

40	Current Fixture Wattage
34	New Fixture Wattage
$ 0.130	Utility Rate per KWH
130	Number of Fixtures (see below)

Assumptions:

Current Fixture:	T12 single lamp - These are wall fixtures extending around the entire parimeter of the gaming area
New Fixture:	T8 single lamp

$ 2.50 Cost of New T8 Lamp

Annual Cost Savings	With lights on:	*Payback*	Eliminated Per Day Pounds of Pollution
$ 295.28	8 hours per day	1.1 years	9.36
$ 369.10	10 hours per day	0.9 years	11.70
$ 442.92	12 hours per day	0.7 years	14.04
$ 516.73	14 hours per day	0.6 years	16.38
$ 664.37	18 hours per day	0.5 years	21.06
$ 885.83	24 hours per day	0.4 years	28.08

Number of fixtures: Converted to:
130 - T12 single lamps = 130 T8 lamps

Total fixtures to be replaced.................. 130

Cost / Payback Analysis

Building: Social Services

180	Current Fixture Wattage
90	New Fixture Wattage
$ 0.130	Utility Rate per KWH
2	Number of Fixtures (see below)

Assumptions:

Current Fixture: 4 lamp T12 40 watt lamps with magnetic ballast

New Fixture: 3 lamp T8 34 watt lamps with electronic ballast

$ 90.00 Cost of New Fixture

Annual Cost Savings	With lights on:	*Payback*	Eliminated Per Day Pounds of Pollution
$ 68.14	8 hours per day	2.6 years	2.16
$ 85.18	10 hours per day	2.1 years	2.70
$ 102.21	12 hours per day	1.8 years	3.24
$ 119.25	14 hours per day	1.5 years	3.78
$ 153.32	18 hours per day	1.2 years	4.86
$ 204.42	24 hours per day	0.9 years	6.48

Number of fixtures:
4 - 4 foot 2 lamp = Converted to: 2 4 foot 3 lamp fixtures

Total fixtures to be replaced.................. 2

Cost / Payback Analysis

Building: Public Works

180	Current Fixture Wattage
90	New Fixture Wattage
$ 0.222	Utility Rate per KWH
4	Number of Fixtures (see below)

Assumptions:

Current Fixture: 4 lamp T12 40 watt lamps with magnetic ballast

New Fixture: 3 lamp T8 34 watt lamps with electronic ballast

$ 90.00 Cost of New Fixture

Annual Cost Savings	With lights on:	*Payback*	Eliminated Per Day Pounds of Pollution
$ 232.73	8 hours per day	1.5 years	4.32
$ 290.91	10 hours per day	1.2 years	5.40
$ 349.09	12 hours per day	1.0 years	6.48
$ 407.27	14 hours per day	0.9 years	7.56
$ 523.64	18 hours per day	0.7 years	9.72
$ 698.18	24 hours per day	0.5 years	12.96

Number of fixtures:		Converted to:	
4 - 4 foot 2 lamp	=	2	4 foot 3 lamp fixtures
2 - 4 foot 4 lamp	=	2	4 foot 3 lamp fixtures

Total fixtures to be replaced.................. 4

Cost / Payback Analysis

Building: Public Works Garage

180	Current Fixture Wattage
90	New Fixture Wattage
$ 0.222	Utility Rate per KWH
9	Number of Fixtures (see below)

Assumptions:

Current Fixture: 4 lamp T12 40 watt lamps with magnetic ballast

New Fixture: 3 lamp T8 34 watt lamps with electronic ballast

$ 90.00 Cost of New Fixture

Annual Cost Savings	With lights on:	*Payback*	Eliminated Per Day Pounds of Pollution
$ 523.64	8 hours per day	1.5 years	9.72
$ 654.54	10 hours per day	1.2 years	12.15
$ 785.45	12 hours per day	1.0 years	14.58
$ 916.36	14 hours per day	0.9 years	17.01
$ 1,178.18	18 hours per day	0.7 years	21.87
$ 1,570.91	24 hours per day	0.5 years	29.16

Number of fixtures:		Converted to:	
4 - 8 foot 2 lamp	=	8	4 foot 3 lamp fixtures
1 - 4 foot 2 lamp	=	1	4 foot 3 lamp fixtures

Total fixtures to be replaced.................. 9

Cost / Payback Analysis

Building: Maintenance Garage

180	Current Fixture Wattage
90	New Fixture Wattage
$ 0.130	Utility Rate per KWH
11	Number of Fixtures (see below)

Assumptions:

Current Fixture: 4 lamp T12 40 watt lamps with magnetic ballast

New Fixture: 3 lamp T8 34 watt lamps with electronic ballast

$ 90.00 Cost of New Fixture

Annual Cost Savings	With lights on:	*Payback*	Eliminated Per Day Pounds of Pollution
$ 374.77	8 hours per day	2.6 years	11.88
$ 468.47	10 hours per day	2.1 years	14.85
$ 562.16	12 hours per day	1.8 years	17.82
$ 655.86	14 hours per day	1.5 years	20.79
$ 843.24	18 hours per day	1.2 years	26.73
$ 1,124.32	24 hours per day	0.9 years	35.64

Number of fixtures:		Converted to:	
3 - 8 foot 2 lamp	=	6	4 foot 3 lamp fixtures
5 - 4 foot 4 lamp	=	5	4 foot 3 lamp fixtures

Total fixtures to be replaced.................. 11

Cost / Payback Analysis

Building: Tubcraft South

180	Current Fixture Wattage	*Assumptions:* Current Fixture:	4 lamp T12 40 watt lamps with magnetic ballast
90	New Fixture Wattage	New Fixture:	3 lamp T8 34 watt lamps with electronic ballast
$ 0.130	Utility Rate per KWH		
28	Number of Fixtures (see below)		
		$ 90.00	Cost of New Fixture

Annual Cost Savings	With lights on:	*Payback*	Eliminated Per Day Pounds of Pollution
$ 953.97	8 hours per day	2.6 years	30.24
$ 1,192.46	10 hours per day	2.1 years	37.80
$ 1,430.96	12 hours per day	1.8 years	45.36
$ 1,669.45	14 hours per day	1.5 years	52.92
$ 2,146.44	18 hours per day	1.2 years	68.04
$ 2,861.91	24 hours per day	0.9 years	90.72

Number of fixtures:
28 - 8 foot 2 lamp = Converted to: 28 4 foot 3 lamp fixtures

Total fixtures to be replaced.................. 28

Cost / Payback Analysis

Building: Tubcraft North

180	Current Fixture Wattage
90	New Fixture Wattage
$ 0.130	Utility Rate per KWH
25	Number of Fixtures (see below)

Assumptions:

Current Fixture: 4 lamp T12 40 watt lamps with magnetic ballast

New Fixture: 3 lamp T8 34 watt lamps with electronic ballast

$ 90.00 Cost of New Fixture

Annual Cost Savings	With lights on:	***Payback***	Eliminated Per Day Pounds of Pollution
$ 851.76	8 hours per day	2.6 years	27.00
$ 1,064.70	10 hours per day	2.1 years	33.75
$ 1,277.64	12 hours per day	1.8 years	40.50
$ 1,490.58	14 hours per day	1.5 years	47.25
$ 1,916.46	18 hours per day	1.2 years	60.75
$ 2,555.28	24 hours per day	0.9 years	81.00

Number of fixtures:
40 - 8 foot 2 lamp = Converted to: 25 4 foot 3 lamp fixtures

Total fixtures to be replaced 25

Cost / Payback Analysis

Building: Planning and Development

180	Current Fixture Wattage
90	New Fixture Wattage
$ 0.137	Utility Rate per KWH
12	Number of Fixtures (see below)

Assumptions:

Current Fixture: 4 lamp T12 40 watt lamps with magnetic ballast

New Fixture: 3 lamp T8 34 watt lamps with electronic ballast

$ 90.00 Cost of New Fixture

Annual Cost Savings	With lights on:	***Payback***	Eliminated Per Day Pounds of Pollution
$ 430.86	8 hours per day	2.5 years	12.96
$ 538.57	10 hours per day	2.0 years	16.20
$ 646.29	12 hours per day	1.7 years	19.44
$ 754.00	14 hours per day	1.4 years	22.68
$ 969.43	18 hours per day	1.1 years	29.16
$ 1,292.58	24 hours per day	0.8 years	38.88

Number of fixtures:		Converted to:	
9 - 4 foot 2 lamp	=	5	4 foot 3 lamp fixtures
10 - 4 foot 1 lamp	=	3	4 foot 3 lamp fixtures
4 - 4 foot 4 lamp	=	4	4 foot 3 lamp fixtures

Total fixtures to be replaced.................. 12

Wind Energy Feasibility Study

Prepared for the Keweenaw Bay Indian Community

July 13th, 2012

Submitted by:
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H&H Wind Energy
Consulting, Engineering, Construction

Table of Contents

Project Overview

The Keweenaw Bay Indian Community ("the Community") is evaluating the feasibility of installing renewable energy generation within the L'Anse Reservation, located on both sides of the Keweenaw Bay in the Upper Peninsula of Michigan. This report provides a summary of the research carried out by H&H Wind Energy ("H&H") to assess the viability of installing wind turbines at two pre-designated locations, as well as a discussion of future opportunities for renewable energy installations, including solar photovoltaic. The section headings in bold contain the scope of work as provided by the Community.

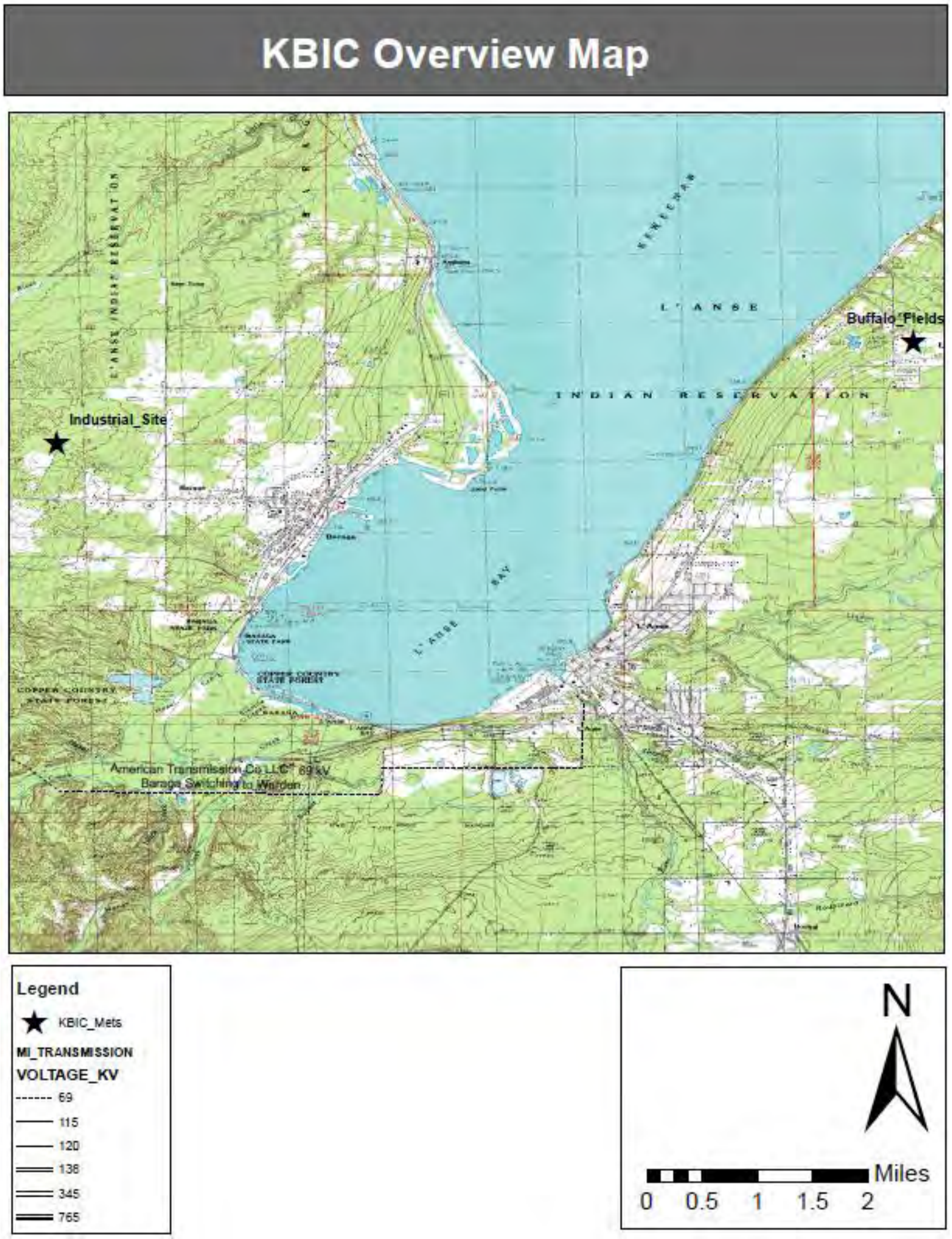
(A) Wind Tower Siting Recommendations

Based upon criteria such as anticipated wind regime, landowner cooperation, ease of access, and substation location for power evacuation, recommend the location of the Sites for the purpose of installing the wind towers to the Community.

Siting Overview

The Keweenaw Bay Indian Community has completed substantial work in evaluating the feasibility of installing one or multiple wind turbines on the L'Anse Reservation, including selecting two potential sites, and installing meteorological towers at each site to monitor the wind resource. The two selected sites will be referred to as the Industrial Site, and the Buffalo Fields Site, and are shown in Figure A-1 below.

Figure A-1 – Overview Map



Although both sites have the potential to host a wind turbine, the Industrial Site is a preferable location for several reasons, including: interconnection feasibility, wind resource, site access, soil type and neighboring property uses. General siting considerations at each site will be discussed below, and the section will conclude with a discussion of potential alternative sites.

Industrial Site

The Industrial Site has many of the key elements required to host a large wind turbine; it is relatively distant from adjacent residences and businesses, it is close to a viable point of interconnection on the distribution system, it has a large open area in the prevailing wind direction, and it is somewhat elevated relative to the surrounding terrain, resulting in a more attractive wind resource.

Land Cover and Surrounding Land Use

The Industrial Site Met tower is located in a large opening in a deciduous forest; the opening is about 1,500 feet by 600 feet and generally opens from the southwest to northeast. The tree cover that does exist to the southwest is relatively sparse with short to medium-sized trees.

Figure A-2 – Industrial Site Met Tower looking southwest

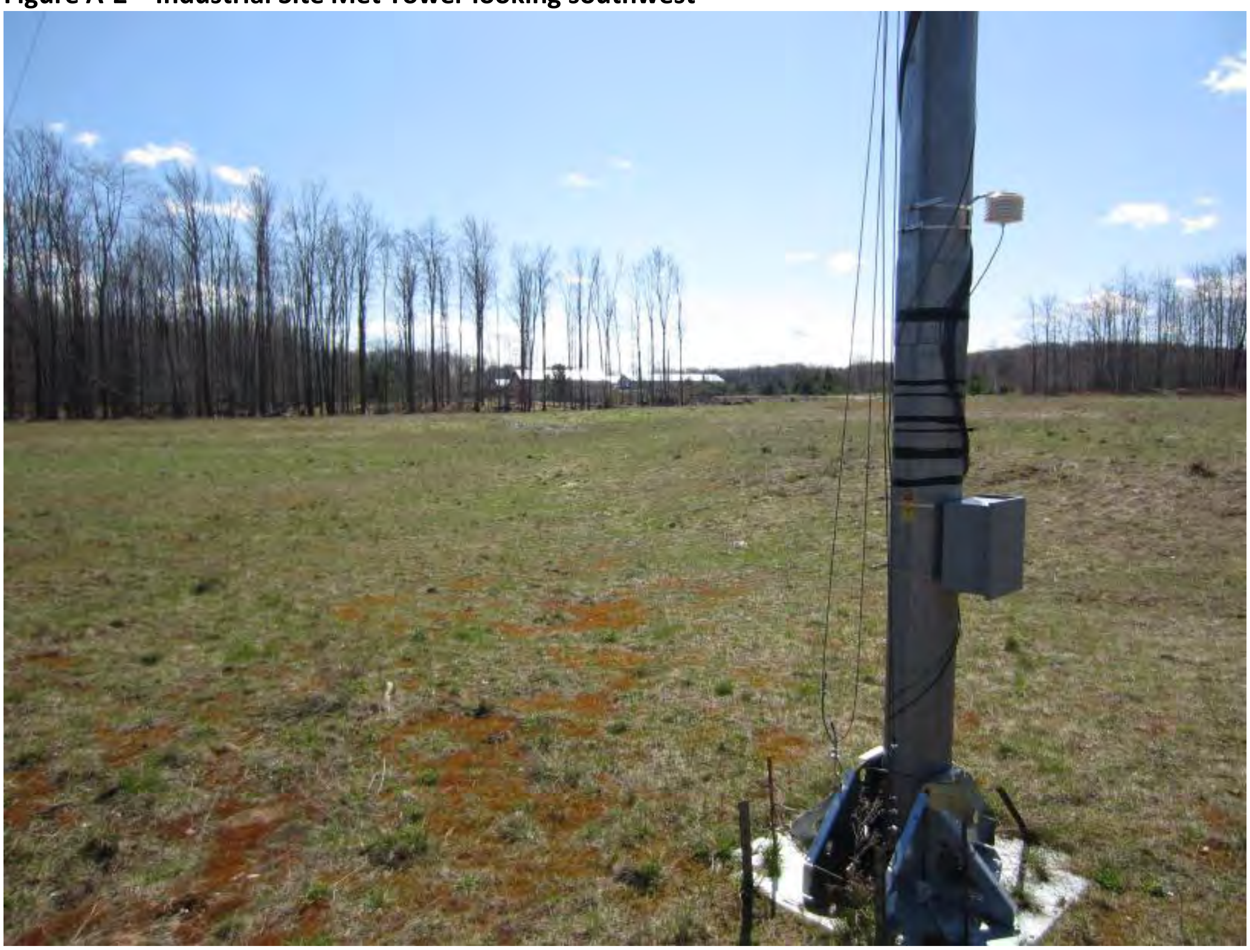
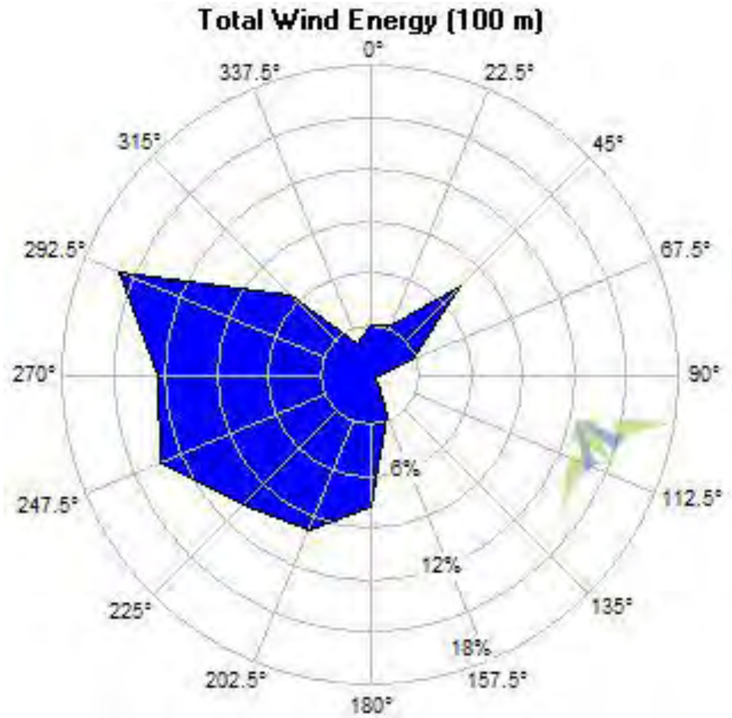


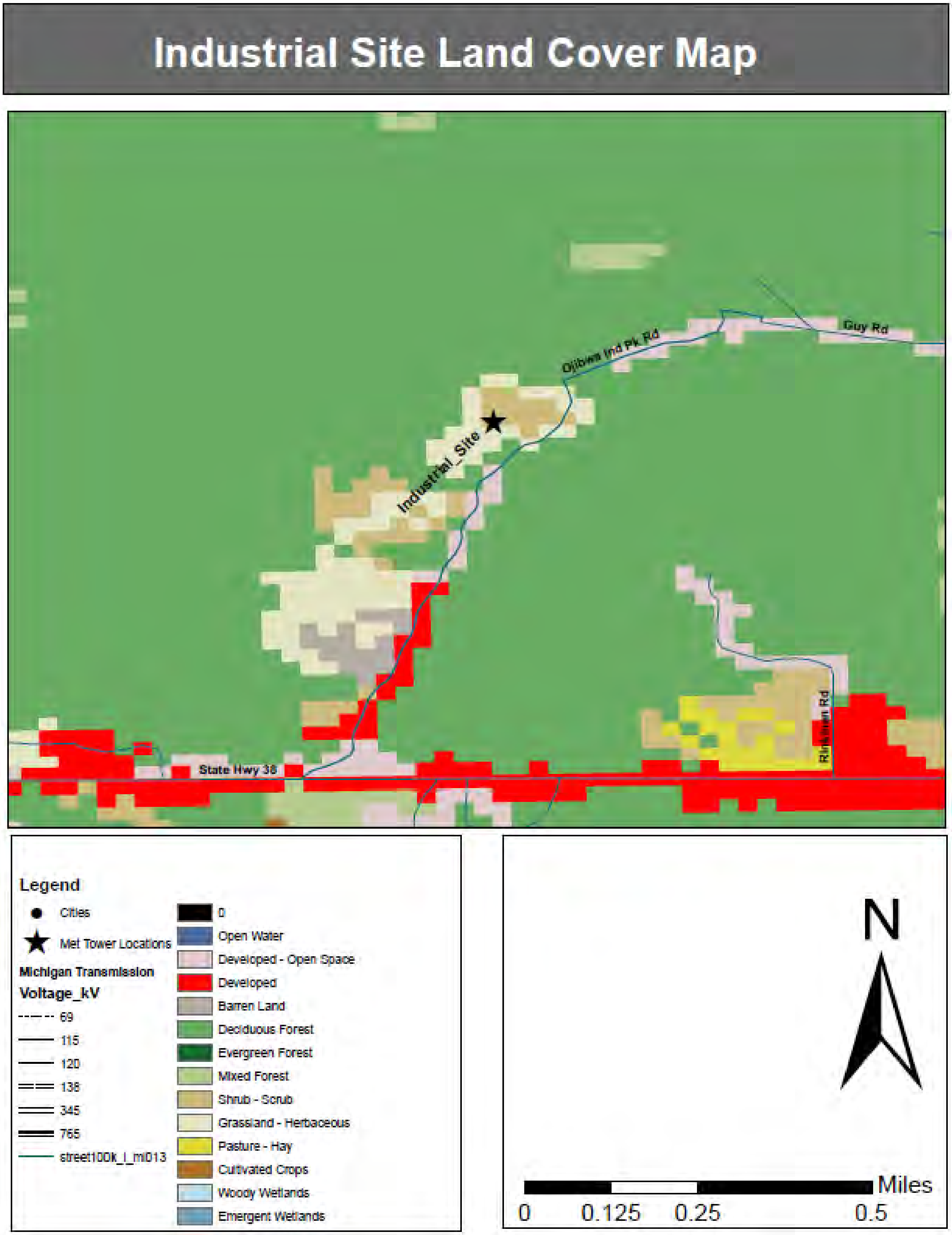
Figure A-3 illustrates the percentage of energy produced from winds in all directions at the Industrial Site met tower.

Figure A-3 – Wind Energy Rose – Industrial Site Met Tower



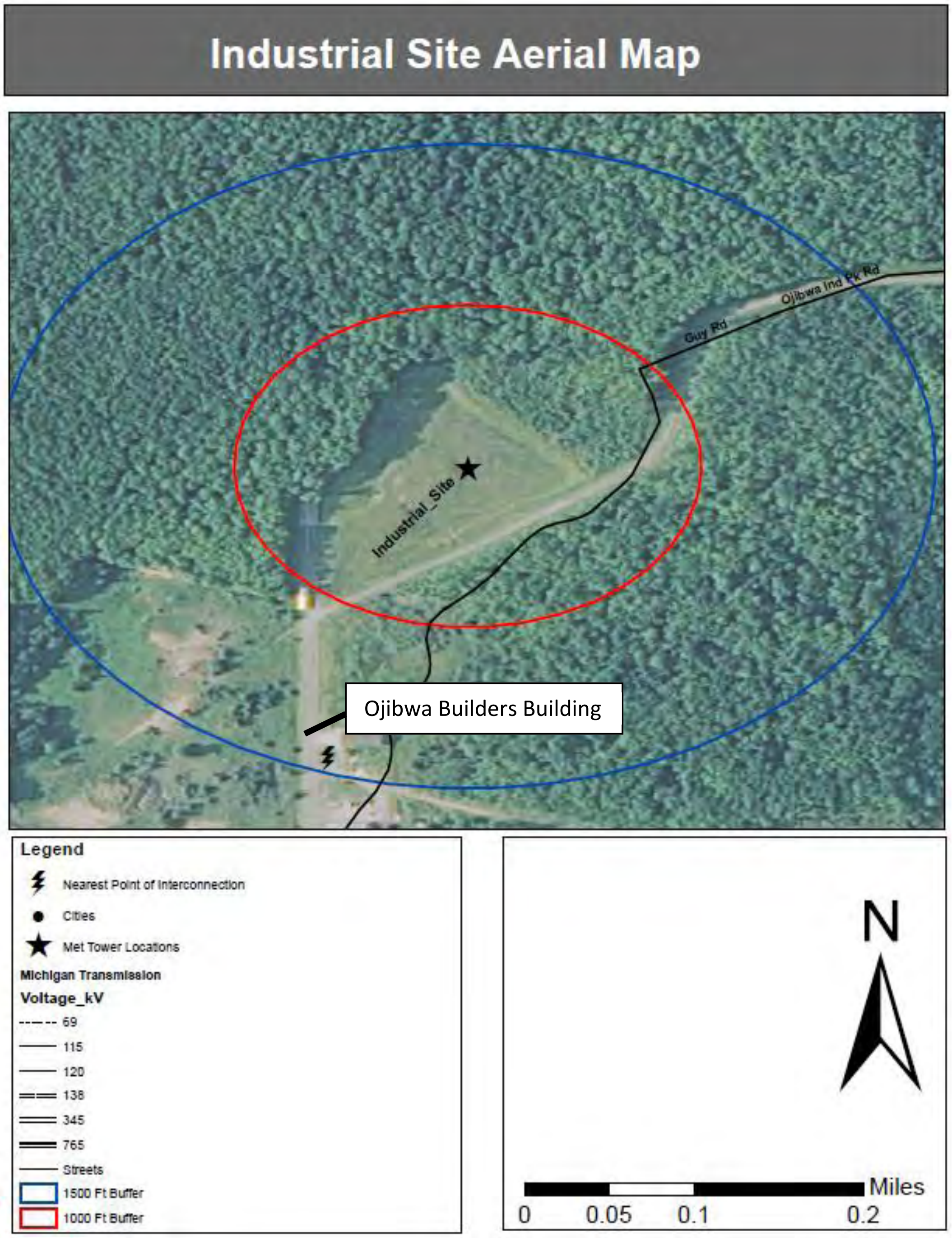
The ~2,000 foot opening to the southwest of the met tower (see Figure A-4) location is well-positioned, as it overlaps with the predominant wind direction, which should translate into higher wind speeds and lower turbulence.

Figure A-4 – Industrial Site Land Cover Map



Another attractive element of the Industrial Site is that there would be relatively little impact to surrounding residences. Generally speaking, it is preferable to locate megawatt-scale wind turbines at least 1,000 feet from non-residential structures, and at least 1,250 feet from occupied residences. This is not a hard-and-fast rule, but is generally a commonly-applied siting guideline used by wind energy project developers and regulators at the county and state level around the U.S. At the Industrial Site specifically, there are no residences within the 1,500 foot buffer, and the only building is a business which is over 1,250 feet from the met tower site.

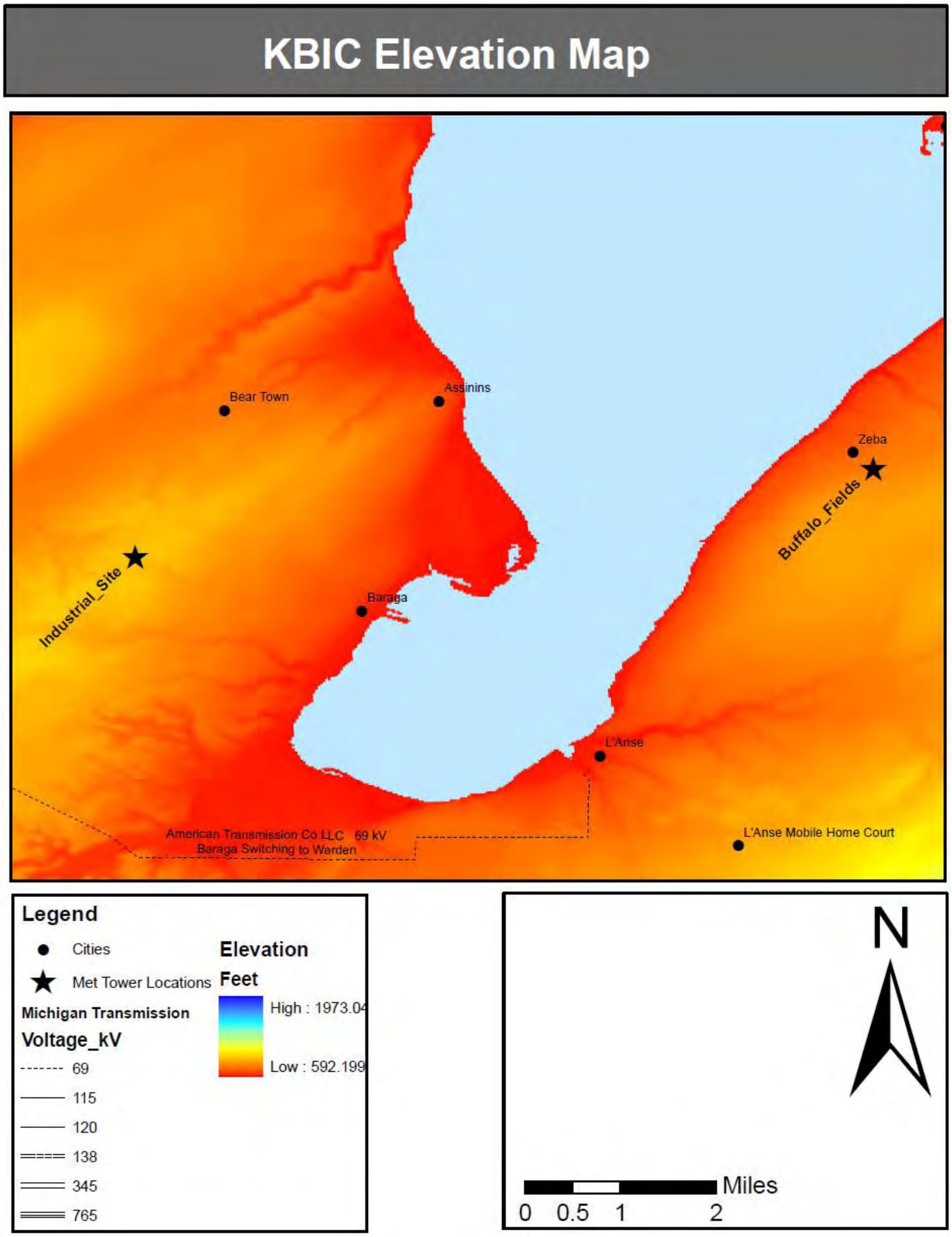
Figure A-5 – Industrial Site Aerial Map



Elevation

As shown in Figure A-5, the Industrial Site is located at 924 feet above sea level, which is relatively well-elevated from the surrounding area. When micrositing wind turbines, particularly in forested areas, topography is very important to consider, with higher elevation sites generally benefitting from higher wind speeds.

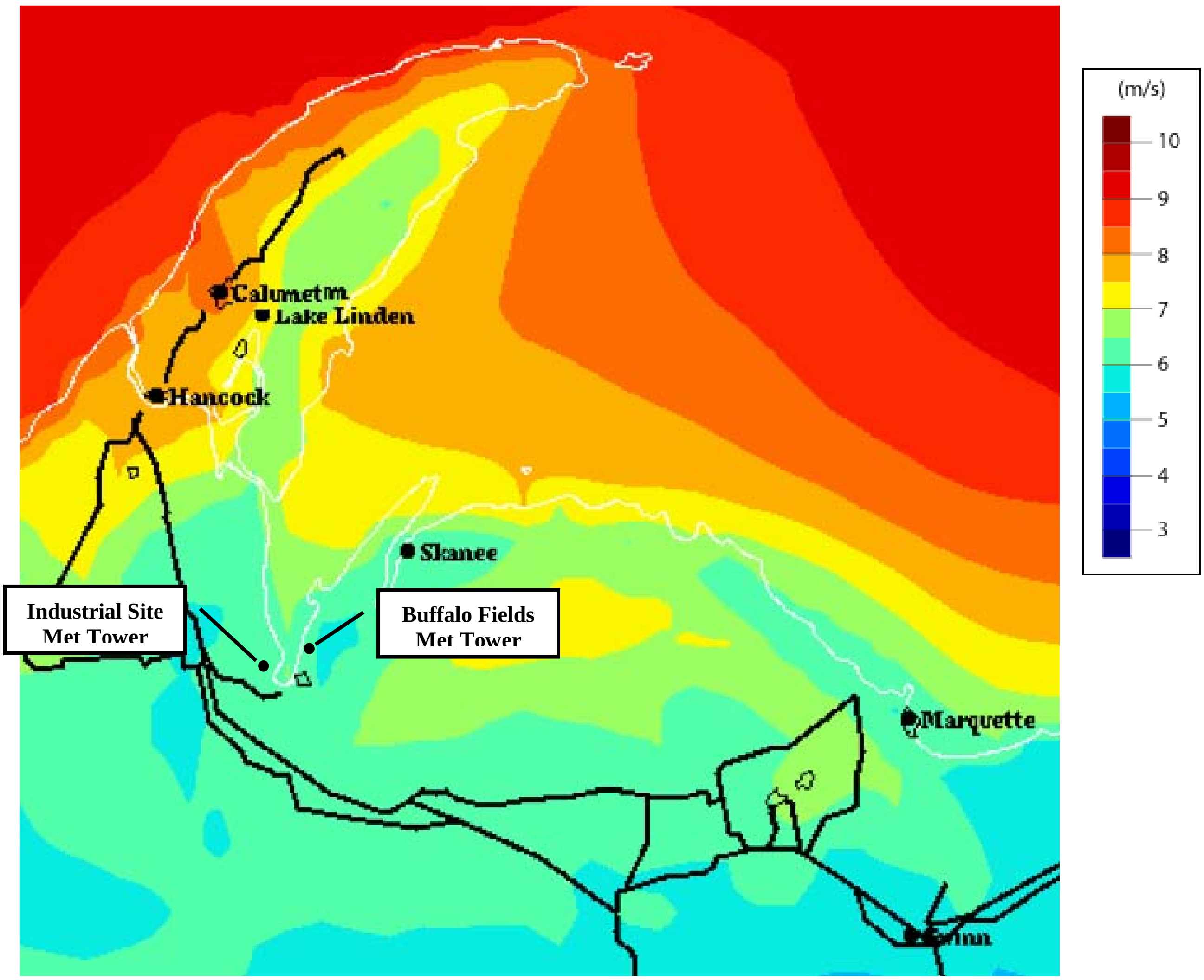
Figure A-6 – Elevation Map of Surrounding Area



Wind Resource

Based on the mesoscale maps reviewed, both the Industrial Site and the Buffalo Fields Site are anticipated to have wind speeds between 6 and 6.5 meters / second (13.4 – 14.5 miles / hour) at 80 meters above ground level. Although mesoscale maps are usually very coarse representations of reality, and actual measured data can vary significantly based on micro-siting considerations such as tree cover, they are helpful to get a general indication of what the wind speeds might be like across a large area.

Figure A-7 – Wind Speed at 80 meters above ground level[1]



Wind speeds between 6 and 6.5 meters / second are generally considered to be at the low end of what would be viable for a commercial wind energy project to be financially viable. However, wind turbine technology is rapidly evolving, and turbine manufacturers are building more and more models that are specifically designed with larger rotors and higher hub heights to enhance the productivity of low-wind sites. Wind resource will be discussed in more detail in section (i). *Meteorological Report*

[1] Canadian Wind Energy Atlas, http://www.windatlas.ca/en/index.php

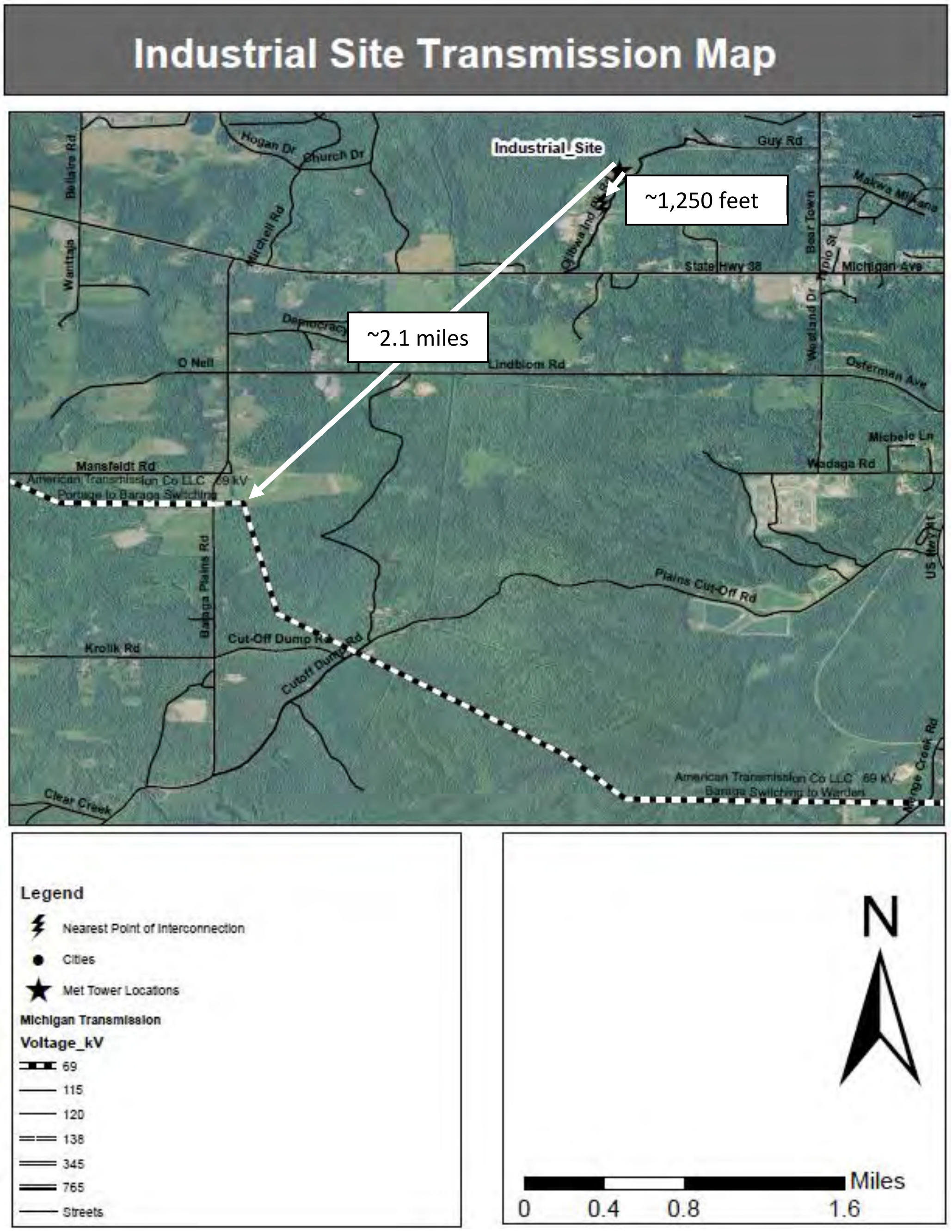
Another key consideration for the suitability of a particular site for installing one or more wind turbines is the capacity of the transmission grid to accommodate the size of project envisioned. There are two options for interconnection for the Industrial Site: interconnecting to the distribution system, or interconnecting to the transmission system. The pros and cons are discussed below:

Distribution interconnection point at Industrial Site – Ojibwa Builders in foreground

- Upper Peninsula Power Company distribution system –12,000 volts, 3 phase, #1 copper line
    - Pros:
        - Much less expensive to construct new interconnection facilities
        - Closer to site - ~1,250 feet from met tower location
        - Simpler and less expensive interconnection study process
        - Likely would not require a new substation
    - Cons:
        - Lower line capacity will limit the potential project size to ~1.5 MW (per discussion with representative at UPPCo, subject to change pending full distribution study)
- Transmission System – 69,000 volts, three phase
    - Pros:
        - Greater line capacity; likely to be able to accommodate several utility scale wind turbines
    - Cons:
        - Farther from site - approximately 2.1 miles at closest point
        - More expensive interconnection facilities; would require new substation on 69,000 volt line which could cost as much as $1 million.
        - New overhead transmission facilities required from turbine(s) to transmission line; likely to cost approximately$400,000
        - More complex and expensive interconnection study process requiring multiple stages of utility review.

Figure A-8 shows the Industrial Site relative the nearest point on the 69,000 volt and the 12,000 volt lines.

Figure A-8 – Industrial Site Transmission Map



Site Access

Site access is an important consideration in the planning process for a large wind turbine installation. Large wind turbine shipments consist of blades that are 125 to 165 feet long, requiring specialized trucks to ship, and wide turning radii on the access roads. A large crane is required to lift the tower sections, generator and blades into place. The fact that the Industrial Site is located within one half mile of State Highway 38 is a big advantage for transportation logistics. Further, the existing roads in the Ojibwa Industrial Park are large and robust, and should be capable of supporting large equipment transport without requiring substantial improvement.

Department of Defense and Federal Aviation Administration Considerations

The Federal Aviation Administration must issue a determination of no hazard for the construction of any structure in excess of 200 feet. Wind turbines can have negative impacts to radar systems (both weather and Department of Defense-related) as well as military flight paths and airports. Based on the results of the preliminary screening tools provided by the FAA, the Industrial Site is not expected to negatively impact either weather or Homeland Security radar, but may impact military flight paths, as shown below.

Figure A-9 – Results of FAA Screening Tool: Homeland Security Radars

Map Legend:

- **Green:** No anticipated impact to Air Defense and Homeland Security radars. Aeronautical study required.
- **Yellow:** Impact likely to Air Defense and Homeland Security radars. Aeronautical study required.
- **Red:** Impact highly likely to Air Defense and Homeland Security radars. Aeronautical study required.

Figure A-10 – Results of FAA Screening Tool: Weather Radar

Map Legend:

- **Green: No Impact Zone.** Impacts not likely. NOAA will not perform a detailed analysis, but would still like to know about the project.
- **Dk Green: Notification Zone.** Some impacts possible. Consultation with NOAA is optional, but NOAA would still like to know about the project.
- **Yellow: Consultation Zone.** Significant impacts possible. NOAA requests consultation to discuss project details and to perform a detailed impact analysis. NOAA may request mitigation of significant impacts.
- **Orange: Mitigation Zone.** Significant impacts likely. NOAA will likely request mitigation if a detailed analysis indicates that the project will cause significant impacts.

Figure A-11 – Results of FAA Screening Tool: Military Flight Paths

The Industrial Site falls within the boundaries of multiple military flight path areas, namely: M-Big Bear, VR604 and VR607, and has the potential to negatively impact military operations. A crucial next step if the Community wants to move forward with constructing a wind turbine at the Industrial Site would be to contact the designated contact at the military to discuss the likelihood that a turbine of the decided height would impact any of these flight paths. A critical piece of information necessary to determine impacts would be the total height of the wind turbine measured to the tip of an extended blade (i.e. hub height plus one blade length. The designated contact for the Department of Defense in this region is Patrick Freeman, whose phone number is (218) 788-7365. There are multiple wind energy projects around the country that have had to either delay, modify or abandon specific turbine locations or entire wind farms due to military flight path issues.

Summary

The Industrial Site is in many respects a good candidate site for the installation of one or multiple large wind turbines. A key consideration at this point is the size of project envisioned by the Community and the resulting impacts on the feasibility of interconnecting to either the distribution system or the transmission system. The fact that the distribution system is 12,000 volts and 3 phase means that it is much more likely that a feasible and relatively inexpensive interconnection to the UPPCo system is possible. Also, once the Community has a rough idea of the size of turbine it would like to install, the issues surrounding military flight paths should be explored in greater detail.

Buffalo Fields Site

The Buffalo Fields Site is a somewhat less appealing location than the Industrial Site for a large wind turbine, but could still potentially be workable under the right circumstances. As compared with the Industrial Site, the Buffalo Fields Site has the following drawbacks:

- Adjacent distribution line has a lower voltage, and is single phase, as opposed to three-phase. This results in a lower interconnection capacity (under 100 kW)
- Turbine location is farther from nearest interconnection point on transmission system
- Greater potential impacts to adjacent residences
- Greater forest cover in the immediate vicinity
- Greater potential for impacts to migrating birds and bats
- Lower wind resource.

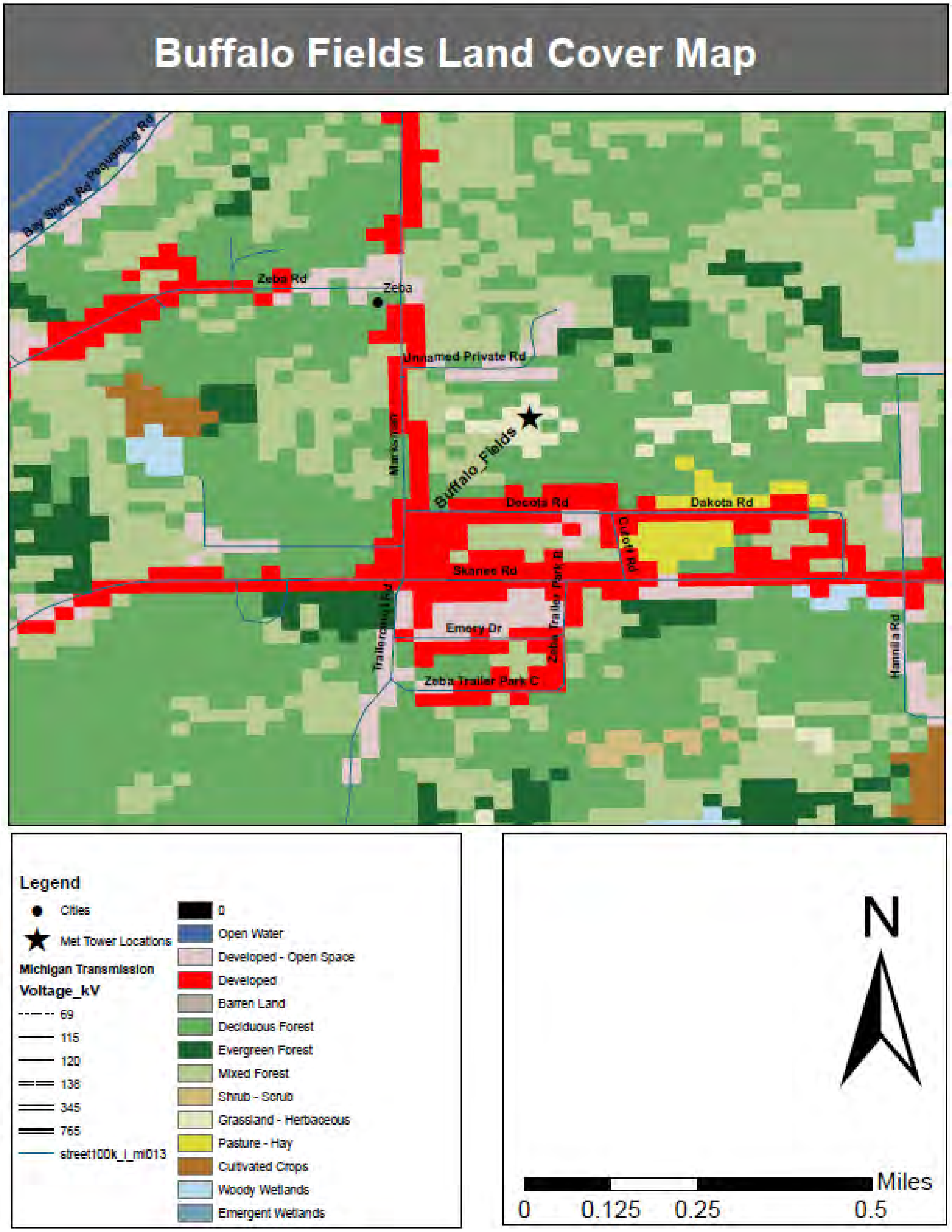
Land Cover and Surrounding Land Use

The Buffalo Fields Met tower is located in a large opening in a deciduous forest; the opening is approximately 1,000 feet by 600 feet and generally opens from the east to west, with the met tower location approximately halfway from the trees on either side. The tree cover consists of short to medium-sized (50-60 feet) trees.

Figure A-12 – Buffalo Fields Met Tower looking north

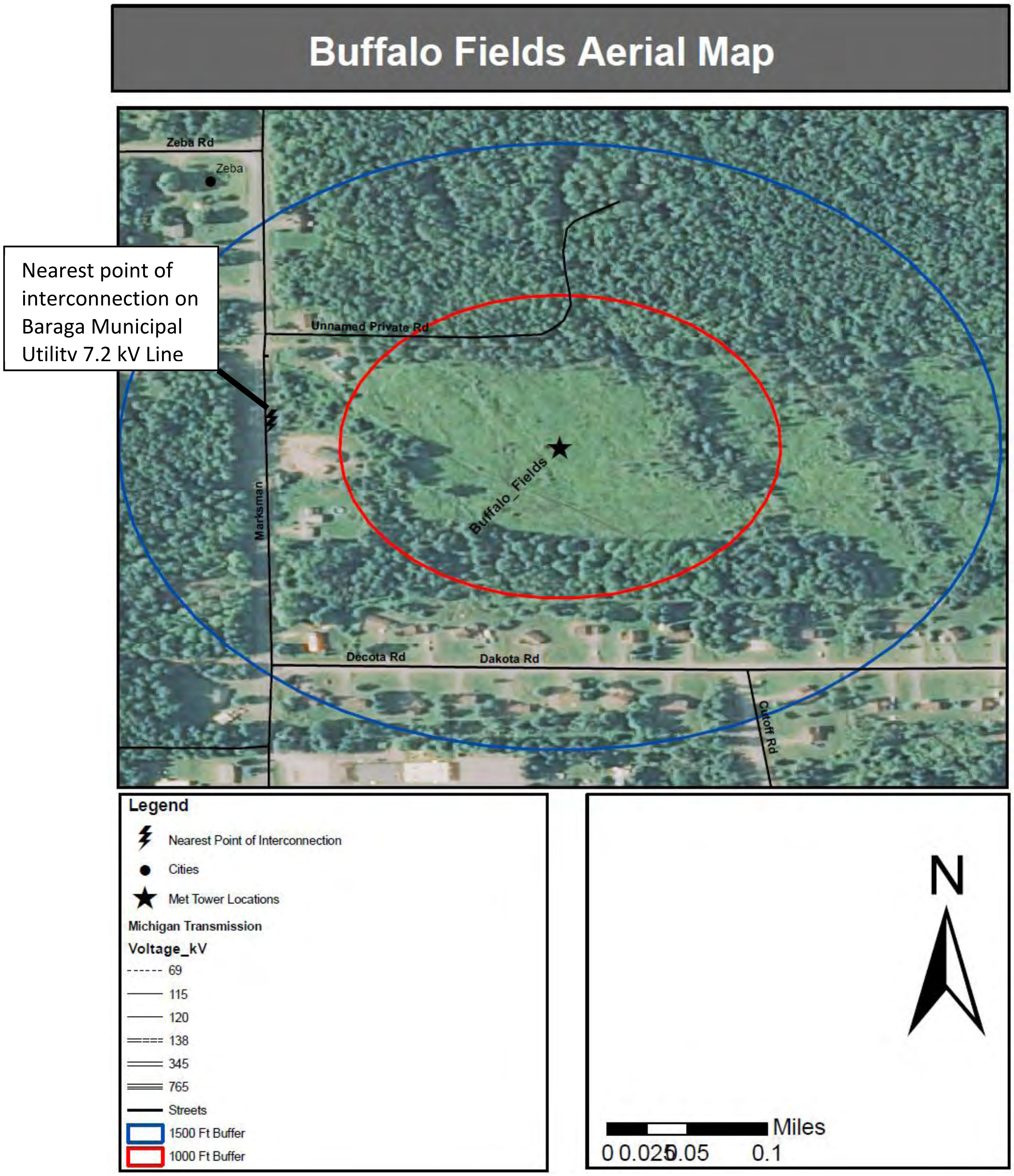
The opening is generally oriented east to west, which is fairly advantageous given the predominant wind direction out of the west/southwest. There is limited to no tree cover in the 500 feet leading up to the met tower location coming from the west.

Figure A-13 – Buffalo Fields Land Cover Map



One of the major drawbacks to the Buffalo Fields site for hosting a large wind turbine is its proximity to adjacent residences. Generally speaking, it is preferable to locate megawatt-scale wind turbines at least 1,000 feet from non-residential structures, and at least 1,250 feet from occupied residences. As shown below, there are no houses within 1,000 feet (red buffer in Figure 14), but there are several within 1,250 feet.

Figure A-14 – Buffalo Fields Site Aerial Map

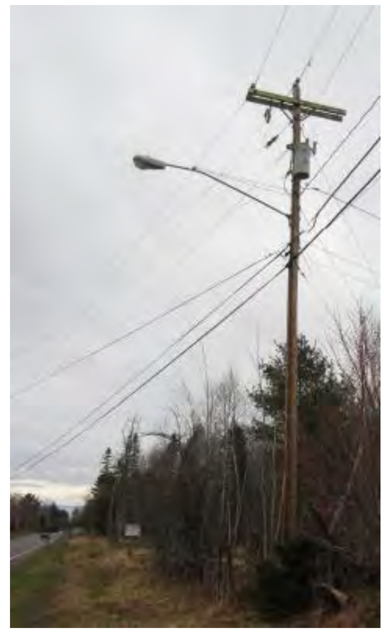


Elevation

As shown in Figure A-5, the Buffalo Fields Site is 782 feet above sea level, which is not elevated from the surrounding area, but rather falls in a low point that appears to be one of several drainages into the bay. Typically, when micrositing wind turbines, particularly in forested areas, topography is very important to consider, with higher sites generally benefitting from higher wind speeds. However, the open waters of the bay to the west of the site may create a slight acceleration effect on the prevailing winds out of the southwest.

Interconnection and Transmission System

Another key consideration for the suitability of a particular site for installing one or more wind turbines is the capacity of the transmission grid to accommodate the size of project envisioned. There are two options for interconnection for the Buffalo Field Site: interconnecting to the distribution system, or interconnecting to the transmission system. The pros and cons are discussed as follows:



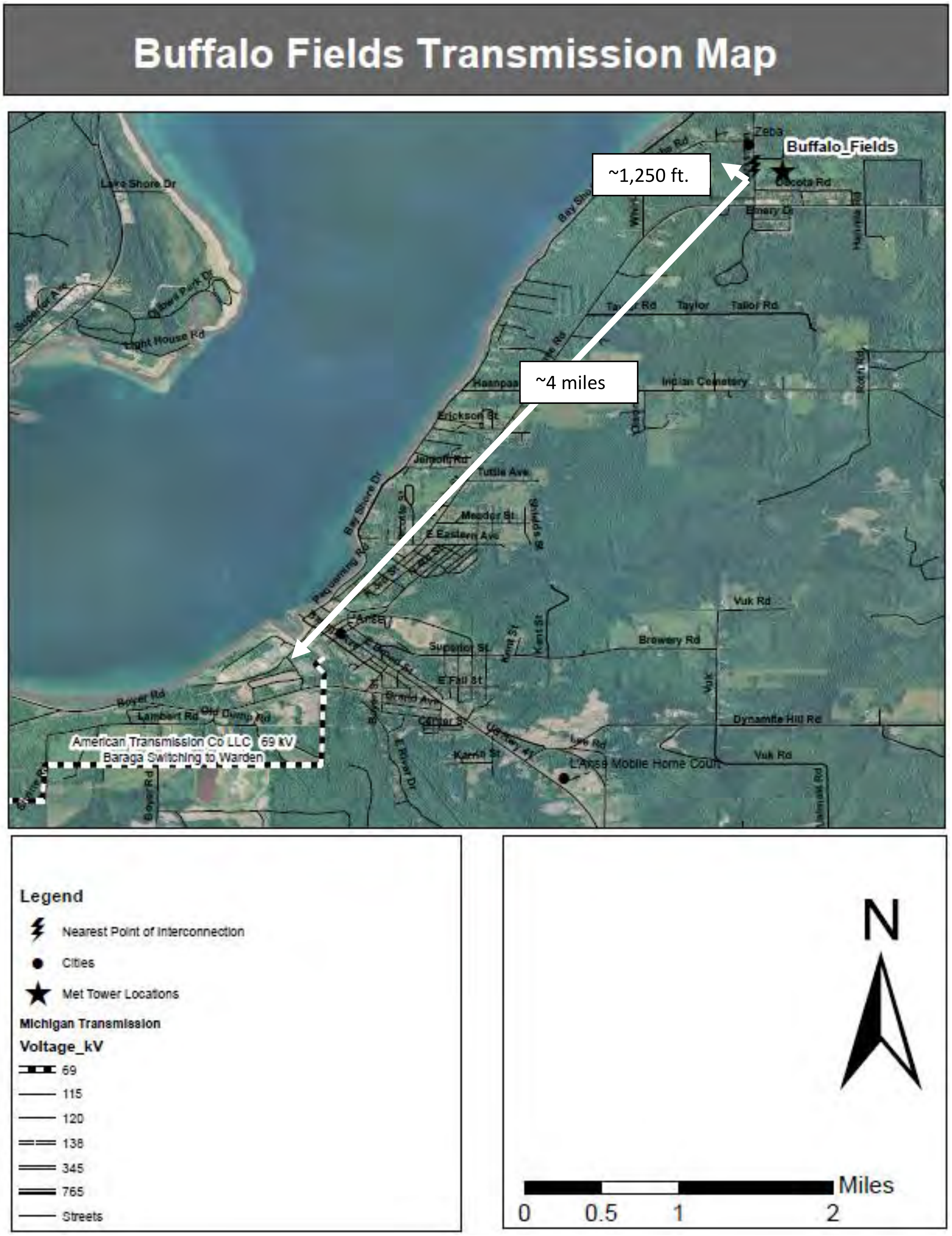
Distribution interconnection point at Buffalo Field Site

- Ontonagon Rural Electric Association Distribution system – 7,200 volts, single phase
    - Pros:
        - Much less expensive to construct new interconnection facilities
        - Closer to site - ~1,250 feet from met tower location
        - Simpler and less expensive interconnection study process
        - Likely would not require a new substation
    - Cons:
        - Far lower line capacity will limit the potential turbine size to 100 kW

- American Transmission Company Transmission system – 69,000 volts, three phase
    - Pros:
        - Greater line capacity; likely to be able to accommodate several utility scale wind turbines
    - Cons:
        - Much farther from site - ~4 miles at closest point
        - More expensive interconnection facilities; would require new substation or at least a new switchyard on 69,000 volt line or existing substation
        - New overhead transmission facilities required from turbine(s) to transmission line
        - More complex interconnection study process

Figure A-15 shows the Industrial Site relative the nearest point on the 69,000 volt and the 7,200 volt lines.

Figure A-15 – Buffalo Fields Transmission Map



Site Access

The Buffalo Fields Site is somewhat more difficult from a transportation logistics perspective; it is located within one half mile of Skanee road, which is a substantial thoroughfare, but there is not a substantial site access road off of Marksman Road, and the road that does exist passes through many low spots that will likely require new culverts or bridges to enable passage by large equipment and cranes.

Figure A-16 – View of Buffalo Fields Met Tower from Marksman Road with access road in foreground

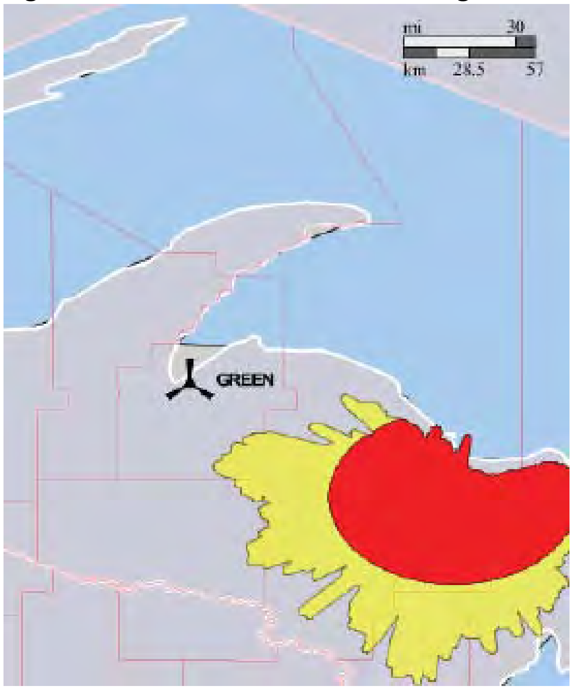
Figure A-17 – Access road water crossing

The lack of robust site access roads is certainly not a factor that will prohibit a project from happening at the Buffalo Fields site, but it will increase the construction costs significantly, particularly for larger, megawatt scale turbines that require larger trucks and cranes.

Department of Defense and Federal Aviation Administration Considerations

The Federal Aviation Administration must issue a determination of no hazard for the construction of any structure in excess of 200 feet. Wind turbines generally speaking can have negative impacts to radar systems (both weather and Department of Defense-related), as well as military flight paths and airports. Based on the results of the preliminary screening tools provided by the FAA, the Buffalo Fields Site is not expected to negatively impact radar, but may have an impact on military flight paths, as shown below.

Figure A-18 – Results of FAA Screening Tool: Homeland Security Radars



Map Legend:
- **Green:** No anticipated impact to Air Defense and Homeland Security radars. Aeronautical study required.
- **Yellow:** Impact likely to Air Defense and Homeland Security radars. Aeronautical study required.
- **Red:** Impact highly likely to Air Defense and Homeland Security radars. Aeronautical study required.

Figure A-19 – Results of FAA Screening Tool: NEXRAD Weather Radar

Map Legend:
- **Green: No Impact Zone.** Impacts not likely. NOAA will not perform a detailed analysis, but would still like to know about the project.
- **Dk Green: Notification Zone.** Some impacts possible. Consultation with NOAA is optional, but NOAA would still like to know about the project.
- **Yellow: Consultation Zone.** Significant impacts possible. NOAA requests consultation to discuss project details and to perform a detailed impact analysis. NOAA may request mitigation of significant impacts.
- **Orange: Mitigation Zone.** Significant impacts likely. NOAA will likely request mitigation if a detailed analysis indicates that the project will cause significant impacts.
- **Red: No-Build Zone.** Severe impacts likely. NOAA requests developers not build wind turbines within 3 km of the NEXRAD. Detailed impact analysis required.

Figure A-20 – Military Flight Paths

The Buffalo Fields Site falls within the boundaries of two military flight path areas, namely: VR604 and VR607, and has the potential to negatively impact military operations. A crucial next step if the Community wants to move forward with constructing a wind turbine would be to contact the designated representative at the military to discuss the likelihood that a turbine of the decided height would impact any of these flight paths. The designated contact for this area is: Patrick Freeman, whose phone number is (218) 788-7365. As discussed before, this consideration should be taken seriously; there are multiple wind energy projects around the country that have had to either delay, modify or abandon specific turbine locations or entire wind farms due to military flight path issues.

Other Siting Considerations

The Buffalo Fields Site is within a mile of the shoreline of Lake Superior, and is not much elevated relative to the surrounding terrain. The proximity to Lake Superior may translate into higher impacts on birds, which tend to use the shoreline as a migratory corridor. This is discussed in greater depth in section (j) Bird and Bat Study.

Summary

The Buffalo Fields Site is in many respects a less attractive candidate site for the installation of one or multiple large wind turbines. However, the site could accommodate a 100 kW or smaller turbine at reasonable cost if the Community is interested in pursuing a project of that size.

Potential Alternative Sites

The Industrial Site is a very good candidate site for the construction of a single megawatt-scale turbine, but due to constraints of the distribution system and the size of the opening in the forest cover, it likely cannot accommodate more than one large turbine. If the Community is interested in pursuing a project of more than one turbine, our recommendation is to explore sites that are southwest of the Industrial Site, which, as shown in Figure A-5, is as high or higher in elevation than the Industrial Park site, but get closer to the interconnection point on the 69 kV transmission system (see Figure A-7), which significantly reduces the fixed costs associated with installing new overhead transmission lines. If the Community is interested in a smaller project with one 100 kW (or smaller) turbine, either the Industrial Site or Buffalo Fields sites would be suitable host locations. However, it would be much more financially attractive to site that size of turbine adjacent to a facility or building with a large electrical load and take advantage of a net-metering arrangement, whereby the electricity produced by the wind turbine offsets retail electricity purchases by that facility. Since this arrangement offsets retail purchases, each kilowatt hour produced is of higher value than if it were being sold at wholesale rates to the utility. Section G contains further discussion of net-metering options

(E) TURBINE SIZE RECOMMENDATIONS

RECOMMEND A PRELIMINARY TURBINE SIZE WHICH WOULD OPTIMIZE EACH TURBINE'S ELECTRICAL OUTPUT CAPACITY DEPENDENT UPON AVAILABLE WIND RESOURCES FOR EACH PRELIMINARY SITE; RECOMMEND PRELIMINARY TURBINE SITES, SELECTION BASED UPON SUBSTATION LOCATION FOR POWER EVACUATION

Large Wind Turbine Characteristics

The type of wind generator installed at a particular site has a large impact on energy production, not only based on the nameplate generation capacity of the particular model, but also based on the size of the rotor, the height of the tower, and the operating parameters of the machine (cut-in speed, cut-out speed, power curve, etc.). These parameters influence a turbines resiliency under a certain wind regime as well, and can have a large impact on the expected useful life of a machine. Wind turbines are ranked into classes by the International Electrotechnical Commission based on average and extreme wind speeds.

Wind Turbine Generator Class	I	II	III	IV
Average wind speed at hub-height (meters/second)	10	8.5	7.5	6
Extreme 50-year gust (meters/second)	70	60	53	42

Generally speaking, the class that a particular wind turbine falls into depends on the ratio of the rotor diameter (typically denoted in meters) to the size of the generator (typically denoted in megawatts); a larger rotor diameter to generator size ratio translates into a more limited ability to operate at higher wind speeds.

Wind Resource

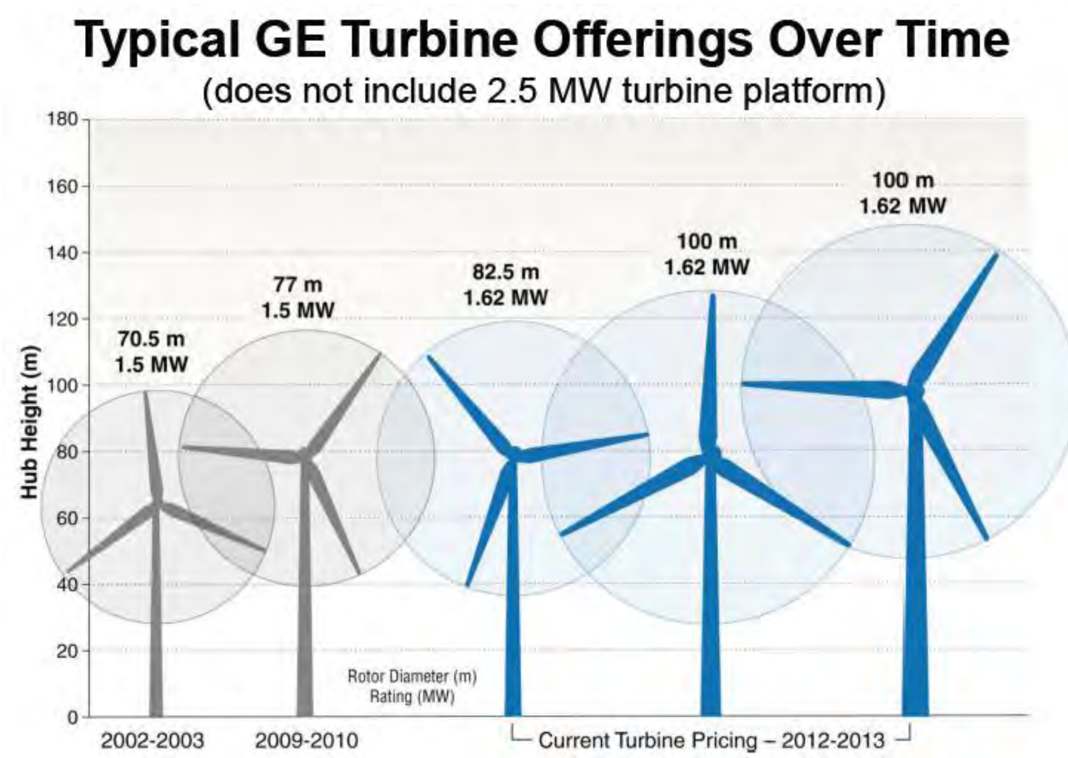
At the Industrial Site, our analysis has determined that the long-term average expected wind speed is 5.78 meters / second (12.9 miles / hour) at 95 meters above ground level and 5.95 meters / second (13.3 miles / hour) at 100 meters above ground level. This wind resource can accommodate an IEC Class IV or above turbine at all turbine heights, as the average wind speed at all hub heights is below 6 meters / second.

At the Industrial Site, based on readings from the meteorological tower, there is a very significant wind speed increase as the height above ground level increases. This is a result of the relatively low average wind speed coupled with the relatively dense and tall forest in close proximity to the site. The forest creates drag and turbulence in the wind currents, which have a larger impact at lower wind speeds and lower heights above ground level. As such, we have recommended using a wind turbine generator with as tall a tower as possible.

Wind Turbine Generator Type

For the Industrial Site, we recommend installing a turbine with as high a ratio of rotor diameter to generator size as possible. Most major turbine manufacturers have realized that as the best wind sites get built out, and more and more people are interested in building wind turbines close to the cities where power is used, there is significant potential in the market for machines that are well-suited to lower wind regime sites. Figure E-1 shows the growth in both hub heights and rotor diameters over the past decade, displaying a clear trend towards higher hubs and larger rotors.

Figure E-1 – Evolution of GE Turbine Size in the Past Decade[2]



Although many manufacturers are now offering Class IV turbines, we have recommended and evaluated two in particular:

- GE 1.6 MW Turbine with 100 meter rotor diameter on 95 meter tower
- Vestas V100 1.8 MW Turbine with 100 meter rotor diameter on 95 meter tower

A major consideration that went into the selection of these manufacturers is their long track record in the wind industry, and their high performance and availability. Wind turbines are very long-term investments; project owners and investors typically count on modern turbines to have operating lives in excess of 20 years. As such, it is very important to select a manufacturer who is well-established, and can be expected to be around and viable for the life of the project, in order to be able to continue honoring warranty commitments, providing for spare parts needs, and performing operations and maintenance activities if applicable.

[2] Wiser et al. "Recent Developments in the Levelized Cost of Energy from US Wind Power Projects." 2/2012, Lawrence Berkeley National Lab & National Renewable Energy Lab.

Vestas has installed over 50,000 megawatts of wind turbine capacity worldwide. GE has installed over 17,000 wind turbines globally. These machines are built on reputable platforms that have long track records of success.

Small Wind Turbine Options

In order to get a better understanding of the full range of possibilities for a wind turbine installation, and to comply with the distribution system limitations at the Buffalo Fields Site we have provided an analysis of a smaller-scale turbine model, the Northwind 100 kilowatt turbine made by Northern Power. This machine was selected both for its reputation as a reliable machine from an established manufacturer, and for its size, which matches with the 100 kilowatt upper threshold for interconnecting a new wind turbine on the Ontonagon REA distribution system.

We have also evaluated a Bergey Excel-S 10 kW machine in order to provide a picture of what type of investment returns might be expected from a net-metered turbine that would be appropriately sized for many of the buildings around the Community.

Additional Turbine Options

We have selected four turbine models as a starting point for initial investigation. There are several dozen Wind Turbine options available in the U.S. market. Existing models are continuously evolving and new options are being made available for community-scale projects and low wind regimes. Our review of the Vestas V100, GE 1.6-100m, Northwind100 and Bergey Excel-Sis not meant to suggest that these turbines are the only viable options. Should the Tribe wish to proceed with the construction of a wind energy project we highly recommend a more in-depth review of current turbine options, for availability, performance, reliability and cost.

(F) Wind Turbine Generator Supplier Negotiations

SOLICIT AND ENTER INTO PRELIMINARY DISCUSSIONS WITH POTENTIAL WIND TURBINE GENERATOR (WTG) SUPPLIERS FOR THE SOLE PURPOSE TO REVIEW EACH TURBINE'S OUTPUT CAPACITY AND PRELIMINARY ENGINEERING SPECIFICATIONS REQUIRED TO MAXIMIZE EACH WTG'S TURBINE'S POTENTIAL OUTPUT ON RESERVATION LAND

Vestas

H&H has made substantial progress in discussions with Vestas regarding pricing and turbine information. Eric Udelhofen has held multiple conference calls with Vestas sales representatives to describe the location, wind regime and general characteristics of the Sites.

Our initial contact at Vestas was Ed Moritz, who was the Senior Business Development Manager for the Midwest region. He has since left the company, and we have been reassigned to Christopher Moné, a Business Development Manager in the Central region, whose contact information is as follows:

Christopher Moné
Manager, Contract & Business Development
Vestas - American Wind Technology, Inc.
Telephone +1 303 655 5542
Mobile +1 303 748 8539
cmone@vestas.com

Vestas has provided a preliminary, non-binding price quote for providing the V100 model on a 95 meter tower to the Community for delivery to the Baraga area, which we have used in the financial analysis section of the report. The quote was $3.3 Million for the supply and delivery of the turbine to the site, which equates to roughly $1,833 per kilowatt of installed capacity. To get a more specific and exact quote with a full scope of services and equipment, Vestas has requested that the Community representatives sign a non-disclosure agreement, which has been included as Appendix A. They have also provided a general specifications document for the V100 turbine which has been included as Appendix B.

GE

GE is considered a relatively favorable supplier for small-scale projects, and has demonstrated a willingness in the past to provide turbines at reasonable cost to customers installing one to two machines at a time. GE has been fairly unresponsive in our discussion so far, but we have recently been designated a contact for turbine sales in the Upper Peninsula, Andrew Phillips, whose phone number is: (312) 463-2368. GE has been unwilling to provide an early-stage quote for use in this feasibility study. In order to estimate pricing for the GE turbines for use in the financial model, we have used information from recently constructed projects as described more fully in section (h). The brochure for the GE 1.6 MW turbine has been included as Appendix C.

Northern Power

Northern Power manufactures a 100 kilowatt turbine called the Northwind 100 that could be well-suited for the Buffalo Fields Site. The turbine is different from the above models in that it is a permanent magnet, direct drive generator, which benefits from having fewer parts, a simpler design, and no gearbox, meaning it should have fewer maintenance needs and higher performance over the long term. The turbine is not optimized for low wind regimes, however, and its performance on a cost-basis is low relative to some other small wind turbines in the market. Northern Power has provided a quote for delivery and installation of one Northwind 100 delivered and installed for $565,000, which equates to $5,650 per kilowatt. The specifications for the Northwind 100 have been included as Appendix D.

Additional Considerations

It is important to keep in mind when evaluating wind turbine pricing that the financial returns and potential revenues are affected not only by the actual cost of the wind turbines, but also by the projected output of the turbine over its 20-plus year expected life. Two turbines that cost the same amount to install can have vastly different rates of return based not only on their generator size, but also on the turbine's net capacity factor. The following table outlines the key data for the turbines under consideration:

Wind Turbine Model	Turbine Cost Delivered and Erected	Generator Size (kilowatts)	Hub Height (meters)	Net Capacity Factor	Expected Annual Production (kilowatt Hours)
Vestas V100	$3,300,000	1,800	95	28%	4,415,347
GE 1.6	$2,700,000	1,600	95	27.8%	3,889,468
Northwind 100	$565,000	100	37	4%	42,729

The best way to evaluate performance across turbines of different sizes is to compare net capacity factors (NCF), which convert expected annual electricity production into a fraction, as follows:

Electricity production in kilowatt hours / (turbine size in kilowatts x # of hours in a year)

The NCF for the Vestas V100 and the GE 1.6 are very similar, reflecting the fact that the turbines have similar general characteristics (hub height, rotor diameter and generator size). The Northwind 100, on the other hand, has a drastically lower NCF of 4%, which reflects the extent to which the wind speed decreases as the elevation above ground level decreases, due in large part to the forest cover adjacent to the Industrial Site.

(G) Power Purchase Agreement Negotiations

Enter into preliminary negotiations of a PPA (Purchase Power Agreement) on behalf of the community, for the power evacuation and sale of electric power generated from the proposed wind turbine farm to potential power purchasers, including, but not limited to, the Baraga Maximum correctional Facility and power companies such as UPPCO and WPPI

Generally speaking, the electricity from wind turbines is marketed in the following ways:

- Turbine owner sells electricity at wholesale rate to purchasing utility, who in turn provides that electricity to retail customers.
- Turbine owner sells electricity at retail to a third party, who uses the electricity to offset a portion of what they would normally purchase from their local utility.
- Turbine owner uses power directly to offset retail purchases from the utility (commonly referred to as “net-metering”).

The first option is the most common structure for large wind projects. The second option is only allowed in certain states for certain technologies, typically solar electric, and is not allowed for wind projects in Michigan. The third option, net metering, is another structure that varies state-by-state.

Power Purchase Agreement Options

Regulatory Context

The primary motivation for utilities and cooperatives to purchase renewable energy has historically been mandates or set-asides that the relevant state creates such that renewable energy generation must comprise a certain percentage of overall energy generation.

In Michigan, the *Clean, Renewable, and Efficient Energy Act*, Public Act 295, requires utilities, retail suppliers, and electric cooperatives to generate 10% of their retail electrical sales from renewable energy resources by 2015. Under this act, eligible renewable resources include: biomass, solar and solar thermal, wind, geothermal, municipal solid waste, landfill gas, existing traditional hydroelectric (i.e., water passed through a dam), tidal, wave, and water current (e.g., run of river hydroelectric) resources. New hydroelectric facilities do not qualify as an eligible resource, but repairs, replacements and upgrades of existing dams may be counted toward compliance.

2012 is the first year that utilities will be required to comply with the renewable energy standard. Utilities must meet the following targets, where the renewable energy baseline means the amount of existing renewable energy generation that the utility has in place at the end of 2011:

- 2012 – Baseline + 20% of gap between baseline and 10%
- 2013 – Baseline + 33% of gap between baseline and 10%
- 2014 – Baseline + 50% of gap between baseline and 10%
- 2015 – 100% of total obligation

Traditional renewable energy creates one credit per Megawatt Hour (MWh) produced. Energy produced from solar is eligible for two types of bonus credit:

- 2 additional credits per MWh
- 1/5 additional credit for power generated between 6 AM and 10 PM on weekdays

Utility Research

The Community procures its electricity from four different sources: Baraga Electric Utility (BEU), Ontonagon Rural Electric Association (OREA), Alger Delta Cooperative Electric Association (ADCEA) and the Upper Peninsula Power Company (UPPCo). The below table shows the amount of electricity received from each source in 2009 and 2010.

	2009 Electricity Use (MWh)	% of total	2010 Electricity Use (MWh)	% of total
BEU	3,405	71%	3,453	66%
ADCEA	1,019	21%	1,332	26%
OREA	359	7%	379	7%
UPPCo	41	1%	33	1%
TOTAL	4,823	100%	5,198	100%

The two main suppliers, BEU and ADCEA, who together make up 92% of the Community's energy supply, both have long-term power supply contracts with WPPI Energy (WPPI), a not-for-profit regional power company headquartered in Sun Prairie, Wisconsin. Based on communications with staff, OREA procures all of its electricity from Upper Peninsula Power Company, meaning that all the electricity procured by the Community is sourced either through WPPI or UPPCo. As such, WPPI and UPPCo are the most likely candidates for pursuing a power purchase agreement. The following section discusses the potential factors that would influence their demand for renewable energy generated by the Community.

WPPI

WPPI serves approximately half of their load with generating facilities that they either fully or partially own, and the remaining load is served with long term firm energy purchases from independent power producers. Including generation from both owned and un-owned facilities, WPPI's electricity comes mainly from coal and nuclear, with wind and gas making up most of the remainder.

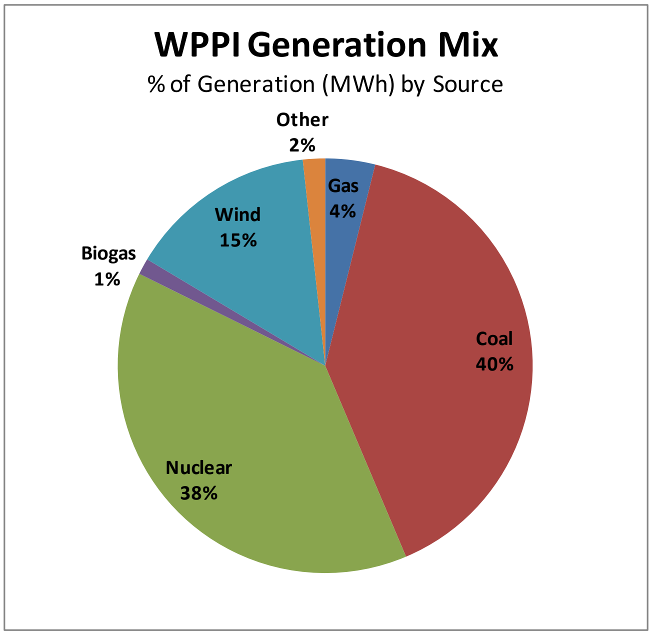


Table G-1 – WPPI Energy Generation Mix[3]

		Capacity (MW)	% of Total Capacity	Generator type	Assumed NCF	Generation (MWh)	% of Total Generation
Owned Generation Facilities	S.Fond Du Lac 1&4	168	12.1%	Gas	1.0%	14,265	0.4%
	Boswell 4	115	9.8%	Coal	73.0%	736,294	23.2%
	Member Owned Generation	65	7.6%	Other	7.5%	42,870	1.3%
	Island St. Peaking Plant	54	5.1%	Gas	7.5%	35,615	1.1%
	Elm Road Generating Station	102	10.0%	Coal	59.0%	527,477	16.6%
	Customer Standby Generation	18	1.8%	Other	7.5%	12,109	0.4%
Firm Purchases	Barton 1	30	3.9%	Wind	33%	86,783	2.7%
	Butler Ridge	54	7.0%	Wind	33%	156,210	4.9%
	Forward Wind Energy Center	28	3.6%	Wind	33%	79,551	2.5%
	Kendall County Unit 3	85	11.0%	Gas	10%	73,535	2.3%
	Neenah Menasha Sewerage Project	0.3	0.0%	Biogas	90%	2,367	0.1%
	Outagamie Clean Energy Project	4.8	0.6%	Biogas	90%	37,869	1.2%
	Point Beach Nuclear Plant	162	21.0%	Nuclear	87%	1,229,963	38.7%
	Top of Iowa II	50	6.5%	Wind	33%	144,639	4.5%

According to the Baraga Electric Utility Renewable Energy Plan Annual Report for 2010,

"WPPI Energy will ensure Baraga meets its renewable energy standard. WPPI Energy has at this time sufficient renewable energy resources to meet all member obligations, including Baraga's renewable energy standard, which starts in 2012, for the foreseeable future."

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[3] This table was assembled with data from multiple sources, including:

- Kellen, Andy, Assistant VP of Power Supply Resources for WPPI Energy. "UP Energy Supply: WPPI Energy", 10/2011.
- Natural Resources Defense Council. "Benchmarking Air emissions of the 100 Largest Electric Power Producers in the United States", June 2010. http://www.nrdc.org/air/pollution/benchmarking/2008/benchmark2008.pdf

U.S. Energy Information Administration. "Wisconsin State Electricity Profile," 2010.

Even so, WPPI is considered a potential customer for renewable energy from the Community, as their requirements under the Michigan and Wisconsin Renewable Energy Standards are both increasing over time.

Upper Peninsula Power Company

UPPCo sources about 92% of their electricity from hydroelectric dams, as shown in the table below.

	% of total UPPCo Generatio	SO2 Tons / MWh	NO2 Tons / MWh	CO2 Tons / MWh
Natural Gas	8%	0.0000	0.0003	0.4824
Hydroelectric	92%	0.0000	0.0000	0.0000
Weighted Average Total Emissions	100%	0.0000	0.0000	0.0370
Weighted Average Total Emissions Including T&D Losses	100%	0.0000	0.0000	0.0396

Since existing dams qualify as renewable energy under the Michigan Renewable Energy Standard, UPPCo far exceeds their requirements, and will not likely have demand for any additional renewable energy in the foreseeable future. We still recommend reaching out to UPPCo to verify that this is indeed the case, but they would not be considered an attractive customer.

Other Utilities

In order to sell electricity to a utility other than UPPCo or WPPI, the electricity would need to be transmitted across the existing transmission system from the point of interconnection near the wind project to the ultimate customer's service territory. In order to reserve the capacity to transmit electricity, utilities charge a fee to the generator that entitles them to a reserved portion of the transmission line. Since the wind resource at the Sites is not very robust compared to wind resources in other parts of the state and region, sales to other utility customers are unlikely, as the project will have the additional burden of paying transmission fees.

Utility Contacts

H&H staff have endeavored to get into contact with the appropriate representatives at UPPCo and WPPI to facilitate future negotiations regarding power purchase agreements should the Community decide to move forward with a wind project.

UPPCo

UPPCo has designated a contact person for customer-owned renewable energy generators on their system. If the Community decides to move forward with a renewable energy project at the Industrial Site, UPPCo would be the interconnection utility and customer. The appropriate contacts are as follows:

- For projects under 20 kW: Kevin Pitts, phone: 920-433-4964, e-mail: klpitts@wisconsinpublicservice.com
- For projects greater than 20 kW: Chet Bergstrom, 920-617-5231, e-mail: ccbergstrom@wisconsinpublicservice.com

UPPCo has also established a buyback rate for customer-owned generation under 2 megawatts (MW) in size, which are currently set as follows for 2012:

- On-peak: $0.04781 / kilowatt hour (kWh)
- Off-peak: $0.03134 / kWh

These rates are based on the average node price for the previous year in either the on-peak or the off-peak period, and as such, are subject to change over time. Please see Appendix F for the UPPCo Parallel Generation Purchase rate sheet.

WPPI

Despite numerous attempts, H&H has been unsuccessful getting in contact with the energy purchasing department at WPPI. The appropriate contact is Andy Kellen, the Assistant Vice President of Power Supply Resources:

Andy Kellen
1425 Corporate Center Drive
Sun Prairie WI 53590
608.834.4500
akellen@wppienergy.org

Unlike UPPCo, WPPI does not have an established buyback rate for customer-owned generation. According to communications with Ontonagon Rural Electric Association, who manages the distribution system for WPPI in the L'Anse/Baraga area, WPPI does not allow interconnection of customer-owned generation over 100 kW on its distribution system. For projects under 100 kW, the electricity buyback rate is based on the avoided cost of the period in question, which is based on the rate that Ontonagon REA pays to its electricity providers (currently WPPI).

Net-Metering Overview and Options

Net metering policies encourage utility customers to install electrical generating facilities at their point of use by enabling them to offset their own retail cost of electricity in a given period. In this way, the value of the electricity generated increases; instead of generating wholesale electricity that would then be re-sold by the utility at a profit, the user is generating retail electricity that reduces their own utility bill. The utility will typically install a bi-directional meter at the point of use, which measures inflow from and outflow to the grid. At the end of the month, the utility will then evaluate whether there is a net outflow (i.e. generation exceeded use) or a net inflow (i.e. use exceeded generation) of electricity to or from the point of use.

Net metering details differ utility to utility, and these minor nuances can have a large impact on the financials of a project. The net metering rules for UPPCo and OREA are discussed below.

UPPCo

UPPCo has a specific Net Metering program for renewable energy projects with a rated capacity between 20 kilowatts (kW) and 150 kW. This program is available for customers taking all-requirements service, and is available on a first-come first-served basis until the nameplate capacity of all participating generators is equal to the 1% of UPPCo's previous year's peak retail demand measured in kilowatts, of which a maximum of 25% can be in the 20-150 kW size range.

UPPCo reviews the bi-directional meter at the end of each month. If the consumer has used more electricity than they have produced, they are billed for that balance accordingly. If they have produced more than they used, the customer's account is credited with that amount, to be used towards future bills. More detailed information is included in UPPCO's Parallel Generation – Modified Net Metering Program Description included as Appendix E.

OREA

OREA allows Member-Consumers to net-meter renewable energy projects with a rated capacity of 20 kW or less. OREA has the same requirement as UPPCO that the aggregate installed capacity of net-metered projects cannot exceed 1% of the previous year's peak retail demand. The generation equipment must be located on the Member-Consumer's premises, serving only the Member-Consumer's premises and must be intended primarily to offset a portion or all of the Member-Consumer's requirements for electricity (i.e. the generation cannot be sized to provide more electricity on an annual basis than is consumed on-site).

(H) PROFORMA FINANCIAL FEASIBILITY REPORT

COLLECTION AND ANALYSIS OF WIND DATA FROM BOTH TOWERS, ALONG WITH PROPOSED PRELIMINARY POWER EVACUATION AND PRELIMINARY POWER SALES FIGURES, INTO A PROFORMA FINANCIAL FEASIBILITY 6 REPORT ("PROFORMA") FOR PRESENTATION TO THE TRIBAL COUNCIL OF THE COMMUNITY; THE PROFORMA SHALL, AMONG OTHERS, OUTLINE THE POTENTIAL REVENUE THAT COULD BE GENERATED FROM THE PROPOSED WIND TURBINE FARM; DEPENDENT UPON THE NUMBER OF WTG SUPPLIERS SOLICITED, SEVERAL PROFORMAS MAY BE PRESENTED, OUTLINING SEVERAL INCOME POTENTIALS

Discussion of Key Assumptions

Annual Production

The most important variable in determining the profitability of a wind energy project is the annual production from the wind turbine generator, which is a function of both the windiness of site, and the type of generator installed. The vast majority of the expense involved with a wind project is incurred during construction. From then on, the fuel is free, and the operations and maintenance expense is relatively minimal, so the revenues from producing electricity are used to pay down the initial investment required to build the project. For this reason, wind project economics are greatly impacted by the amount of energy produced over the life of the project.

Wind Resource

The wind resource at a particular site is characterized as the long-term average wind speed available to be converted into electrical energy by a wind turbine.

At the Industrial Site, our analysis has determined that the long-term average expected wind resource is 3.5 meters / second (7.8 miles / hour) at 37 meters above ground level and 5.78 meters / second (12.9 miles / hour) at 95 meters above ground level. This wind resource can accommodate an IEC Class IV or above turbine, as the average wind speed at hub height is below 6 meters / second.

At the Buffalo Fields Site, we have determined that the long-term average expected wind resource is 3.76 meters / second at 43 meters above ground level, which is the hub height for the Bergey Excel-S we are recommending for net-metering installation at one of the L'Anse area buildings.

Wind Turbine Generator Type

At the Industrial Site, based on readings from the meteorological tower, there is a very significant wind speed increase as the height above ground level increases. This is a result of the relatively low average wind speed coupled with the relatively dense and tall forest in close proximity to the site. The forest creates drag and turbulence in the wind currents, which have a larger impact at lower wind speeds and lower heights above ground level. Although taller towers are more expensive to construct, at sites like the Industrial Site, investing a small additional amount in increased turbine costs reaps very large dividends over the 20-plus year expected life of the turbine. As such, we have recommended using a wind turbine generator with as tall a tower as possible.

As discussed in Section (e), we have recommended turbines that are specifically designed to take full advantage of lower wind speed sites. The two turbine types that we have recommended for installation at the industrial site are:

- GE 1.6 MW Turbine with 100 meter rotor diameter on 95 meter tower
- Vestas V100 1.8 MW Turbine with 100 meter rotor diameter on 95 meter tower

At the Buffalo Fields Site, the upper size threshold for interconnecting a wind turbine is 100 kW, as discussed in Section (e), and the best economic scenario is to net-meter a small turbine at one of the higher load buildings. With this constraint, we have selected the Northwind 100 turbine for the 100 kW analysis, which has a long track record of good performance and reliability, and the Bergey Excel-S for a smaller net-metered installation. However, as discussed in greater detail in Section (i), the wind resource at the Buffalo Fields Site at the 37 meter hub height of the Northwind machine and the 43 meter hub height for the Bergey is quite low, which results in poor economic performance. The wind resource improves markedly as the elevation above ground level increases, but the smaller machines in this size range are generally significantly shorter and cannot take advantage of this improvement.

Net Capacity Factor

The expected Net Capacity Factors (NCFs) used in the Pro Forma to estimate projected revenues based on the wind resource analysis and the turbine-specific power curves are:

Industrial Site
- GE 1.6 MW: 27.8%
- Vestas V100 1.8 MW: 28%

Buffalo Field Site
- Northwind 100: 4.9%
- Bergey Excel-S: 6.6%

Power Purchase Agreement Rate

As discussed in Section (g), UPPCo has an established buyback rate for projects under 2 MW, which is calculated as follows:

- On-peak rate: $0.04781 / kilowatt hour (kWh)
  - On-peak hours are between 7 AM and 11 PM, Monday through Friday excluding holidays.
- Off-peak rate: $0.03134 / kilowatt hour (kWh)
  - Off-peak hours are all hours not considered on-peak as described above.

In order to calculate projected revenues accurately given that there are different prices for on and off-peak electricity, we used the wind data from the meteorological tower to estimate the proportion of electricity that would be produced during both periods. Based on this analysis:

- Approximately 51% of annual production is estimated to occur during on-peak hours
- Approximately 49% of annual production is estimated to occur during off-peak hours

  Using these estimates, the weighted average rate for electricity under UPPCo's current buyback rate is: $0.040 / kWh. This will be used as the baseline electricity rate for the financial analysis.

Although we have used measured data from on-site to estimate these proportions, there is significant potential for the actual proportions to differ from the estimates, which could drastically affect the revenues in a particular period.

According to the 2012 US Energy Information Administration Annual Energy Outlook, real electricity prices are projected to remain at approximately the same level as 2012 throughout the next 20 years. As such, the only escalation factor applied to the above rate is the generalized inflation estimate of 2.5%.

Tax Benefits & Incentives

Numerous federal and state incentives are available for qualifying renewable energy projects. However, the ability of a project owned by the Community to qualify for these incentives will be impacted by decisions around project ownership structure. Generally speaking, to qualify for the federal tax benefits available to wind projects, the owner must have a federal income tax liability. Various ownership structures are possible to make most advantageous use of federal incentives, limit Tribal liability, maintain maximum Tribal sovereignty, and achieve other goals of the Community. There is a more extensive discussion of ownership structures in a National Renewable Energy Lab report entitled: "Renewable Energy Development in Indian Country: A Handbook for Tribes", available at: http://www.nrel.gov/docs/fy10osti/48078.pdf

Federal

Renewable energy projects in the U.S. are eligible for multiple tax benefits and incentives created to foster the growth of the industry.

Production Tax Credit / Investment Tax Credit

The largest current federal incentive available to renewable energy projects is the Production Tax Credit (PTC). The PTC is a corporate tax credit available for renewable energy projects placed in service before the end of 2012. The current amount of the tax credit is 2.2 cents / kilowatt hour (kWh), but the amount escalates at inflation. Projects receive this tax credit for the first 10 years of operation.

The American Recovery and Reinvestment Act of 2009 ("Stimulus Bill") created a new option for eligible renewable energy projects, allowing them to opt for the

Business Energy Investment Tax Credit (ITC) instead of the PTC. The ITC is a corporate tax credit equivalent to 30% of eligible costs associated with installing a wind project which the project creates in the first year of operation.

Depending on the energy production at a specific site, either the PTC or the ITC may be more financially attractive. At the Industrial Site, it is most attractive with the ITC due to the relatively low energy production. However, neither tax credit is currently available for projects placed in service after 12/31/2012. The wind industry is lobbying to extend these tax credits; more information on current status is available at:
http://www.awea.org/issues/federal_policy/index.cfm

Accelerated Depreciation

Wind and solar projects are eligible for a system of accelerated depreciation called the "Modified Accelerated Cost-Recovery System" that allows corporations to write off the vast majority of an investments in wind or solar projects in the first five years of project operation. This tax benefit can only be monetized if one or multiple investors in the project have a federal tax liability that can be offset by the depreciation credit. Since the project is to be owned by a Tribal Corporation, this benefit is not available.

State

Renewable Portfolio Standard

As discussed in the Power Purchase Agreement section, Michigan enacted the Clean, Renewable, and Efficient Energy Act in 2008, which requires electricity providers to generate 10% of their retail electricity sales from renewable energy by 2015, with interim milestones in the intervening years. This drives demand for electricity from wind and solar projects such as those that would be installed by the Community.

Grant Funding

Funding for renewable energy projects on Tribal land is available periodically through the Department of Energy's Tribal Energy Program, the Environmental Protection Agency, the U.S. Department of Agriculture, and the U.S. Department of the Interior. Based on conversations with Greg Nominelli, we have modeled the project without any grant funding for the time being.

Capital Expenditures, Operations and Maintenance, and other costs

In order to generate capital requirements and financial returns, we had to make a number of assumptions using information from various public sources.

Capital Expenditures

We made efforts to get into contact with Vestas, GE, Bergey and Northwind to get price quotes for providing a wind turbine for the project. Vestas, Bergey and Northwind have assigned sales representatives with whom we can negotiate a price. They have both provided indicative pricing based on 2014 construction which we have used for the financial model.

GE has been unwilling to provide a quote thus far, so we have estimated pricing based on recent GE projects that have been constructed. As discussed above, under the Stimulus Bill, wind projects became eligible to receive an ITC Grant from the federal government equal to 30% of the qualified costs of a wind project. Qualified costs include approximately 95% of overall project costs. The US Treasury Department published the recipient, date and amount of each ITC Grant. Using recipient information, we were able to identify project location, size and turbine type. Based on the amount of the grant, we were able to approximate the overall cost of each project. We then pared down the list of projects to contain only GE projects of a similar size to that being considered by the Community, and took an average cost per megawatt. We have verified our estimates through interviews with project leads for other single turbine GE installations in the Upper Midwest.

Operating Expenses

We compiled our estimate for annual operating expenses using multiple references to ensure accuracy and reduce bias. Estimates for individual cost items were obtained from the Windustry Community Wind Toolbox, available online at: http://windustry.org/communitywind.

Next, we interviewed representatives from multiple colleges in the Midwest U.S. who have recently installed single turbine projects. From these interviews, we were able to obtain overall operating expense budgets.

The resultant operating cost estimates for the Vestas and GE scenarios are as follows:

- Operations and Maintenance plus warranty: $50,000 / turbine / year
- Operations and Maintenance Contingency Fund: $25,000 / turbine / year starting year 4
- Insurance: $12,000 / turbine / year
- Project management, administrative & legal costs: $10,000 / turbine / year
    - TOTAL: $97,000 / year

All operating costs are escalated at 3% per year for the life of the project, both to reflect inflation, and to reflect increasing costs to maintain the turbines as they age.

State and Local Taxes

Wind systems in Michigan are exempt from property taxes per Senate Bill Number 583 enacted in 2006. They are, however, subject to sales tax. As such, the 6% Baraga County rate has been applied to the capital expenses of the project.

Debt Funding

Based on input from Gregg Nominelli, we have assumed a 5 to 1 ratio of debt to equity. In the GE scenario, for example, capital expenditures are estimated at $3.6 million, and we have assumed that the Community will fund $600,000 directly as equity, and the remaining $3 million is funded through debt.

Results

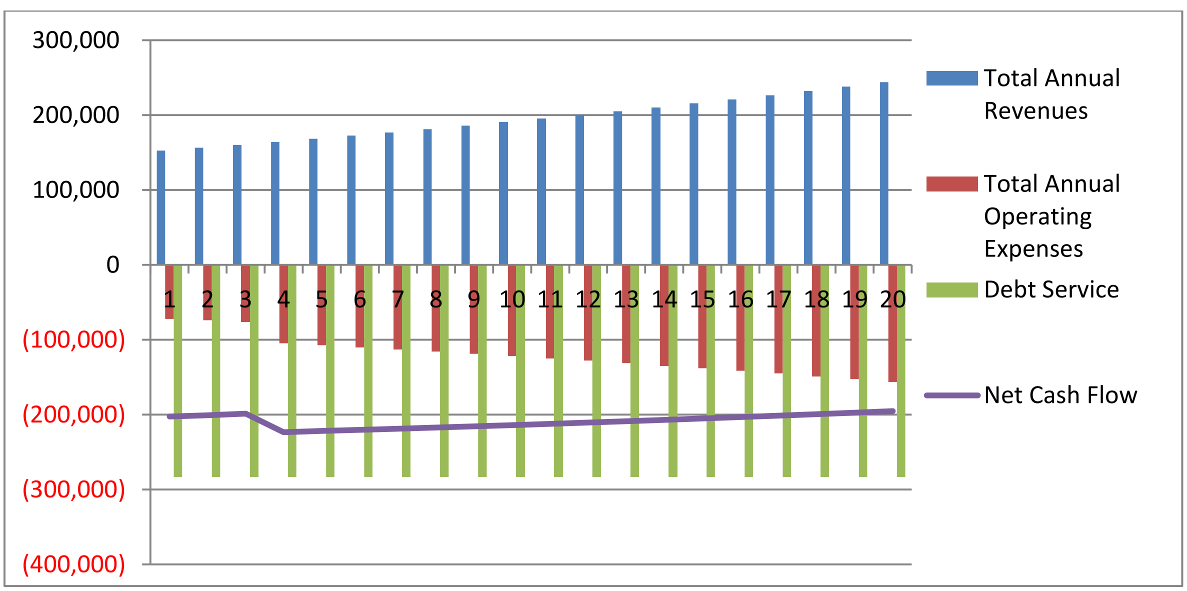
In order to define projected revenues from the project, we used the Windustry Wind Project Financial Model[4], which is considered industry standard for the community-scale wind market. This financial model allows the user to input all relevant project-specific assumptions and inputs, as well as the unique ownership, tax and debt structure of a particular project. The results were then validated against an internal financial model to ensure their accuracy.

Industrial Site

GE 1.6 MW

The GE 1.6 MW scenario at the Industrial Site with the assumptions outlined above represents a negative 20 year investment return for the Community, with the following high level returns:

- Net Present Value assuming 8% discount rate: -$2.6 million
- Internal Rate of Return: N/A (Negative)
- Payback Period: N/A – longer than 20 years
- Projected Revenues and debt service:



With a 50% grant, assuming the Community sticks with the 1/6th equity stake on the remaining balance, the 20 year investment returns are as follows:

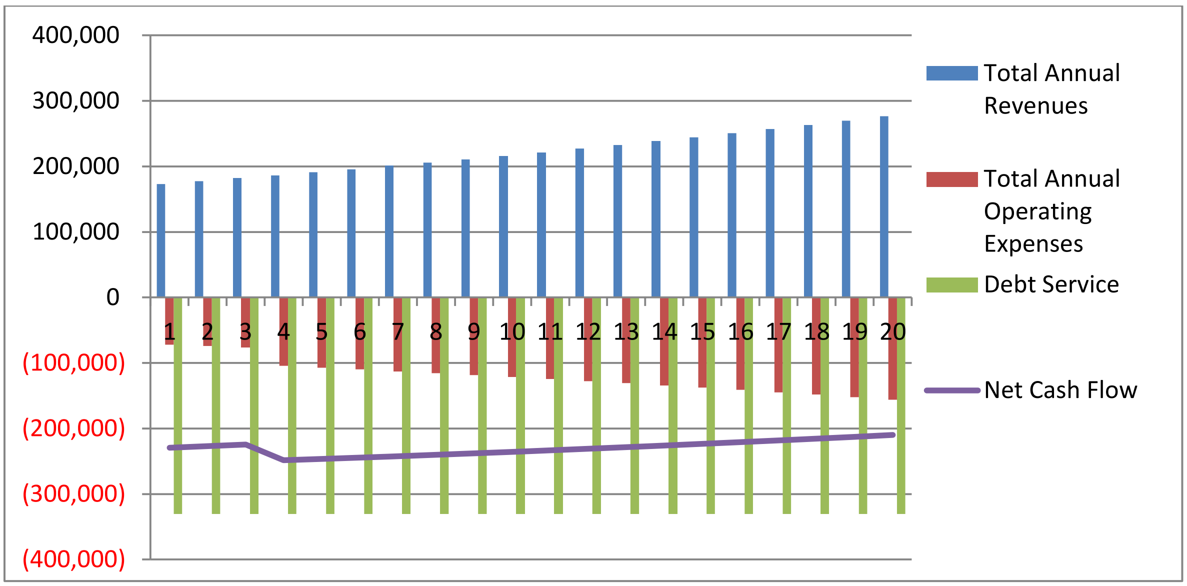
[4] Available at: http://www.windustry.org/your-wind-project/community-wind/community-wind-toolbox/chapter-3-project-planning-and-management/wi

- Net Present Value assuming 8% discount rate: -$970,000
- Internal Rate of Return: N/A (Negative)
- Payback Period: N/A – longer than 20 years

VestasV100

The Vestas V100 1.8 MW scenario at the Industrial Site with the assumptions outlined above represents a negative 20 year investment return for the Community, with the following high level returns:

- Net Present Value assuming 8% discount rate: -$2.9 million
- Internal Rate of Return: N/A (Negative)
- Payback Period: N/A – longer than 20 years
- Projected Revenues and debt service:



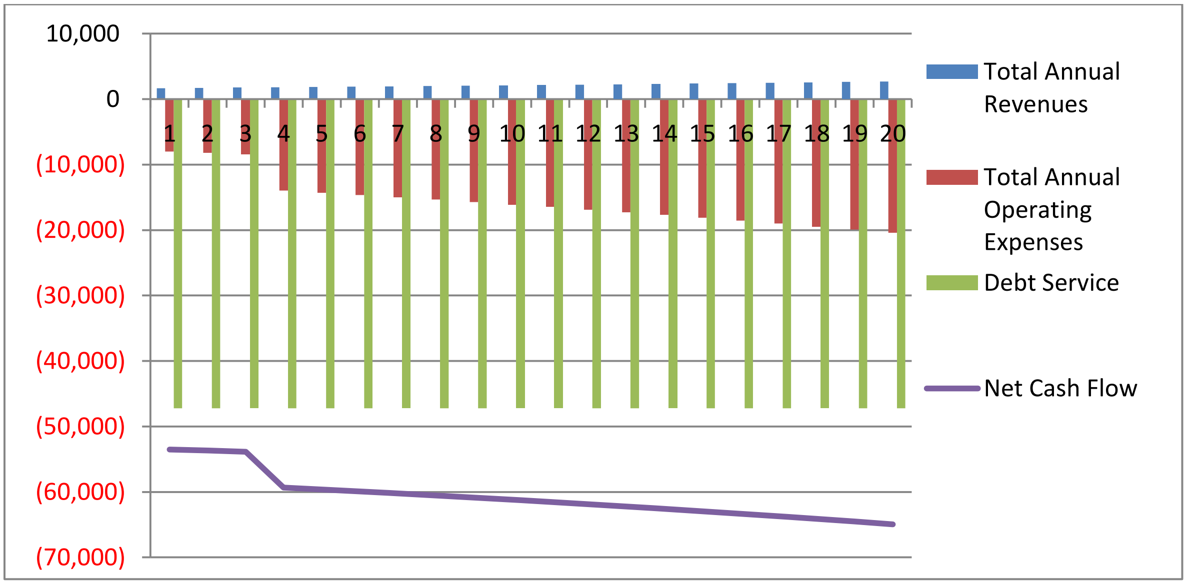
With a 50% grant, assuming the Community sticks with the 1/6th equity stake on the remaining balance, the 20 year investment returns are as follows:

- Net Present Value assuming 8% discount rate: -$1,040,000
- Internal Rate of Return: N/A (Negative)
- Payback Period: N/A – longer than 20 years

Northwind 100

The Northwind 100 scenario at the Industrial Site with the assumptions outlined above represents a negative 20 year investment return for the Community, with the following high level returns:

- Net Present Value assuming 8% discount rate: -$670,000
- Internal Rate of Return: N/A (Negative)
- Payback period: N/A, longer than 20 years
- Projected Revenues and debt service:



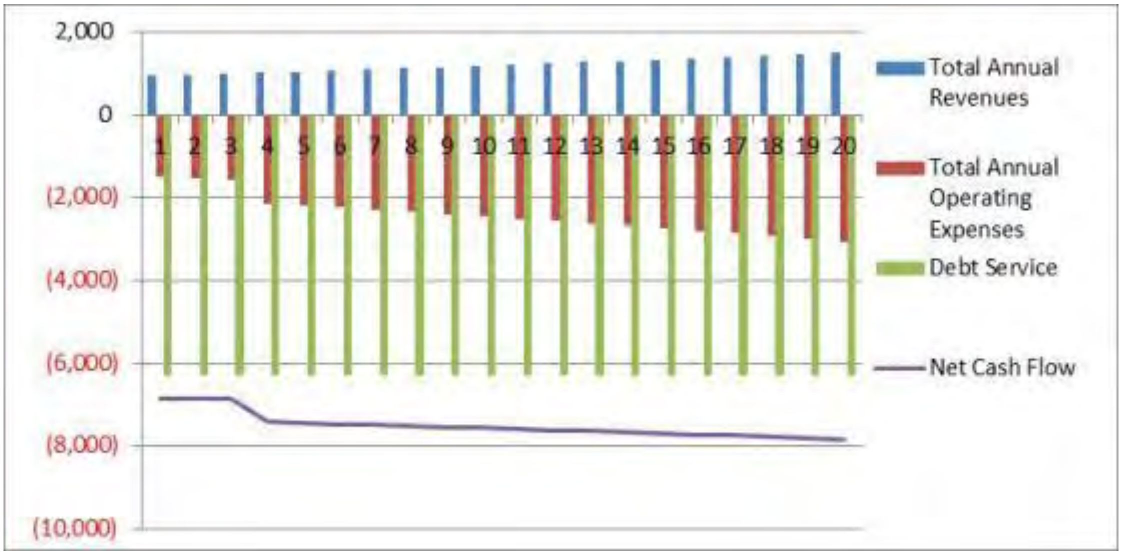
With a 50% grant, assuming the Community sticks with the $1/6^{th}$ equity stake on the remaining balance, the 20 year investment returns are as follows:

- Net Present Value assuming 8% discount rate: -$400,000
- Internal Rate of Return: N/A (Negative)
- Payback Period: N/A – longer than 20 years

Bergey Excel-S

The Bergey Excel-S net-metered to a building with the assumptions outlined above, and using an electricity rate of $0.167 per kilowatt hour, represents a negative 20 year investment for the Community, with the following high level returns:

- Net Present Value assuming 8% discount rate: -$85,804
- Internal Rate of Return: N/A (Negative)
- Payback period: N/A, longer than 20 years
- Projected revenues and debt service:



With a 50% grant, assuming the Community sticks with the 1/6th equity stake on the remaining balance, the 20 year investment returns are as follows:

- Net Present Value assuming 8% discount rate: -$48,000
- Internal Rate of Return: N/A (Negative)
- Payback Period: N/A – longer than 20 years

Discussion of Results

The low returns for the wind projects result in large part to the fact that the Projects are not able to use any federal tax incentives typically available to wind projects, since the Tribal Corporation who will own the projects has no federal tax liability. Further, the financial model assumes that there are no grants to defray the investment costs of the wind turbines. Lastly, the wind resource would be considered marginal, resulting in relatively low electricity production, especially with the Northwind 100 and the Bergey Excel S. A final consideration is that the current electricity market, which has set the power purchase agreement rate used in the financial model, is well below historical averages, and could increase over time, improving the financial picture for a wind project in the area.

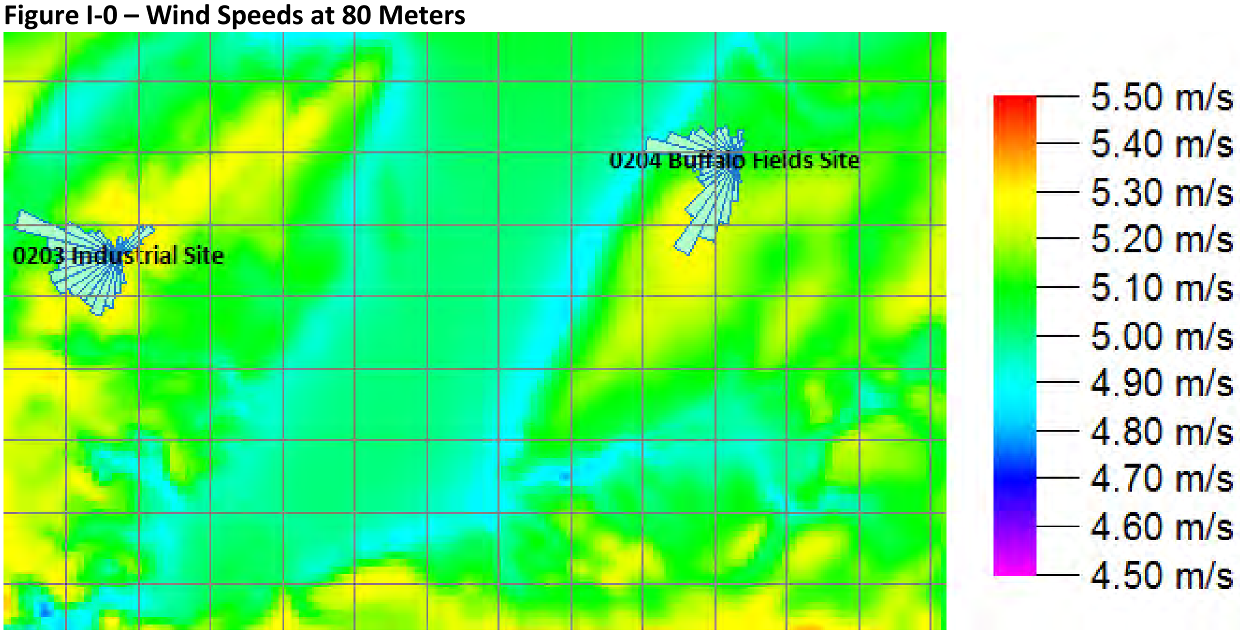
(I) METEOROLOGICAL REPORT

PROVIDE A METEOROLOGICAL REPORT, EXPLAINING AND HIGHLIGHTING WIND FLOW PATTERNS, SPEEDS, GUSTING WINDS, AND WIND SHEAR, ALL WITHIN A ONE-MILE RADIUS OF THE SITES, FOR THE DETERMINATION OF BLADE LENGTH AND HUB HEIGHT OF THE TURBINES FOR THE PROPOSED WIND TURBINE FARM ("METEOROLOGICAL REPORT")

Introduction

Two 60-meter meteorological towers were commissioned in 2011, one at the Industrial Site and one at the Buffalo Fields Site. The Industrial Site tower was commissioned on April 20, 2011 and the Buffalo Fields Site tower was commissioned on June 29, 2011. The two sites, situated about 5.5 miles apart, are similar in elevation, topography and ground cover and exhibit a similar wind resource. Figure I-0 shows the overall wind resource based on the measured data from each of the two met towers.

Figure I-0 – Wind Speeds at 80 Meters



Tower and Sensor Configuration

Wind monitoring was performed using NRG Systems 60-meter XHD NOW measurement systems. The towers are both tilt-up (including 10-inch and 8-inch diameter tubes) secured with four sets of guy-cables attached to 12 earth anchors set in the ground. Six calibrated #40 NRG anemometers and two #200P wind vanes were configured on each tower at different heights to provide both redundant measurements and allow for the accurate calculation of wind shear. Each sensor was installed on a 2.4-meter side mount boom providing an IEC compliant tower diameter to boom length ratio of 10:1. Specific sensor configuration details for both towers are found in Appendix G and summarized in Table I-1 below.

Table I-1 – Met Tower Sensor Configuration

Sensor Type	Height	Orientation to True North	Boom Length
Anemometer NRG #40C	58.00m	180	2.40m
Anemometer NRG #40C	58.00m	270	2.40m
Windvane NRG #200P	53.50m	180	2.40m
Anemometer NRG #40C	50.00m	180	2.40m
Anemometer NRG #40C	50.00m	270	2.40m
Windvane NRG #200P	47.50m	180	2.40m
Anemometer NRG #40C	40.00m	180	2.40m
Anemometer NRG #40C	40.00m	270	2.40m
Temperature NRG #110S	2.00m	0	NA

Data Logger Configuration

NRG Symphonie PLUS Data Recorders were used to collect the site wind resource data. The data logger measures actual wind speed every two-seconds and then calculates and stores a 10-minute average wind speed, along with standard deviation, maximum sample and minimum sample within the 10-minute averaging interval. The same measurements are calculated and recorded for temperature and wind direction. The data from the loggers was retrieved manually through on-site visits by Mark Carlson every few months. Detailed logger information is included in Appendix G.

Monitoring Period

Although the Industrial Site tower was erected and commissioned on April 20, 2011, and has operated continuously ever since, the Buffalo Fields site wasn't erected until June 30th, 2011. As such, we have decided to evaluate the period covering June 30th, 2011 through June 29th, 2012, which will allow a more accurate comparison of the data sets for each tower.

Quality

Over the course of the monitoring period, overall data recovery from the site was perfect with a 100 percent recovery rate. The data was processed to remove erroneous readings due to winter icing events, which occur when freezing rain stops the anemometers from spinning correctly. These erroneous readings amounted to approximately 2% of the data and were not used in this report.

Results Summary

Industrial Site

The site demonstrated an average 58-meter wind speed of 4.47 meters per second with a prevailing southwesterly orientation. A 4.47 m/s wind is considered a Batelle Class 1 or “low” wind resource with an average power density of 94 watts per meter^2 and a mean energy content of 825 kWh per meter^2. The highest recorded wind gust was 14.6 m/s on July 2nd, 2011.

The calculated wind shear coefficient, which indicates how the wind speed changes with increasing height (on a scale of 0 to 1), is 0.562. This is an extremely high wind shear but is consistent with similar sites that have a relatively low wind speed and are surrounded by mature forests.

The recorded turbulence intensity at 58 meters was 22.5 percent. This is a high turbulence level which means that the wind speed varied substantially during each measurement interval. Turbine fatigue and maintenance needs are reduced at sites with low turbulence levels. This high turbulence level is expected at heavily forested sites with low or moderate wind speeds.

The wind resource exhibited a distribution shape factor (Weibull) of K= 2.1. A normal wind speed distribution with K = 2 is the basis for estimating energy production from standard wind turbine power curves. This standard K value means the distribution of wind speeds is close to “normal”.

Table I-2 below shows the summary results from the Industrial Site at each monitoring height. The most relevant information is highlighted as bold text.

Buffalo Fields Site

Buffalo Fields had an average 58-meter wind speed of 4.42 meters per second with a prevailing southwesterly orientation. A 4.42 m/s wind speed is considered a Batelle Class 1 or “low” wind resource with an average power density of 85 watts per meter^2 and a mean energy content of 898 kWh per meter^2. The highest recorded wind gust was 18.2 m/s on April 18th, 2012.

The calculated wind shear coefficient, which indicates how the wind speed changes with increasing height, is 0.492. This is an extremely high wind shear but is consistent with similar sites that have a relatively low wind speed and are surrounded by mature forests.

The recorded turbulence intensity at 58 meters was 20 percent. This is a high turbulence level which means that the wind speed varied substantially during each measurement interval. Turbine fatigue and maintenance needs are reduced at sites with low turbulence levels. This high turbulence level is expected at heavily forested sites with low or moderate wind speeds.

The wind resource exhibited a distribution shape factor (Weibull) of K= 1.8. A normal wind speed distribution with K = 2 is the basis for estimating energy production from standard wind turbine power curves. This standard K value means the distribution of wind speeds is close to “normal”.

Table I-3 below shows the summary results from the Industrial Site at each monitoring height. The most relevant information is highlighted as bold text.

Table I-2 – Industrial Site Met Tower Sensor Configuration

Variable	Speed 58 m A	Speed 58 m B	Speed 50 m A	Speed 50 m B	Speed 40 m A	Speed 40 m B
Measurement height (m)	**58**	**58**	**50**	**50**	**40**	**40**
Mean wind speed (m/s)	**4.455**	**4.402**	**4.127**	**4.07**	**3.566**	**3.6**
MoMM wind speed (m/s)	4.455	4.401	4.127	4.07	3.566	3.6
Median wind speed (m/s)	4.3	4.3	4	3.9	3.4	3.4
Min wind speed (m/s)	0.4	0.4	0.4	0.4	0.4	0.4
Max wind speed (m/s)	14.8	14.6	14.1	14	13.3	13.1
Weibull k	**2.119**	**2.134**	**2.146**	**2.068**	**1.937**	**2.033**
Weibull c (m/s)	5.004	4.944	4.643	4.569	3.999	4.047
Mean power density (W/m²)	**94**	**90**	**75**	**73**	**52**	**52**
MoMM power density (W/m²)	94	90	75	73	52	52
Mean energy content (kWh/m²/yr)	825	791	657	642	459	457
MoMM energy content (kWh/m²/yr)	825	791	657	642	460	457
Energy pattern factor	1.757	1.748	1.761	1.795	1.909	1.847
Frequency of calms (%)	1.86	2.04	1.6	2.54	3.09	2.44
Possible records	52,156	52,156	52,156	52,156	52,156	52,156
Valid records	51,232	51,232	51,232	51,232	51,232	51,232
Missing records	924	924	924	924	924	924
Data recovery rate (%)	98.23	98.23	98.23	98.23	98.23	98.23

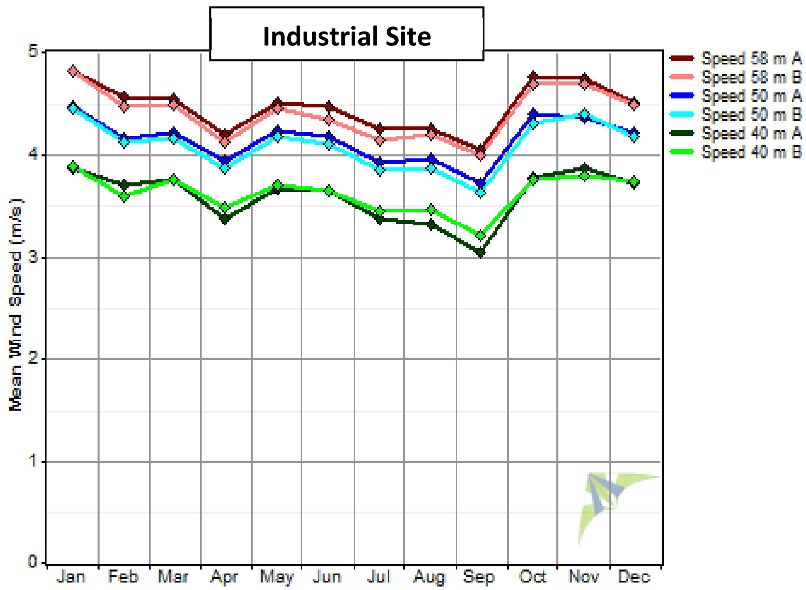
Table I-3 – Buffalo Fields Met Tower Sensor Configuration

Variable	Speed 58 m A	Speed 58 m B	Speed 50 m A	Speed 50 m B	Speed 40 m A	Speed 40 m B
Measurement height (m)	**58**	**58**	**50**	**50**	**40**	**40**
Mean wind speed (m/s)	**4.385**	**4.452**	**4.142**	**4.139**	**3.658**	**3.71**
MoMM wind speed (m/s)	4.384	4.451	4.141	4.138	3.657	3.709
Median wind speed (m/s)	4.3	4.3	4	4	3.5	3.6
Min wind speed (m/s)	0.4	0.4	0.4	0.4	0.4	0.4
Max wind speed (m/s)	18.2	18.4	16.9	17.2	15.2	15.3
Weibull k	**1.802**	**1.859**	**1.895**	**1.88**	**1.76**	**1.838**
Weibull c (m/s)	4.894	4.983	4.646	4.638	4.077	4.151
Mean power density (W/m^2)	**103**	**105**	**85**	**85**	**61**	**62**
MoMM power density (W/m^2)	103	105	85	85	61	62
Mean energy content ($kWh/m^2/yr$)	898	923	740	741	538	545
MoMM energy content ($kWh/m^2/yr$)	898	923	740	741	538	545
Energy pattern factor	1.99	1.955	1.948	1.952	2.052	1.993
Frequency of calms (%)	3.56	2.7	2.23	2.66	4.55	3.36
Possible records	52,704	52,704	52,704	52,704	52,704	52,704
Valid records	52,485	52,485	52,362	52,244	52,443	52,485
Missing records	219	219	342	460	261	219
Data recovery rate (%)	99.58	99.58	99.35	99.13	99.5	99.58

Monthly Wind Speeds

Figure I-3 and Table I-4 show how the wind speed varies by month throughout the 12-month-long monitoring period at both sites. As is typical in the upper Midwest, the summer months show the lowest average wind speeds and the strongest winds are present in cooler winter months.

Figure I-3 – Monthly Wind Speeds



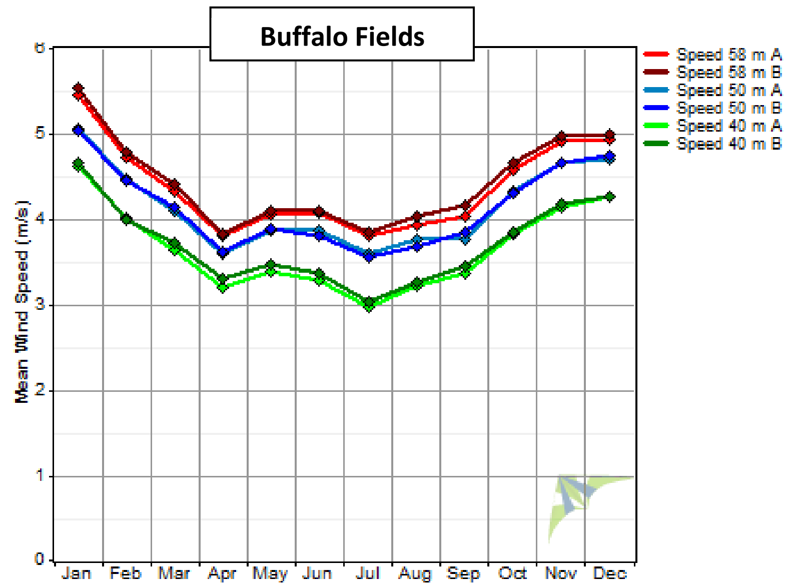


Table I-4 – Monthly Wind Speeds at 58 Meters (meters per second)

Industrial Site

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
4.82	4.56	4.55	4.20	4.51	4.46	4.25	4.24	4.05	4.75	4.75	4.50

Buffalo Fields

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
4.82	4.56	4.55	4.76	4.13	4.19	4.25	4.25	4.05	4.75	4.75	4.50

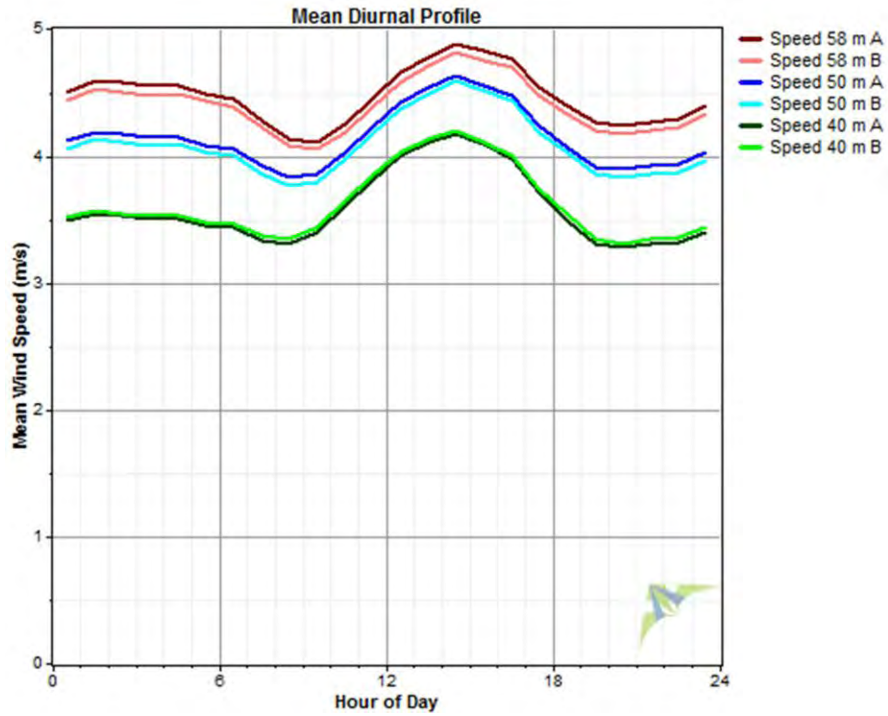
Daily Variation – Industrial Site

Table I-5 Table of Hourly Averages

Hour of Day	Mean Wind Speed (m/s)
0.5	4.50
1.5	4.60
2.5	4.58
3.5	4.55
4.5	4.55
5.5	4.50
6.5	4.45
7.5	4.28
8.5	4.13
9.5	4.10
10.5	4.25
11.5	4.45
12.5	4.65
13.5	4.78
14.5	4.89
15.5	4.83
16.5	4.76
17.5	4.54
18.5	4.40
19.5	4.26
20.5	4.25
21.5	4.27
22.5	4.29
23.5	4.40

average	4.47
on-peak avg	4.47
off-peak avg	4.47

Figure I-6 Daily Wind Speeds



The diurnal (daily) variation of the wind resource is shown in Table I-5 below and in Figure I-6. Analysis of the data show that the wind resource during the peak demand (defined as 8 a.m. to 10 p.m.) is 4.45 m/s compared to the off-peak average wind speed of 4.46 m/s. This suggests that the value of the power can be seen as having a neutral impact on the grid.

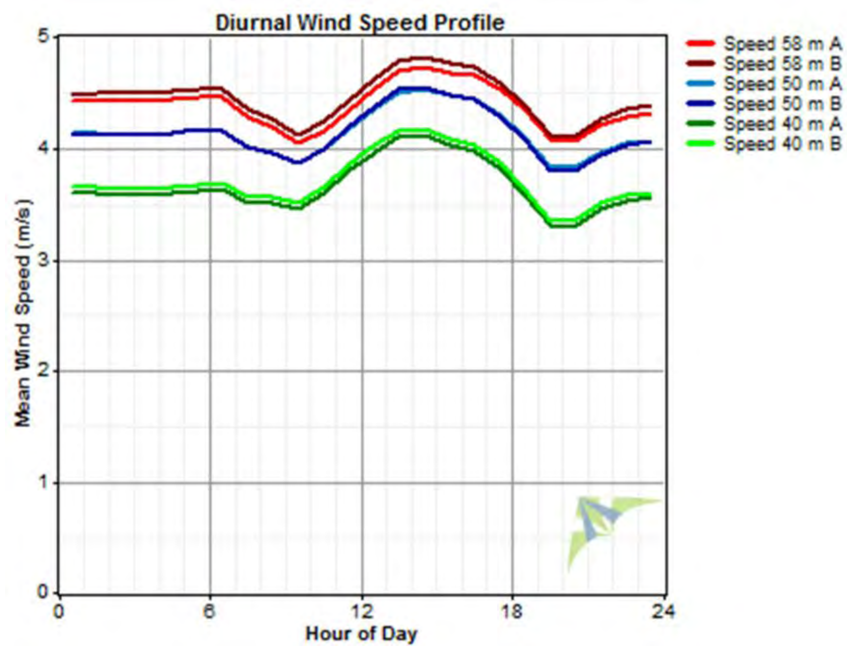
Daily Variation – Buffalo Fields Site

Table I-7 Table of Hourly Averages

Hour of Day	Mean Wind Speed (m/s)
0.5	4.42
1.5	4.43
2.5	4.44
3.5	4.42
4.5	4.44
5.5	4.46
6.5	4.45
7.5	4.28
8.5	4.20
9.5	4.05
10.5	4.16
11.5	4.34
12.5	4.53
13.5	4.70
14.5	4.73
15.5	4.68
16.5	4.66
17.5	4.53
18.5	4.35
19.5	4.08
20.5	4.07
21.5	4.21
22.5	4.29
23.5	4.32

average	4.39
on-peak avg	4.38
off-peak avg	4.40

Figure I-8 Daily Wind Speeds



The diurnal (daily) variation of the wind resource at Buffalo Fields is shown in Table I-7 below and in Figure I-8. Analysis of the data show that the wind resource during the peak demand (defined as 8 a.m. to 10 p.m.) is 4.38 m/s compared to the off-peak average wind speed of 4.40 m/s. This suggests that the value of the power can be seen as having a neutral impact on the grid.

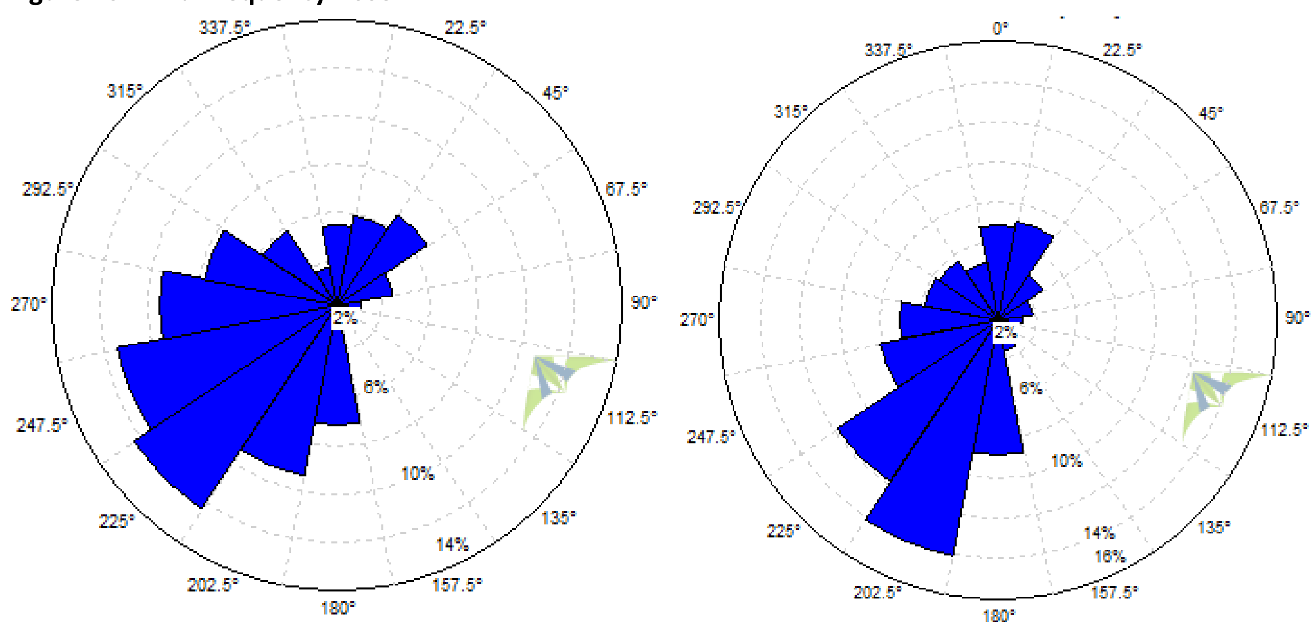
Wind Direction

The prevailing wind direction is an important factor to consider when determining the location of a turbine, especially in an area that has varied landscape characteristics, including ground cover, elevation changes and other obstacles to wind flow. As described previously, the ideal site for a wind turbine is upwind of obstacles that impede the smooth flow of the wind.

The two wind vanes constantly measured wind direction and recorded the average value every ten minutes. The wind direction data were then processed into a “wind rose” or graphical representation of the prevailing wind profiles. Figure I-9 shows the wind rose frequency distribution (as a percent of time) of the wind speeds by degree direction from North at each site. In this case, it is observed that the prevailing winds originate from the southwest with a secondary influence from the northeast.

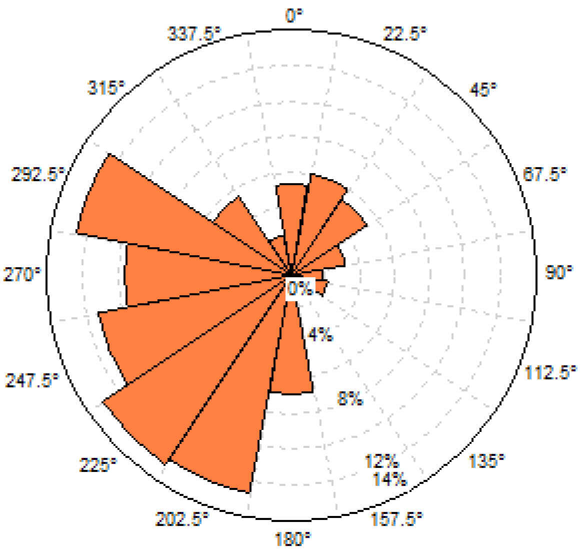
However, wind direction alone is insufficient to make an informed decision about the site layout requirements. The energy density of the wind as a function of the prevailing direction(s) must also be calculated. The result is a “wind energy direction” map that shows the direction of the winds with the highest energy content. Figure I-8 shows that winds with the highest energy originate from the west. The west and southwest sectors account for nearly 70% of available energy.

Figure I-9 Wind Frequency Rose

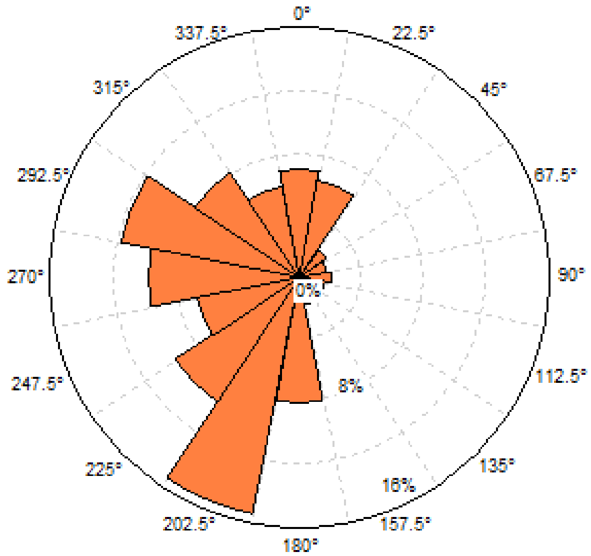


Industrial Site **Buffalo Field Site**

Figure I-10 Wind Energy Roses



Industrial Site



Buffalo Field Site

Wind Shear

Wind shear describes how the wind speed changes with increasing elevation above the ground. Small turbines are typically installed on towers between 30 and 45 meters while medium size wind turbines are now typically installed on 60-to-80 meter towers and many companies are beginning to offer 100 and 120 meter towers for large turbines. Given the wide range of possible turbine heights it is critical to accurately estimate the expected wind speed at a proposed turbine height based on information obtained from the met tower. This is why anemometers are installed at multiple elevations on a met tower: 40-meters, 50-meters and 58-meters in this case.

The difference in wind speed at each height enables calculation of a wind shear coefficient that is then used to predict the wind speed at other heights. In general, the rate at which the wind speed increases with height slows down as the height increases. In other words, the biggest wind speed change will occur at lower elevations due to the effect of trees, buildings, crops and other sources of ground drag. Regardless, since the power in the wind is proportional to the cube of the wind speed, small changes in average wind speeds at higher elevations will have a significant impact on the available power and the total amount of energy production.

Based on the actual wind speed measurements at 40-, 50- and 58-meters, the calculated wind shear coefficient for the Industrial Site is 0.603, and for the Buffalo Fields Site is 0.49. Using this coefficient we can calculate the windspeed at heights above the met tower.

Table I-11 Extrapolated Wind Speeds

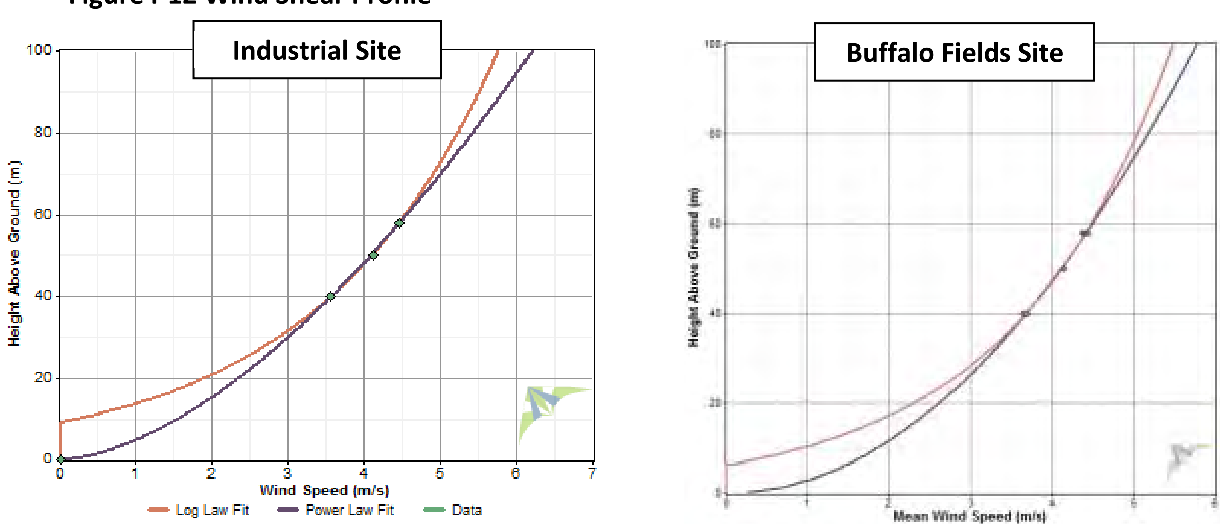
Industrial Site

Height	Wind speed
100	6.04
80	5.33
58	4.46
50	4.13
40	3.57

Buffalo Fields

Height	Wind speed
100	5.78
80	5.18
58	4.21
50	4.11
40	3.68

Figure I-12 Wind Shear Profile

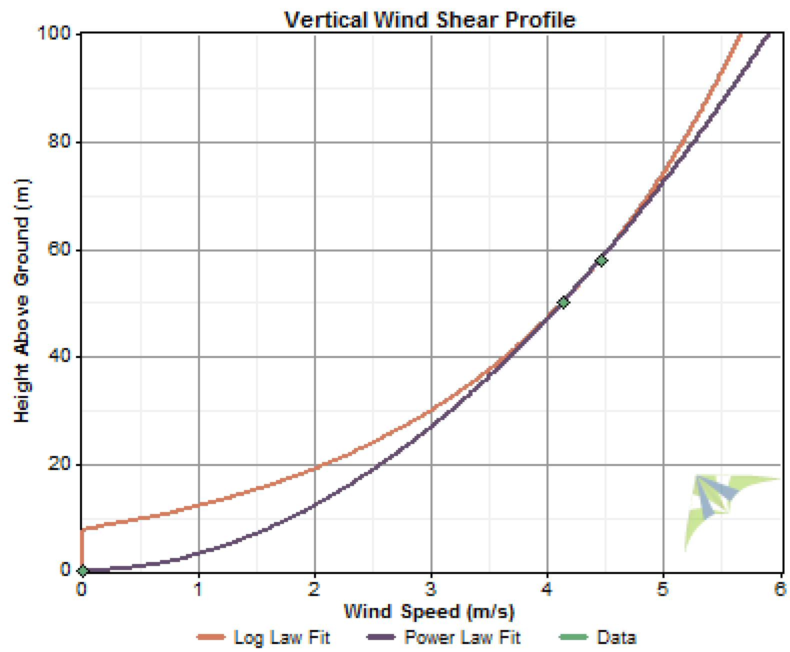


The wind shear value at the Industrial Site of 0.603 shown above is extremely high even at a site within a mature forest. In order to reduce the effect of nearby vegetation and provide a more accurate, conservative wind shear value we can exclude the measurement from the lowest anemometer. Our analysis and conclusions in this report are based on an adjusted wind shear of 0.515, calculated by using wind speed measurements at 50m and 58m. This wind shear value still suggests that this site will see significant changes in wind speed with increased wind turbine tower height. Table I-11 and Figure I-12 show the windspeeds at 80m and 100m with a lower windshear value.

Table I-13 Extrapolated Wind Speeds at Industrial Site

Height	Windspeed
100	5.84
80	5.22
58	4.46
50	4.13

Figure I-14 Wind Shear Profile at Industrial Site



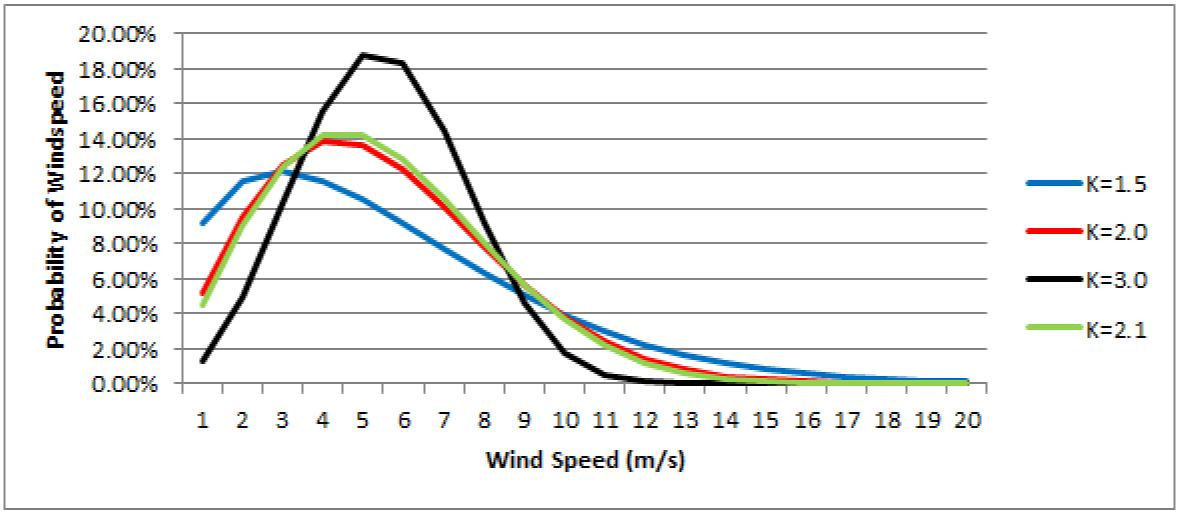
Wind Speed Distribution

The primary goal of a wind resource monitoring project is to develop a data set that will allow accurate predictions of wind turbine energy production. Turbine energy production is determined by comparing a wind turbine's rated power at any given wind speed (its power curve) to the expected hours per year the wind blows at any given wind speed.

The wind variation for a typical site is usually described using the Weibull Distribution. The Weibull distribution is defined by the site's mean wind speed and a parameter known as the "shape factor" symbolized by the letter "k." A lower shape factor indicates a more uniformly distributed wind speed while a higher k-value indicates that more of the wind will tend to blow at speeds near the mean with less high-speed (high energy component) values.

The Industrial Site has a mean wind speed of 4.46 m/s and a "best-fit" shape factor of k= 2.12. Figure I-15 below shows the recorded wind speed distribution as well as wind speed distribution curve changes for a constant mean wind speed of 4.46 m/s for several different shape factors. Inspection of the curves show that the higher shape factor curves have less high wind speed periods than lower k curves. This indicates the Industrial Site will produce nearly the same amount of energy from any given turbine as a perfectly normal site with k=2.

Figure I-15 Wind Speed Distribution at Industrial Site



Buffalo Fields Site

The Buffalo Fields Site has a mean wind speed of 4.21 m/s and a "best-fit" shape factor of k=1.80, which is also close enough to k=2 to produce nearly the same amount of energy from any given turbine as the perfectly normal site.

Data Confidence

Although the data collected from the met tower spans a full year, it is important to note that the data set does not provide a long-term statistical model of the wind resource that is 100% accurate. Wind speeds vary from year to year and even a three-year study only provides a 95% certainty level.

To obtain greater certainty, a long-term correlation study could be completed which compares the wind speed trend during the 12-month monitoring period to 10 years of nearby climate records from a nearby public meteorological station, such as the Houghton County Memorial Airport. Once the long-term trend is understood, the shorter 12-month dataset would be adjusted either upward or downward to represent the long-term wind speed.

Additional Meteorological Considerations

In addition to measured wind characteristics, turbine suppliers may request information about general climate conditions in order to determine what turbine configuration is most appropriate for the chosen site. Should the Tribe proceed with discussions with a particular turbine manufacturer, a site suitability survey will likely need to be completed which includes extreme winds, turbulence levels, and temperature extremes. This information can be derived from the final met tower data when a project moves to the next phase of development.

(J) Bird and Bat Study

PROVIDE A BIRD AND BAT STUDY, INCLUDING, BUT NOT LIMITED TO THE IDENTIFICATION OF MIGRATORY FLIGHT PATTERNS OF BIRDS AND BATS WITHIN A ONE-MILE RADIUS OF THE SITES

Introduction

Knowledge of biological resources near proposed wind turbines is an important tool to assist in identifying areas of potential concern, and informing siting decisions. The Keweenaw Bay Indian Community (KBIC) is considering erecting one or multiple wind turbines within the L'Anse Indian Reservation (collectively, the "Sites"). This report is intended to describe wildlife and biological resources within a one mile radius of the proposed wind turbine sites in order to provide a fuller understanding of the potential impacts of installing wind turbines at the Sites.

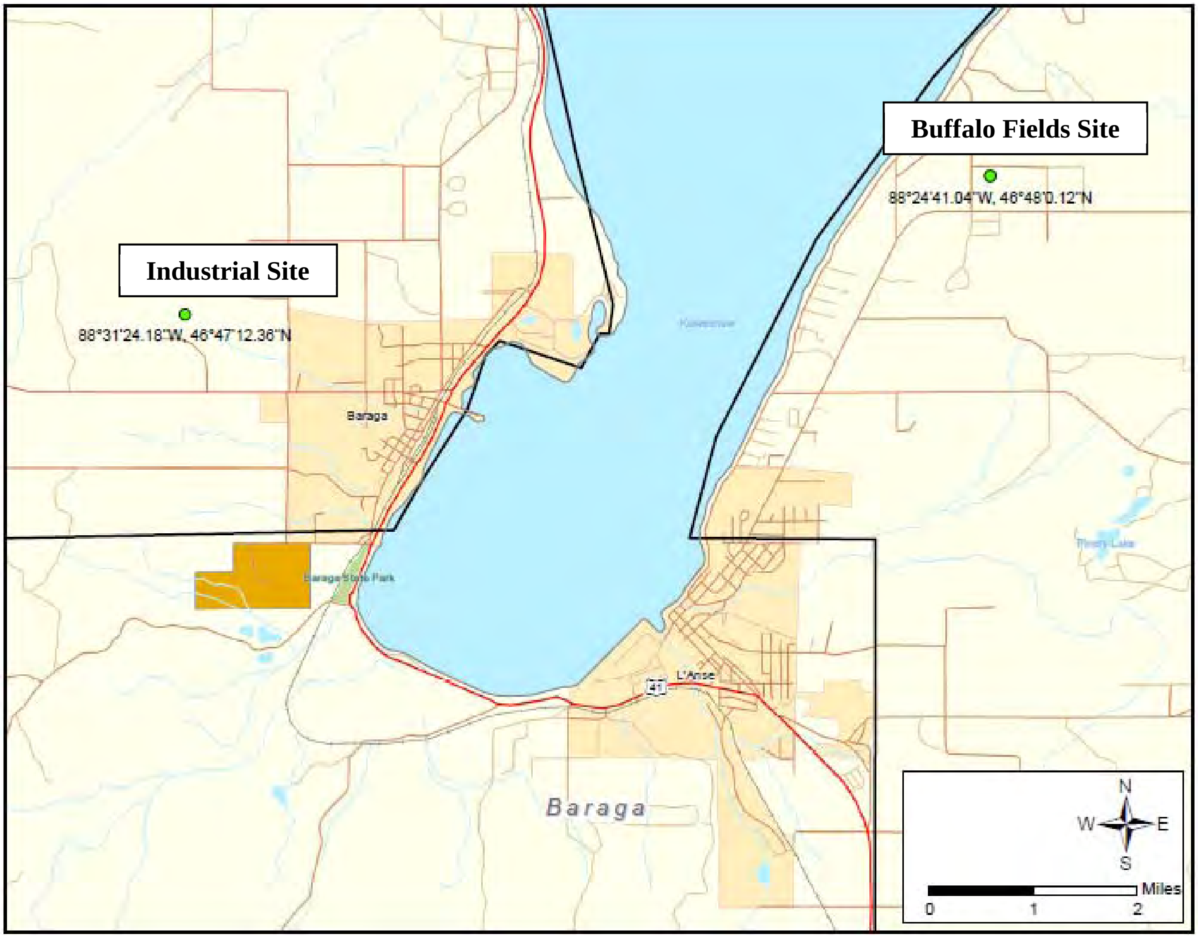
Methods

Biological and wildlife features within the vicinity of the Sites were evaluated through a survey of existing data as well as a site visit on April 3rd & 4th, 2012. Several sources of available data were used to characterize the biological resources in the area around the proposed sites, including public literature, field guides, and public data sets. The purpose of the site visit was to identify important physical features of the site, photograph representative habitats, and identify wildlife on site. A list of observed wildlife is included in Table J-1.

Study Area

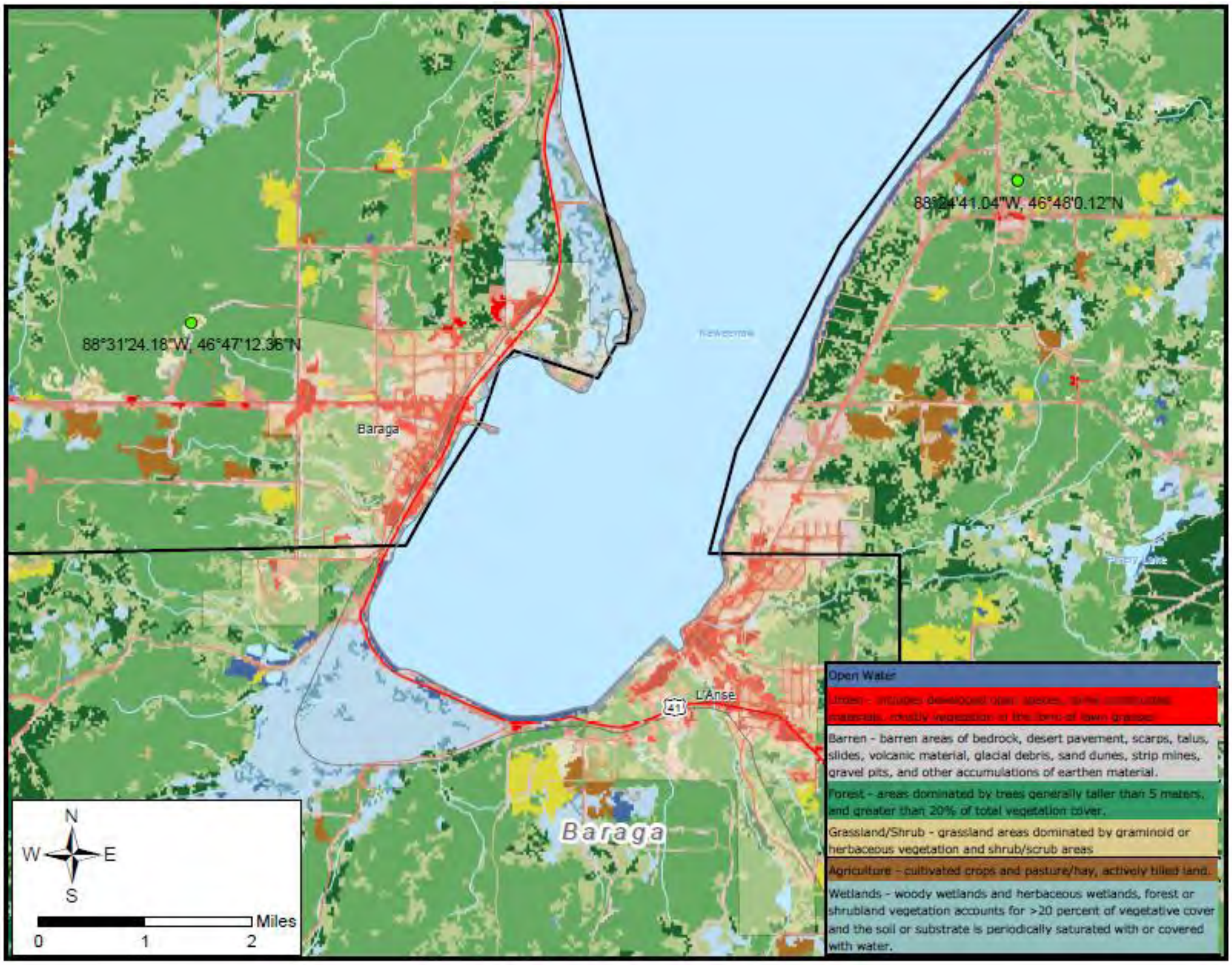
The proposed wind turbine(s) would be located at one of two sites within the L'Anse Indian Reservation: the "Industrial Site", located west of Baraga, or the "Buffalo Fields Site", located northeast of L'Anse (see Figure J-1).

Figure J-1 Overview Map of Sites and Vicinity



Both Sites are within the Western Upper Peninsula ecoregion, which encompasses almost 25,000 square miles and includes all of Baraga, Iron, Houghton, Keweenaw, Ontonagon and Gogebic counties and portions of Menominee, Dickinson and Marquette counties in Michigan. Land cover in the ecoregion consists primarily of forest (81%) and wetlands (11%), with agricultural and urban uses covering only 2% each. Figure J-2 shows the land cover in the vicinity of the Sites.

Figure J-2 Land Cover Vicinity Map[5]



The region is underlain by highly resistant igneous and metamorphic bedrock of the Precambrian Shield. Glaciers have overridden the section many times, eroding some of the underlying bedrock and redepositing glacial drift upon the bedrock or older underlying glacial deposits, resulting in a diverse landscape of glacially scoured bedrock ridges and glacial features, including moraines, lake beds, and outwash channels and plains, which create heterogeneous micro-habitats that support unique cliff, glade and lakeshore biotic communities. The ecoregion also contains wetlands, made up of bogs, fens and wet meadows. These also provide unique habitat features that attract high densities of sensitive species.

The primary land use in the ecoregion is production forestry, which has over the past two centuries changed the character of the many parts of the forest from largely northern hardwoods and pine to aspen, paper birch and jack pine.[6]

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[5] Source data from National Land Cover Database, http://www.mrlc.gov/nlcd06_data.php
[6] Michigan Wildlife Action Plan, Terrestrial Systems: Western Upper Peninsula, Michigan DNR, 6/2005

Wildlife

On April 3rd – 4th, 2012, a site visit was performed to identify both habitat features and bird species within a one-mile radius of the Sites. Table J-1 contains a list of the species identified on the site visit in the order that they were seen.

Table J-1 Bird Species Identified On Site Visit

Industrial Site

Common Name	*Scientific Name*	Number
Common Raven	*Corvus Corax*	2
Savannah Sparrow	*Passerculus sandwichensis*	6
White-breasted nuthatch	*Sitta carolinensis*	1
Black-capped chickadee	*Poecile atricapillus*	6
American Robin	*Turdus migratorius*	16
Northern Flicker	*Colaptes auratus*	1
Ring-billed Gull	*Larus delawarensis*	8
Goldfinch	*Spinus tristis*	2
Downy Woodpecker	*Picoides pubescens*	1
American Kestrel	*Falco sparverius*	1
Bald Eagle	*Haliaeetus leucocephalus*	1

Buffalo Fields Site

Common Name	*Scientific Name*	Number
American Robin	*Turdus migratorius*	4
Ring-billed Gull	*Larus delawarensis*	4
Dark-eyed Junco	*Junco hyemalis*	7
American Crow	*Corvus brachyrhynchos*	2
Northern Flicker	*Colaptes auratus*	2
Goldfinch	*Spinus tristis*	3
Chipping Sparrow	*Spizella passerina*	1
American Tree Sparrow	*Spizella arborea*	3
Common Raven	*Corvus corax*	1
Turkey Vulture	*Cathartes aura*	2
Pileated Woodpecker	*Dryocopus pileatus*	1

Raptors

Species likely to occur in the area

Based on information compiled from the Michigan Bird Records Committee, 27 raptor species are known to occur in the Upper Peninsula, including 10 species of owls. 18 of these 27 raptor species are known to nest in the Upper Peninsula.

Table J-2 - Raptor Species Known to Occur in the Upper Peninsula[7]

Common Name	*Scientific Name*	Nests in area?
Osprey	*Pandion haliaetus*	Y
Mississippi Kite	*Ictinia mississippiensis*	N
Bald Eagle	*Haliaeetus leucocephalus*	Y
Northern Harrier	*Circus cyaneus*	Y
Sharp-shinned hawk	*Accipiter striatus*	Y
Cooper's hawk	*Accipiter cooperii*	Y
Northern goshawk	*Accipiter gentilis*	Y
Red-shouldered hawk	*Buteo lineatus*	Y
Broad-winged hawk	*Buteo platypterus*	Y
Swainson's hawk	*Buteo swainsoni*	N
Red-tailed hawk	*Buteo jamaicensis*	Y
Rough-legged hawk	*Buteo lagopus*	N
Golden eagle	*Aguila chrysaetos*	N
American kestrel	*Falco sparverius*	Y
Merlin	*Falco columbarius*	Y
Gyrfalcon	*Falco rusticolus*	N
Peregrine falcon	*Falco peregrines*	Y
Great horned owl	*Bubo virginianus*	Y
Snowy owl	*Bubo scandiacus*	N
Northern hawk owl	*Surnia ulula*	N
Burrowing owl	*Athene cunicularia*	N
Barred owl	*Strix varia*	Y
Great gray owl	*Strix nebulosa*	N
Long-eared owl	*Asio otus*	Y
Short-eared owl	*Asio flammeus*	Y
Boreal owl	*Aegolius funereus*	N
Northern saw-whet owl	*Aegolius acadicus*	Y
Turkey Vulture	*Cathartes aura*	Y

Though the above table provides good information about the potential for various raptor species to occur in the vicinity of the Sites, it does not contain information about abundance, which is critical to determining the magnitude of potential impacts.

[7] Michigan Upper Peninsula bird list from the Michigan Bird Records Committee, 12/31/2003

Fortunately, in the spring of 2010, the Copper County and Laughing Whitefish Audubon Societies conducted a raptor survey on the Keweenaw Peninsula (Table J-3). Though the survey was taken from Brockway Mountain, which is approximately 60 miles NNW of Baraga near the tip of the peninsula, it is included to provide a general indication of the prevalence of different raptor species in the general vicinity of the Sites. The survey took place between March 15th and June 15th of 2010.

Table J-3 Keweenaw Raptor Survey Results[8]

RAPTOR SPECIES	FRD	LRD	Season Total	Day high count
Turkey Vulture	31-Mar	12-Jun	756	71 on 4/15
Osprey	14-Apr	13-Jun	47	6 on 4/29-30, 5/1
Bald Eagle	13-Mar	13-Jun	821	98 on 3/31
Northern Harrier	18-Mar	31-May	145	28 on 4/18
Sharp-shinned Hawk	18-Mar	15-Jun	1581	393 on 5/1
Cooper's Hawk	31-Mar	24-May	22	4 on 5/1, 5/15
Northern Goshawk	17-Mar	24-May	29	5 on 5/3
Red-shouldered Hawk	31-Mar	9-May	9	2 on 4/6
Broad-winged Hawk	15-Apr	14-Jun	4851	988 on 5/1
SWAINSON'S HAWK	27-Apr	18-May	7	2 on 5/1
Red-tailed Hawk	22-Mar	14-Jun	746	79 on 3/31
Rough-legged Hawk	23-Mar	24-May	119	20 on 4/15
Golden Eagle	13-Mar	20-May	31	6 on 3/26
American Kestrel	31-Mar	11-Jun	91	18 on 4/14
Merlin	26-Mar	10-Jun	42	4 on 4/2, 4/13
Peregrine Falcon	14-Apr	18-May	20	6 on 5/16
Unidentified raptors			192	
Total Individuals			9509	

The broad-winged hawk is by far the most abundant raptor species in the survey, followed by the sharp-shinned hawk; these two hawks collectively comprise over half of all raptors identified. Bald eagles were also relatively abundant.

Potential Raptor Nesting Habitat

No raptor nests were observed on the site visit within a one-mile radius of the potential sites. There is the potential for raptor nests to occur in the forested areas surrounding

[8] Keweenaw Raptor Survey, 2010. http://keweenawraptorsurvey.org/raptors-of-brockway/. Copper Country Audubon Society & Laughing Whitefish Audubon Society.

both sites, but there were no features that would tend to congregate large numbers of raptors in the near vicinity.

Areas of Potentially High Prey Density

The only noted area of potentially high prey density near the Sites was an informal carrion dump located approximately one half mile southwest of the Industrial Site met tower. There were multiple deer and fish carcasses that attracted a bald eagle and multiple crows. This informal dump site should be cleared to avoid attracting bald eagles and other scavenging birds if a wind turbine is installed at this site.

Besides this dump site, the Sites do not appear to have any concentrations of raptor prey that would warrant avoidance in siting wind turbine generators.

Migrating Birds

Most species of bird are protected by the Migratory Bird Treaty Act (1918). Since most songbirds migrate at heights above 900 feet[9], which is well above the tip height of modern wind turbines, migrating birds are most at risk of turbine collisions when ascending or descending from stopover habitats. It is likely that birds migrate near the proposed sites, including songbirds.

The Nature Conservancy, in partnership with Michigan State University, has compiled regional siting guidelines for wind energy facilities in the Great Lakes area. In these guidelines, they recommend avoiding areas within 5 miles of the shoreline of the Great Lakes, as "coastal areas support high concentrations of migratory birds,"[10] who use these areas as stopover habitats. The Buffalo Fields Site is about a mile from the shoreline, and the Industrial Site is about three miles from the shoreline. These recommendations are by no means prohibitive or binding in nature, but rather were prepared to provide siting information and guidance for potential renewable energy projects in the Great Lakes. They are included here to provide context, and suggest that the Industrial Site may have a lesser impact on migratory birds due to its greater distance from the shoreline.

Important Bird Areas (IBA) (discussed in greater depth in Section g) are designated in part for their high concentrations of migratory birds, and often serve as important stopover habitat. There are no IBAs within a five mile radius of the Sites.

In the areas surrounding the Sites, there is less forest cover and greater habitat fragmentation from development than many of the surrounding areas, making stopover of migrating birds relatively less likely than the surrounding areas of Baraga County.

[9] US Fish and Wildlife Service. 1998. Migration of Birds, Circular 16. US Department of the Interior.
[10] Page 2, Ewert, D.N., J.B. Cole, and E. Grman. 2011. Wind Energy: Great Lakes Regional Guidelines. Unpublished report, The Nature Conservancy, Lansing, Michigan.

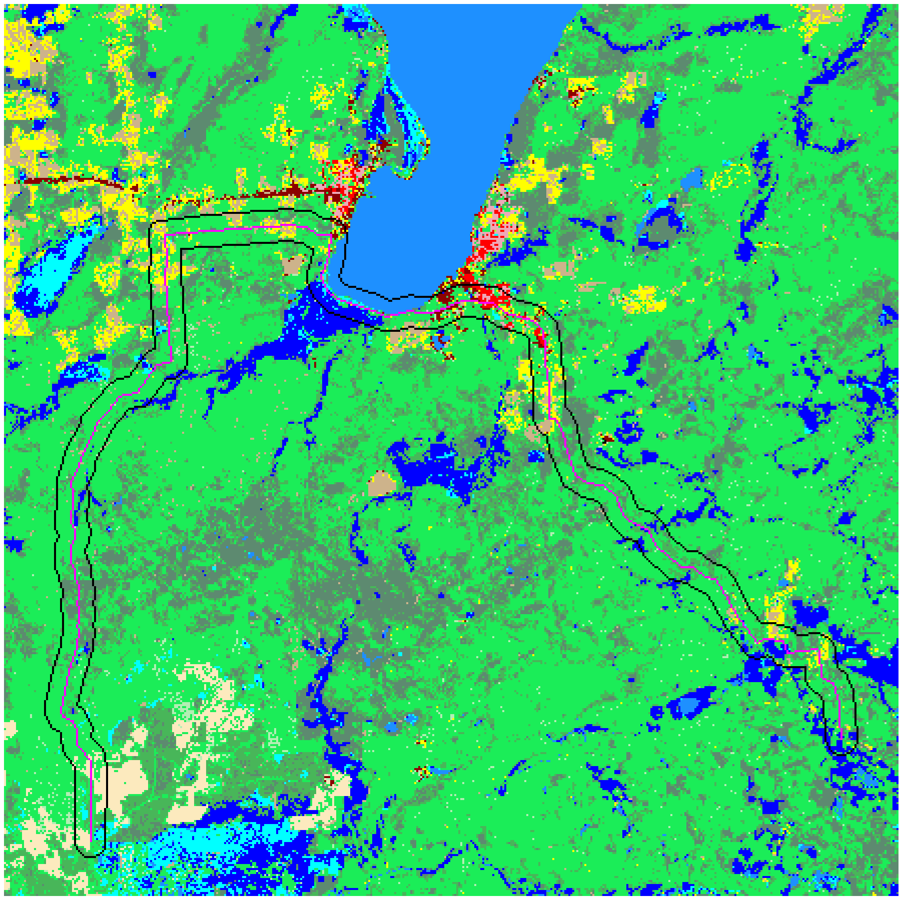
Figure J-3 Industrial Site Met Tower behind Ojibwa Builders building

Figure J-4 Buffalo Fields Met Tower with clearing and house in background

Breeding Birds

The USGS Breeding Bird Survey (BBS) route #49006 runs east to west about one mile south of the Industrial Park site (along Michigan Avenue) and six miles south of the Buffalo Fields site (along Highway 41).

Figure J-5 U.S.G.S. Breeding Bird Survey Route #49006 - Herman



Each BBS route is 24.5 miles long, and all birds seen or heard are tallied for a three-minute period every half mile along the route. A total of 125 species have been recorded during the summer breeding season along the Herman BBS route, including 3 species of raptor (broad-winged hawk, red-tailed hawk, and American kestrel). The most abundant birds were the American robin, red-winged blackbird, red-eyed vireo, white-throated sparrow, cliff swallow, European starling, tree swallow and song sparrow, all of which had an average of over 25 individuals observed per route over the 20 plus years the route has been monitored.

Discussion of Sensitive Bird Species

There are six species of bird known to occur in the western Upper Peninsula ecoregion that are listed as special concern (state-level), threatened or endangered[11] (Federal).

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[11] Michigan Natural Features Inventory, Michigan State University Extension. http://mnfi.anr.msu.edu/

Table J-4 Threatened or Endangered Bird Species in Western Upper Peninsula

Common Name	*Scientific Name*	State Status	Federal Status
Kirtland's Warbler	*Dendroica kirtlandii*	Endangered	Listed Endangered
Common moorhen	*Gallinula chloropus*	Threatened	N/A
Common loon	*Gavia immer*	Threatened	N/A
Bald eagle	*Haliaeetus leucocephalus*	Special Concern	N/A
American bittern	*Botaurus lentiginosus*	Special Concern	N/A
Osprey	*Pandion haliaetus*	Special Concern	N/A

Endangered Bird Species

The Kirtland's warbler is the only federally listed endangered species known to occur in the proximity of the proposed wind turbine sites. Kirtland's warblers have very specific habitat requirements, depending on large stands of young Jack pine to nest. As this habitat has become increasingly rare due to fire suppression, the Kirtland's warbler populations have plummeted. There are no large stands of young Jack pines within a one-mile radius of the proposed wind turbine locations, meaning it is unlikely that Kirtland's warblers will be negatively impacted by the Project.

Threatened Bird Species

There are two species of bird that are listed as threatened that have the potential to occur in the proximity of the proposed wind turbine sites: the common moorhen and the common loon.

Common moorhens are medium-sized water birds with dark bodies, a white undertail, and white flank stripes, typically found in emergent marsh habitats but also in lakes and ponds with emergent and grassy vegetation along the border. There are no emergent marsh habitats or lakes within a one mile radius of the proposed turbine locations, meaning it is unlikely that common moorhens will be affected by the Project.

The Common loon is a large, heavy-bodied bird that nests in sheltered islands on large, undeveloped inland lakes. They depend on quiet, shallow, sheltered coves to rear chicks. Although Common loons were observed on the Keweenaw Bay during the site visit, there is no suitable nesting habitat proximate to the proposed turbine locations, meaning it is unlikely that loons will nest in close proximity to the Sites. The Buffalo Fields site, due to its proximity to the shores of the Keweenaw Bay, may have a higher probability of impacts to Common loons and other waterfowl than the Industrial site.

Bird Species of Special Concern

The American bittern is a brown, medium sized heron with a stout body and neck and relatively short legs. It inhabits freshwater wetlands, especially large shallow wetlands with dense growth of emergent vegetation. As there is no suitable habitat proximate to the proposed turbine locations, it is unlikely that American bitterns will be negatively impacted by the Project.

The bald eagle is a large bird of prey immediately recognizable by their white head and tail and dark brown body. Bald eagles nest in a wide variety of habitats usually close to open water. Nests may be placed in snags or large live trees as well as on constructed platforms or utility poles. Near open water, they are resident year round. The US Fish and Wildlife Service has documented bald eagle nest sites within Baraga County, and it is likely that there are bald eagles in the general vicinity of the proposed wind turbine locations. One bald eagle was documented on the site visit at the Industrial Site, scavenging a pile of fish and deer carcasses approximately one quarter mile southwest of the meteorological tower. Keeping the surrounding area clear of carcasses and offal would decrease the potential for negative impacts to bald eagles from a wind turbine.

Bald eagles are protected under the Bald and Golden Eagle Protection Act, which prohibits anyone, without a permit from the Department of the Interior, from "taking" bald eagles, including their parts, nests or eggs. The Act defines "take" as "pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, molest or disturb." A violation of the Act can result in a fine of $100,000 ($200,000 for organizations), imprisonment for one year, or both, for a first offense. Penalties increase substantially for additional offenses, and a second violation of this Act is a felony[12].

The Osprey is a large hawk with long, narrow wings, dark brown above and white below. Historically, Ospreys nested only in trees or snags or on cliffs, but they have adapted to use some man-made structures such as utility poles and towers, chimneys, windmills, buoys, and platforms. Ospreys prefer to nest above or near open water. Since there is no open water in the immediate vicinity of either Site, it is unlikely that Ospreys will nest near the proposed turbine locations.

Bats

Bat casualties have been reported from most wind power faculties where post-construction fatality data are publicly available. Reported estimates of bat mortality at wind power facilities have ranged from 0.01 – 47.5 per turbine per year in the U.S. with an average of 3.4 per turbine per year. Most of the bat casualties at wind power facilities to date are migratory species which conduct long migrations between summer and winter habitats. The species most commonly found as fatalities at wind power facilities include hoary bat (*Lasiurus cinereus*), silver-haired bat, (*Lasionycteris noctivagans*), and eastern red bats (*Lasiurus borealis*).

[12] Bald and Golden Eagle Protection Act, US Fish and Wildlife Service, http://permits.fws.gov/ltr/ltr.shtml

The highest numbers of bat fatalities found at wind-energy facilities to date have occurred in eastern North America, on ridgetops dominated by deciduous forest. However, multiple sources have recently reported relatively high fatality rates from a project in Wisconsin, which was located in agricultural habitats, consisting mainly of corn, soybean and alfalfa fields. This report found a much different species composition than most other studies in the U.S., with a higher proportion of little brown and big brown bats compared to other published results. At this same project, a large number of resident bat fatalities were found, whereas most recorded bat fatalities at other projects in the U.S. have been migratory. Researchers postulate that these irregular results may be the result of a large bat hibernaculum in an abandoned mine approximately 30 miles from the project. Though not conclusive, this is worth considering for wind projects on the Western Upper Peninsula, where there are a number of abandoned mine shafts that serve as important bat hibernacula, including the Quincy Mine near Hancock ~25 miles north of Baraga, and the South Lake Mine near Greenland ~25 miles west of Baraga.

At least eleven bat species have been recovered during post- construction carcass searches at wind-energy facilities throughout the US, and of these, seven species have the potential to occur within one mile of the proposed wind turbine.

Table J-5 Bat Species with Potential to Occur in Baraga County, Michigan

Common Name *Scientific Name*	General Habitat	Roosting Habitat
Big brown bat *Eptesicus fuscus*	Generalists, found in most habitats; most abundant in deciduous forest	Beneath loose bark, in small tree cavities, buildings, barns and bridges
Eastern pipistrelle *Perimyotis subflavus*	Forage over water; avoid deep woods and open fields	Hibernate in caves, mines and tunnels, roost either in same location or in trees, rock crevices or barns
Eastern red bat *Lasiurus borealis*	Found wherever there are trees east of the Rocky Mountains	Roost in foliage of deciduous trees
Hoary bat *Lasiurus cinereus*	Prefer diverse forest habitats with a mix of forest and openings that provide edge habitat	Roost in large deciduous and conifer trees near edge habitat
Little brown myotis *Myotis lucifugus*	Wide variety of forest habitats; forage over water and open land	Roost in tree cavities and crevices, buildings, attics and other structures
Northern myotis *Myotis septentrionalis*	Forage over water and forest clearings	Hibernate in natural caves and deep mines; roost in either same location or forested habitats around wetlands
Silver haired bat *Lasionycteris noctivagans*	Forested areas	Hibernate in tree hollows, loose bark, cave openings and cliff crevices; roost in old growth forests

None of these bat species are listed as endangered or threatened by the USFWS.

Bats generally forage over water and over open spaces such as fields and scrub/shrub. Insect prey are likely to concentrate over water. The proposed facility will likely result in the mortality of some migratory bat species, such as hoary and silver-haired, and also resident bat species such as big brown and little brown.

Sensitive Animal Species

Federally Listed Species

One federally-listed animal species has the potential to occur in Baraga County, Michigan. The Canada lynx is a Federal Threatened species that has been recently documented to occur on the Upper Peninsula. The Upper Peninsula is not considered critical habitat for the Canada lynx; in fact there is currently no critical habitat in either Michigan or Wisconsin. As the two possible wind turbine sites are close to population centers with high levels of human activity, it is not expected that Canada lynx frequent the area within a one mile radius of the proposed sites.

State Species of Greatest Conservation Need

Species of greatest conservation need (SGCN) are species with small or declining populations or other characteristics that make them vulnerable. They include species currently federally or State listed as threatened or endangered, and other species identified through analysis of available data and recommendations from experts on particular taxa of Michigan. Table J-5 shows the SGCN that are have the potential to occur in Baraga County.

Table J-5 State Species of Greatest Conservation Need with Potential to Occur in Baraga County

Common Name *Scientific Name*	Habitat	Likelihood in Project Area
Arctic shrew *Sorex arcticus*	Found near bodies of water, esp. densely in spruce and tamarack swamps	Somewhat likely; abundance in Upper Peninsula not well quantified
Pygmy shrew *Sorex hoyi*	Found in northern coniferous and deciduous forests and open wet areas	May be present; abundance in Upper Peninsula not well quantified
Water shrew *Sorex palustris*	Found wherever there are trees east of the Rocky Mountains	May be found in Upper Peninsula; difficult to determine abundance
Silver haired bat *Lasionycteris noctivagans*	Found in forested areas; hibernate in tree hollows, loose bark, cave openings and cliff crevices; roost in old growth forests	Possibly occurs; habitat available
Red bat *Lasiurus borealis*	Found statewide; abundant across its range	Possibly occurs; habitat available
Hoary bat *Lasiurus cinereu*	Found statewide; abundant nowhere	Possibly occurs
Eastern pipistrelle *Perimyotis subflavus*	Hibernate in caves, mines and tunnels, roost in same location or trees, rock crevices or barns	Forage over water; avoid deep woods and open fields
Northern myotis *Myotis septentrionalis*	Forage over water and forest clearings; hibernate in natural caves and deep mines; roost in either same location or forests around wetlands	Possibly occurs
Gray wolf *Canis lupus*	Require large areas of contiguous forest	Abundant in Upper Peninsula; unlikely near sites due to fragmented habitat and proximity to human development
American marten *Martes americana*	Found in structurally complex, mature forests	Possible but unlikely due to fragmented habitat and proximity to human development
Moose *Alces alces*	Found in boreal and mixed deciduous forests	Present throughout Upper Peninsula
Least chipmunk *Tamias minimus*	Variety of habitats, including mixed deciduous and coniferous forests, boreal forests and sagebrush	Somewhat abundant throughout UP; range constricting northward
Northern flying squirrel *Glaucomys sabrinus*	Found in a variety of hardwood and conifer forests, swamps, snags & cavities and downed woody debris	Present throughout the Upper Peninsula
Woodland jumping mouse *Napaeozapus insignis*	Found in a variety of forest settings, ponds, river/stream/riparian/floodplain corridor, inland rock/cliff/ledge and downed woody debris	Present but not abundant throughout the Upper Peninsula
Southern red-	Found in savanna, lowland and upland shrub,	Poorly documented

backed vole *(Clethrionomys gapperi)*	hardwood & coniferous forests, bogs, ephemeral wetlands, swamps and inland lakes	
Southern bog lemming *(Synaptomys cooperi)*	Found in pasture, savanna, shrub, forests, bogs and wetlands	Present throughout the state; presence and abundance by county poorly understood
Deer mouse (*Peromyscus maniculatus* gracilis)	Found in agricultural fields, idle fields, shrubs, forests, bogs, dunes and emergent wetlands	Present throughout the Upper Peninsula, abundance fluctuates
Snowshoe hare (*Lepus americanus)*	Found in shrub, hardwood & conifer forests, bogs, swamps, and down woody debris	Present throughout UP, population declining over past 15-20 yrs

Identification of designated protected, sensitive or special wildlife habitat (e.g., Important Bird Areas)

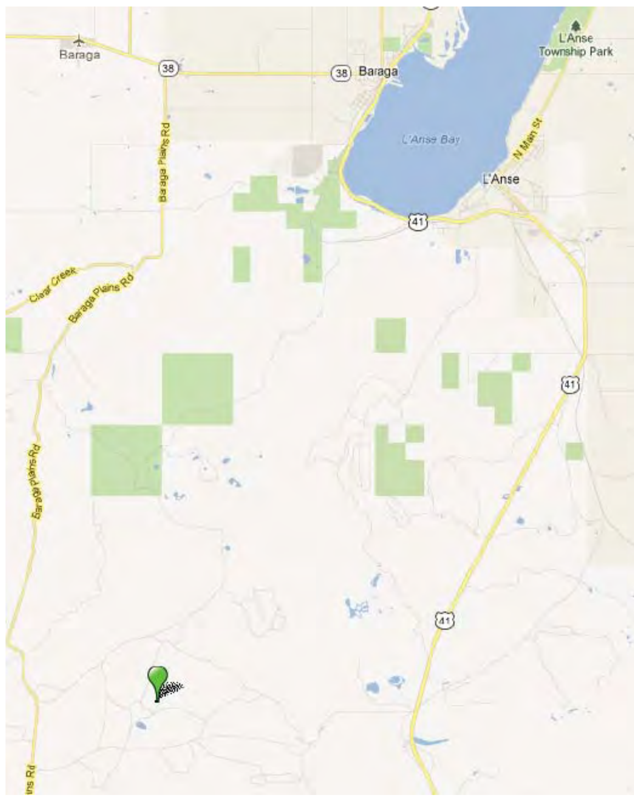
Important Bird Areas

Important Bird Areas (IBAs) are areas selected by the Audubon Society for their unique habitat characteristics, and are considered vital to birds and other biodiversity. IBAs are sites with rare and/or threatened bird species, significant species assemblages, and high concentrations of migratory birds. The Audubon Society works with landowners, public agencies, community groups and non-profits to ensure that IBAs are property managed and conserved to minimize the effects that habitat loss and degradation on birds and other biodiversity. There are two IBAs within a 20 mile radius of the proposed Sites.

Baraga Plains

Baraga Plains is a state and federally owned IBA in the boreal hardwood transition region located about 10 miles south-southwest of Baraga. Baraga Plains has a unique sandy jack pine plain that supports significant populations of spruce grouse and black-backed woodpeckers as well as occasional Kirtland's Warblers, which are a federally-listed endangered species.

Figure J- 6 Map Showing Location of Baraga Plains Important Bird Area



Sturgeon River Sloughs Important Bird Area

This area supports a variety of important wetland species, including the Northern harrier and the American bittern, a state species of special concern. Sturgeon River Sloughs is approximately 10 miles north of Baraga.

Figure J-7 Map Showing Location of Sturgeon River Sloughs Important Bird Area

There are no Nature Conservancy properties or partnership projects within 50 miles of the Sites. According to the U.S. Fish and Wildlife Service, there is no critical habitat for threatened and endangered species in Baraga County[13]

Special Status Plant Species

Construction of wind turbine generators, like any other type of construction, involves impacts on plant species in the immediate vicinity of the wind turbine and associated

[13] US Fish and Wildlife Critical Habitat for Threatened & Endangered Species Mapper: http://criticalhabitat.fws.gov/crithab/

infrastructure, including access road, crane pad and transmission facilities. The construction of a wind turbine generator at the proposed sites is unlikely to have impacts on federally listed or state sensitive plant species.

Federally listed species

According to the Michigan Natural Features Inventory[14], there are no Federally-listed endangered plant species known to occur in Baraga County.

Sensitive Plant Species

The species listed in Table J-7 have the potential to occur within Baraga County if suitable habitat is present based on the Michigan Natural Features Inventory. The majority of the sensitive plant species known to occur in the county only occur on or near bedrock outcrops or in wetlands, neither of which exist at the two potential sites. The species bordered in red are most likely to occur near the proposed sites based on habitat features.

[14] Michigan Natural Features Inventory, Rare Species Explorer, Michigan State University Extension: http://mnfi.anr.msu.edu/explorer/results.cfm

Table J-7 Sensitive Plant Species with Potential to Occur in Baraga County

Common Name *Scientific Name*	State Status	Habitat
Purple clematis *Clematis occidentalis*	Special Concern	Found in rocky forest openings in the western Upper Peninsula, and along bedrock shorelines of Lake Superior.
Douglas's hawthorn *Crataegus douglasii*	Special Concern	Found on rocky and bedrock outcrop shorelines in northern Michigan (conglomerate or basalt substrates) and thin-soiled bedrock glades and balds in near-shore areas and hilltops, often in shrubby thickets.
Fragrant cliff woodfern *Dryopteris fragrans*	Special Concern	Found on open rock outcrops in the Western Upper Peninsula (granite-quartzite and basaltic formations) as well as shaded talus slopes.
American shore-grass *Littorella uniflora*	Special Concern	Found on the sandy-mucky shores of soft water lakes and submerged in depths of water up to 3 feet or more.
Northern gooseberry *Ribes oxyacanthoides*	Special Concern	Found on igneous bedrock outcrops in the western Upper Peninsula.
Blue-eyed-grass *Sisyrinchium strictum*	Special Concern	Generally occurs in dry to moist prairies and damp sands associated with coastal plain marshes.
Goblin moonwort *Botrychium mormo*	Threatened	Occurs in mature as well as second growth mesic northern hardwood forests and, much less commonly, in coniferous forests in soil with a rich humus layer.
Floating marsh marigold *Caltha natans*	Threatened	Found in shallow, slow-moving streams often associated with beaver disturbance or shallow waters of lakes near stream mouths. Usually rooted in shallow water on muddy substrate or stranded on mud flat.
Shortstalk chickweed *Cerastium brachypodum*	Threatened	Found on rock outcrops and alvar in the Upper Peninsula. Little is known about its specific habitat requirements.
Showy orchis *Galearis spectabilis*	Threatened	Found in rich deciduous woods, often near temporary spring ponds in sandy clay or rich loam soils, or in shady, rich microhabitats alongside common spring ephemerals. Vigorous colonies can spread into more open habitat.
Narrow-leaved gentian *Gentiana linearis*	Threatened	Found primarily in wet meadows, bogs, springy areas, river and stream margins, kettle-holes, and borrow pits in the western Upper Peninsula. Usually occurs near granite-derived substrates.
Big-leaf sandwort *Moehringia macrophylla*	Threatened	Found on rock outcrops in woods, rocky shores, and cliffs.
Farwell's water milfoil *Myriophyllum farwellii*	Threatened	Found in shallow water of lakes, ponds, and marshes with mucky or peaty (occasionally sandy) bottoms in the Upper Peninsula.
Canada rice grass *Oryzopsis canadensis*	Threatened	Found in pine barrens, particularly within sandy, moist areas that have recently been cleared of their jack pine cover and on the margins of small depressions. Primarily found in the Upper Peninsula
Pine-drops *Pterospora andromedea*	Threatened	Found in dry woods dominated by pines, usually with a well developed needle duff. Along Great Lakes shorelines, it is exclusively found on forested backdunes.

Vegetation Summary and Conclusions

The area surrounding the Sites is primarily comprised of mixed forest and developed land. There are no known federally listed plants to occur near the project area; however, six species of state-level special concern and nine state threatened species have some possibility of occurring. Of these nine, only three are considered likely to occur based on habitat requirements. Surveys for these three species should be carried out once final locations are known to identify if they exist in the construction area.

Wetlands

Wetland areas tend to congregate greater concentrations of rare species, and have higher possibility of impacts from ground disturbance. In order to determine presence of wetland habitats in the proximity of the Sites, we consulted the Michigan Department of Natural Resources wetland dataset. As Figures J-8 & J-9 show, there are no wetlands in the immediate proximity of the Sites

Figure J-8 Industrial Site Wetlands Map

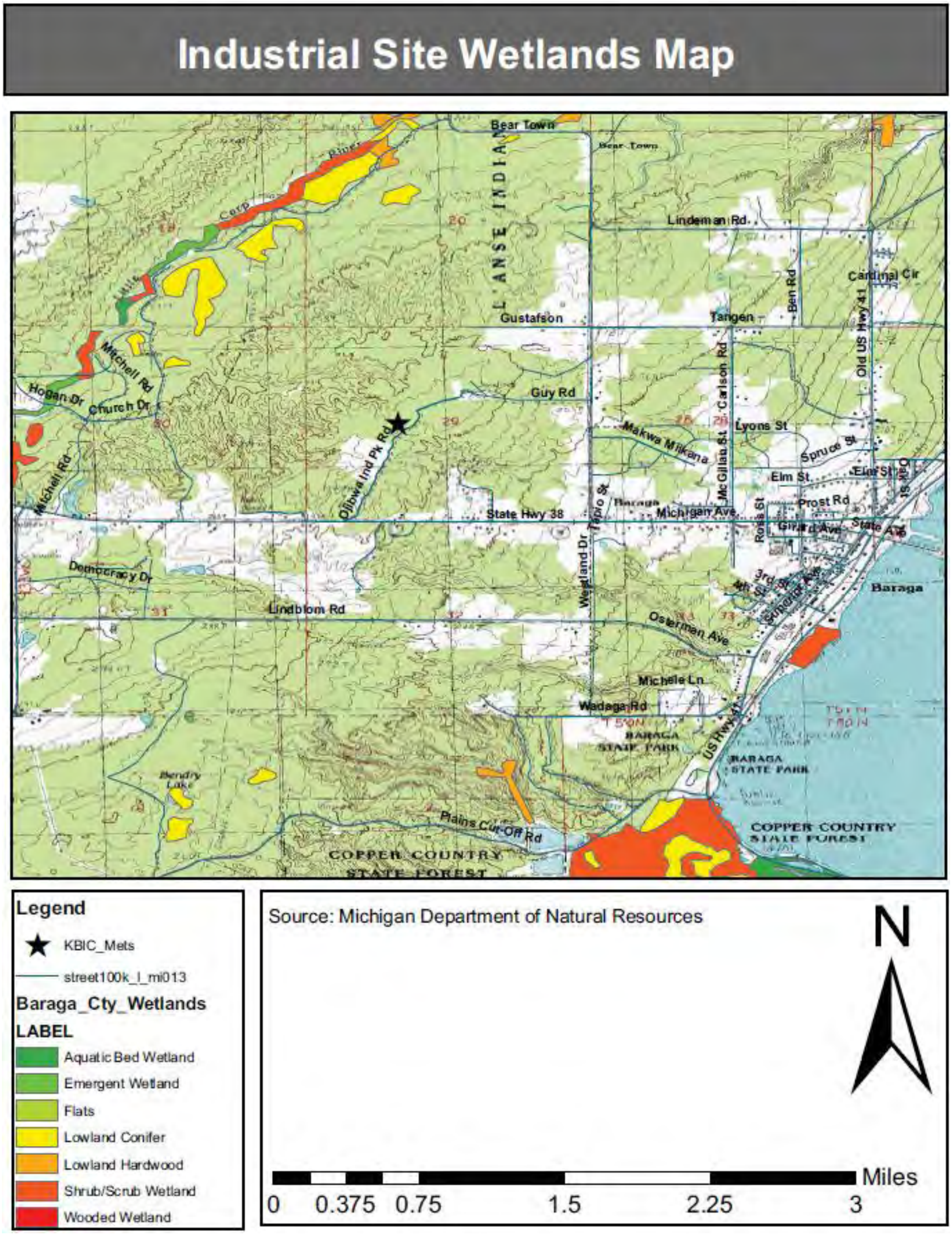
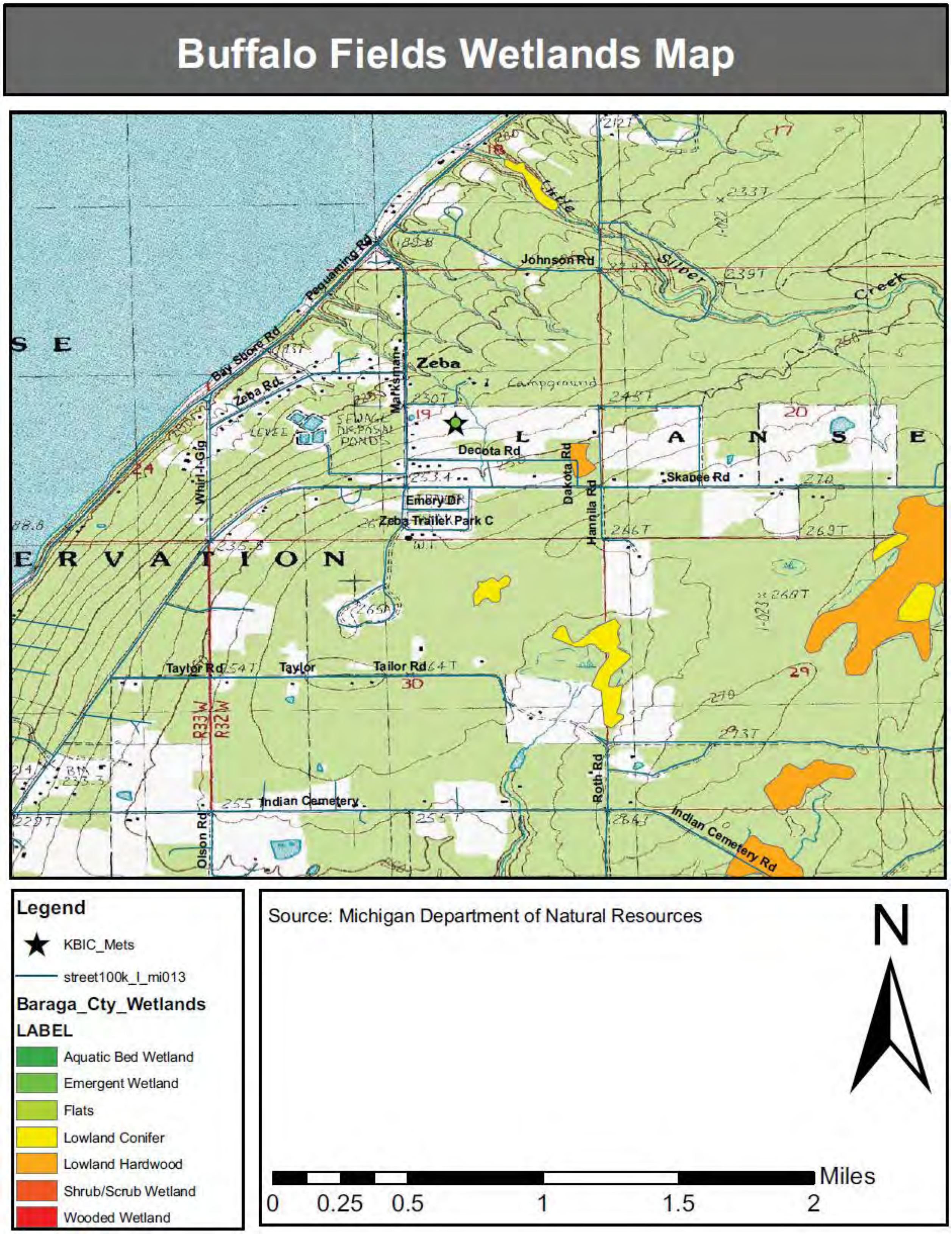


Figure J-9 Buffalo Fields Wetlands Map



Summary

Both sites are expected to have relatively low impacts on biological resources as compared with similar wind projects nationwide due to their close proximity to human settlement in areas with high levels of existing human impact. The Buffalo Field Site is expected to have higher impacts to migrating birds and other biological resources due to its proximity to the shoreline of Lake Superior. Neither Site has attributes within a one-mile radius that would tend to congregate large numbers of sensitive bird species; however, the Buffalo Fields Site's proximity to the shore of Lake Superior is likely to be closer to a larger number of flight paths for migratory birds.

(K) Soil and Ground Study

PROVIDE A STUDY TAKING INTO ACCOUNT THE SOIL AND GROUND CONDITIONS AT THE SITES AND AT PRELIMINARY TURBINE SITES AS DESCRIBED IN SECTION A (1) (E) OF THIS ATTACHMENT I, THE SUITABILITY OF SUCH SOIL AND GROUND CONDITIONS FOR WIND TURBINES, THE IMPACT OF A WIND FARM ON THE SITES AND THE PRELIMINARY TURBINE SITES, AND THE COSTS FOR THE WIND TURBINE FOUNDATIONS (“”SOIL AND GROUND STUDY”); CONTRACTOR IS AWARE THAT THE COMMUNITY WILL PERFORM A PHASE 1 ENVIRONMENTAL ASSESSMENT FOR THE SITES AND THE PRELIMINARY TURBINE SITES

Industrial Site

Bedrock

The bedrock at the Industrial Site is comprised of Jacobsville Sandstone, a fluvial sandstone formed by north-flowing streams entering Lake Superior between 1.6 and 0.5 billion years ago. Jacobsville sandstone is known to be very strong and durable, qualities that have led to its appeal as a building material, especially in the late 1800’s and early 1900’s.

Soil Structure

The soil at the Industrial Site is comprised of the Keweenaw-Kalkaska complex, which consists of ~ 52% Keweenaw soils and ~42% Kalkaska soils with the remainder made up of minor components.

- Keweenaw Soil Characteristics

Slope	1-8%
Depth to restrictive feature	More than 80 inches
Drainage class	Well-drained
Capacity of most limiting layer to transmit water (Ksat)	Moderately high to high (0.57 to 5.95 in / hr)
Depth to water table	More than 80 inches
Frequency of flooding	None
Frequency of ponding	None
Available water capacity	Low
Typical Profile	○ 0-4 inches: loamy sand ○ 4-18 inches: loamy sand ○ 18-35 inches: sand ○ 35-60 inches: loamy sand

- Kalkaska Soil Characteristics

Slope	1-8%
Depth to restrictive feature	More than 80 inches
Drainage class	Somewhat excessively drained
Capacity of most limiting layer to transmit water (Ksat)	High to very high (5.95 to 19.98 in / hr)
Depth to water table	More than 80 inches
Frequency of flooding	None
Frequency of ponding	None
Available water capacity	Low
Typical Profile	○ 0-4 inches: Sand ○ 4-18 inches: Sand ○ 18-35 inches: Sand ○ 35-60 inches: Sand

The Keweenaw-Kalkaska soil complex will provide a fortuitous medium for constructing a wind turbine foundation. The fact that the water table is greater than 80 inches below the soil surface means that expensive "buoyant" or geo-piered foundations will not be required. A wind turbine located at the Industrial Site will likely be able to employ the less expensive and simpler to construct post or spread foundation typical to the majority of commercial-scale wind projects in the Midwest U.S (see figures K-1 and K-2).

Figure K-1 – Post Foundation

Post foundations are employed in stiff soils, and are typically around 30 feet deep and 15 feet in diameter. They essentially consist of a cylindrical form in which anchor bolts are sunk and then concrete is poured such that the anchor bolts extend above the surface. The turbine base is then attached to the anchor bolts.

Figure K-2 – Spread Foundation

Spread foundations are typically 11-15 feet deep and about 55 feet in diameter at the base. They consist of a rebar cast into which concrete is poured to create a conical spread shaped foundation with exposed anchor bolts which are attached to the turbine base.

Since the industrial Site is expected to be able to accommodate post or spread foundations, no additional price adders will be necessary when estimating expected capital expenditures for the financial feasibility analysis.

Buffalo Fields Site

Bedrock

The bedrock at the Buffalo Fields Site is comprised of the Michigamme Formation, a varied formation of sedimentary and volcanic rocks primarily composed of metamorphosed greywacke.

Soil Structure

The soil at the Buffalo Fields Site is comprised of the Munising-Yalmer loamy sand complex, which consists of ~ 50% Munising soils and ~42% Yalmer soils with the remainder made up of minor components.

- Munising Soil Characteristics

Slope	1-8%
Depth to restrictive feature	More than 80 inches
Drainage class	Moderately well-drained
Capacity of most limiting layer to transmit water (Ksat)	Very low (0.00 in / hr)
Depth to water table	~12-24 inches
Frequency of flooding	None
Frequency of ponding	None
Available water capacity	Very low
Typical Profile	○ 0-9 inches: loamy sand ○ 9-21 inches: sandy loam ○ 21-48 inches: loamy sand ○ 48-80 inches: sandy loam

- Yalmer Soil Characteristics

Slope	1-8%
Depth to restrictive feature	More than 80 inches
Drainage class	Moderately well-drained
Capacity of most limiting layer to transmit water (Ksat)	Very low to moderately low (0.00 – 0.06 in/hr)
Depth to water table	~18-24 inches
Frequency of flooding	None
Frequency of ponding	None
Available water capacity	Very low
Typical Profile	○ 0-7 inches: Loamy sand ○ 7-23 inches: Fine sand ○ 23-70 inches: Fine sandy loam

The Munising-Yalmer loamy sand soil complex has the potential to require a more expensive foundation than the Industrial Site location due to the shallow water table and less well-drained soil types. Rammed aggregate pier foundations are often required when the native soil does not drain well, and the water table is close to the soil surface. These foundation construction techniques involve creating piers of imported rammed aggregate that stabilize the base of the foundation. Typical spread foundations are then constructed on top of the newly reinforced base of several rammed aggregate piers. These foundations require extra effort and materials, increasing construction costs. The capital expenditures estimate used in the financial analysis has been adjusted accordingly.

Additional considerations

The turbine supplier will require a full geotechnical analysis including borings or soil cores prior to construction; the results of this analysis will inform the final foundation design. Since this more detailed study will be fairly costly, and the final foundation design will depend on the size of wind turbine, it is recommended that this analysis be delayed until the Community has decided on a final wind turbine model.

(L) ARCHEOLOGICAL STUDY

PROVIDE AN ARCHAEOLOGICAL STUDY REGARDING THE HERITAGE AND HISTORY OF THE SITES AND THE PRELIMINARY TURBINE SITES, TO MAKE SURE THAT THE SITES AND THE PRELIMINARY TURBINE SITES ARE SUITABLE FOR WIND TURBINES ("ARCHAEOLOGICAL STUDY")

Introduction

Knowledge of cultural and historical resources near proposed wind turbines is an important tool to assist in identifying areas of potential concern, and informing siting decisions. Under the Natural Historic Preservation Act, potential wind energy projects are recommended to consult with the state Historical Preservation office to determine if there may have impacts to historical or Tribal resources. If federal funds are to be used for a portion of the project, Section 106 consultation will be required, and subsequently a federal permit or approval may be required if it is determined that the project will impact Tribal resources, or a property that is either listed or eligible for listing in the National Register of Historic Places (NRHP).

In order to determine if there are known cultural and historical resources near the proposed Sites, we conducted cultural resource record searches using the Michigan State Historical Preservation Office Historic Site mapping tool and the US Department of the Interior NRHP mapping tool. We also consulted with the Keweenaw Bay Indian Community Historic Preservation Office. This research was carried out in an attempt to determine if previously recorded historic and archaeological sites, structures or properties are located near the proposed Sites.

Historical Structures within a one-mile radius of Sites

Industrial Site

Based on data collected by the Michigan Historical Center, there are no recorded National Register of Historic Place-listed properties within a one-mile radius of the Industrial Site. The nearest recorded site is the US 41 Backwater Creek Bridge, which is approximately 2 miles south southeast of the Industrial Site, as shown below.

Figure L-1 – Historic Sites Near Industrial Site[15]

Buffalo Fields Site

Based on data collected by the Michigan Historical Center, there is one recorded NRHP-listed property within a one-mile radius of the Buffalo Fields Site; the Zeba Indian United Methodist Church Historical Marker, which is located just off the intersection of Marksman Road and Zeba Road at coordinates: N46.8025564 W88.4145355, approximately 2,000 feet northwest of the Buffalo Fields Site.

Archeological Resources

There are no archaeological sites listed on or determined eligible for listing on the National Register of Historic Places as being present within a one-mile radius of the proposed Sites.

KBIC Tribal Historic Preservation Office Consultation

Based on consultation with Chris Chosa, the Director of the KBIC Tribal Historic Preservation Office, there are no historic sites within either the Industrial Site or the Buffalo Fields Site.

[15] Michigan Historical Center – State Historic Preservation Office on-line mapping tool: http://www.mcgi.state.mi.us/hso/map.asp

(M) Solar Photovoltaic Feasibility Assessment

Although not in the original scope, we have performed a high-level feasibility assessment of a solar photovoltaic installation

Solar Resource Assessment

The areas around Baraga and L'Anse are fairly far north, and as such, do not have an exceptional solar resource. However, solar photovoltaic is much less of a site-specific resource than wind, meaning that the availability of potential host sites increases, and it is easier to locate the solar panels where the electricity will be used (on a rooftop, or in an adjacent empty lot). Further, the economics of solar photovoltaic do not suffer as much as wind when you decrease the size of the project, making it a more likely option for net-metered projects located at the point of use. Lastly, solar panel prices have decreased significantly in the past two years (as much as 40%), making solar photovoltaic a more attractive investment.

Estimated Output

We used the National Renewable Energy Laboratory's PVWatts map and tool to estimate the potential output from a solar photovoltaic installation at the Community[16]. Based on this information, a fixed-tilt system with the recommended tilt of 40 degrees and an Azimuth of 180 degrees (facing due south) will produce approximately 1,140 kilowatt hours per kilowatt per year. Using this information, we can adjust the size of the system to match the demand for the building at which it is constructed.

Using this production estimate, a 20 kW system will produce about 22,800 kilowatt hours per year, and a 100 kW system will produce about 114,000 kilowatt hours per year.

Other Major Assumptions

Project Size

Wherever the project is ultimately located, we recommend sizing the system such that the expected production will not exceed the expected consumption of the building at which the project is located, and such that the installed capacity of the system does not exceed the relevant net-metering threshold for the utility. In qualifying for net-metering, the project will be able to maximize the value of the production from the solar system, thus providing the greatest value to the Community.

The below table shows the average total electricity consumption for the 19 highest use meters, with the green highlighted buildings capable of hosting a 20 kW solar system, and the yellow highlighted buildings capable of hosting a 150 kW solar system. The maximum allowable size of a net-metered system with Baraga and OREA is 20 kW, whereas for UPPCo it is 150 kW.

[16] NREL's PVWatts tool is available at: http://mapserve3.nrel.gov/PVWatts_Viewer/index.html

Building	Average Annual Electricity Consumption	Utility
Ojibwa Lanes Lounge, and Casino	1,773,560	Baraga
Ojibwa Motel and Restaurant	544,960	Baraga
Pines Convenience Center	351,320	Baraga
Ojibwa College	262,360	Baraga
Radio Tower and Building - Houghton	254,399	UPPCo
Keweenaw Bay Natural Resources - Hatchery	247,080	OREA
WCUP Radio - Hancock Station	211,204	OREA
La Pointe Health Clinic	165,480	Baraga
Tribal Center Annex	164,680	Baraga
Big Bucks Bingo Hall	137,680	Baraga
New Day	103,185	UPPCo
Four Seasons Inn	70,400	Baraga
KBIC Child Development Center - Head Start	69,980	OREA
Tribal Senior Center	63,840	Baraga
Residential Property	60,100	UPPCo
Comm Food Warehouse	52,294	OREA
New Day	29,042	UPPCo
USDA - Rental Building	23,335	UPPCo
WCUP Radio	23,246	Baraga

For the purposes of this analysis, we have chosen to evaluate the New Day as a representative UPPCo project, and the Community Food Warehouse as a representative OREA/Baraga project. New Day is the largest UPPCo user within the greater Baraga/L'Anse area, and can accommodate approximately 90 kW of solar photovoltaic capacity. The Community Food Warehouse could accommodate a larger system, but we have assumed a 20 kW capacity for now based on the current OREA/Baraga net metering rules.

Installation Cost

We are assuming for the purposes of this report that a solar system will cost roughly $4,000 per kilowatt for the 20 kW system, and roughly $3,500 per kilowatt for the 90 kW system, which is within current industry averages, but may change based on site-specific installation parameters and requirements.

Financing Assumptions

As with the wind project, we have assumed that the solar project will be funded through a combination of debt and equity, with debt representing approximately 83.3% (5/6th) of total capital expenditures, and equity representing the remaining 16.7% (1/6th). We have assumed that the debt has an interest rate of 7%.

Electricity Cost

We have used the average annual retail rate as the value of the electricity for each project. The values are as follows:

- New Day: $0.167 / kilowatt hour
- Community Food Warehouse: $0.165 / kilowatt hour

We have assumed that electricity rates will increase at 2% annually.

Other Assumptions

We have assumed the following general parameters for the financial model, with are in line with industry standard assumptions:

- Annual Production Degradation (rate at which production decreases over time due to soiling of the panels, degradation of equipment etc.): **0.5%**
- Project life: 25 years
- Inverter life: 10 years
- Cost to replace inverter: $300 / kW
- Annual operations and maintenance costs: $17.60 / kW / year
- Federal and State taxes: Fully exempt

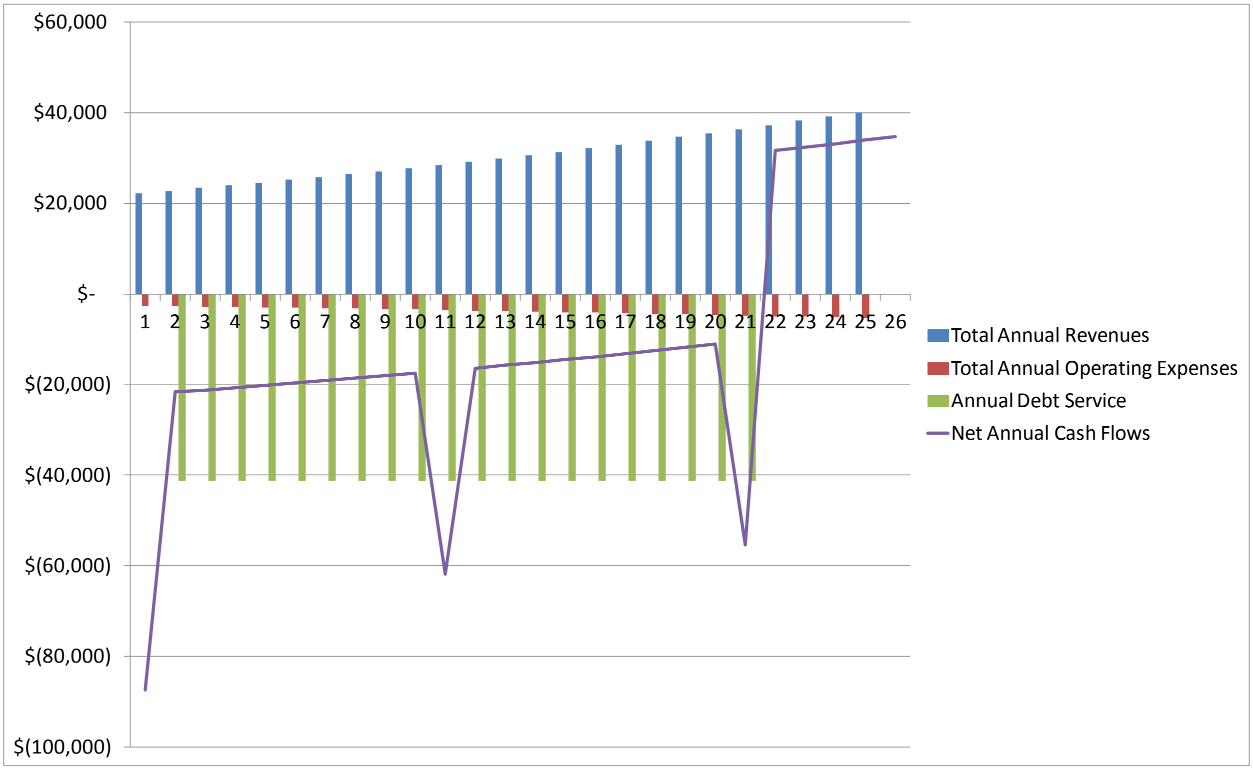
Results

New Day (without grant)

The 90 kW scenario at New Day with the assumptions outlined above represents a negative 25 year investment return for the Community, with the following high level returns:

- Total Investment amount (including debt): $315,000
- Net Present Value assuming 8% discount rate: -$135,696
- Internal Rate of Return: N/A (Negative)
- Payback Period: N/A – longer than 25 years

Projected Revenues and debt service:

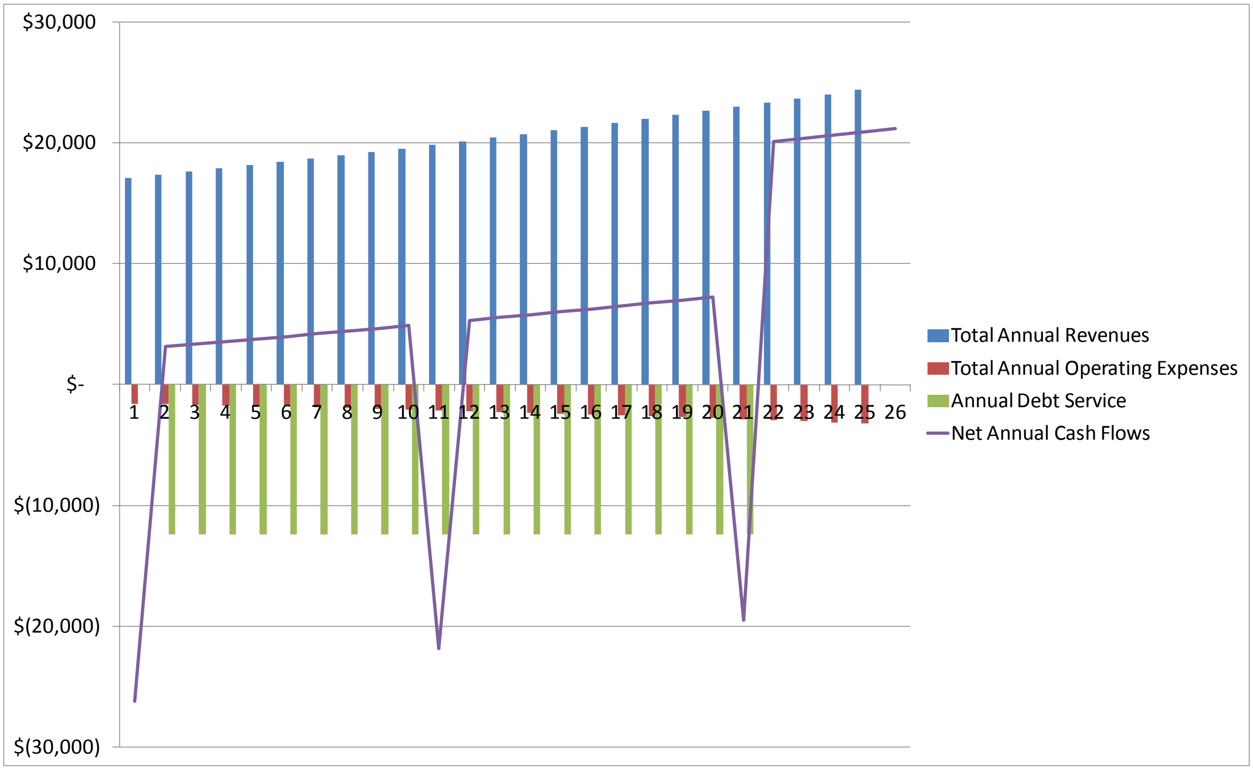


New Day (with 50% grant)

The 90 kW scenario at New Day with the assumptions outlined above represents a positive 25 year investment return for the Community, with the following high level returns:

- Total Investment amount (including debt): $157,500
- Net Present Value assuming 8% discount rate: $32,656
- Internal Rate of Return: 13.3%
- Payback Period: 12 years

Projected Revenues and debt service:

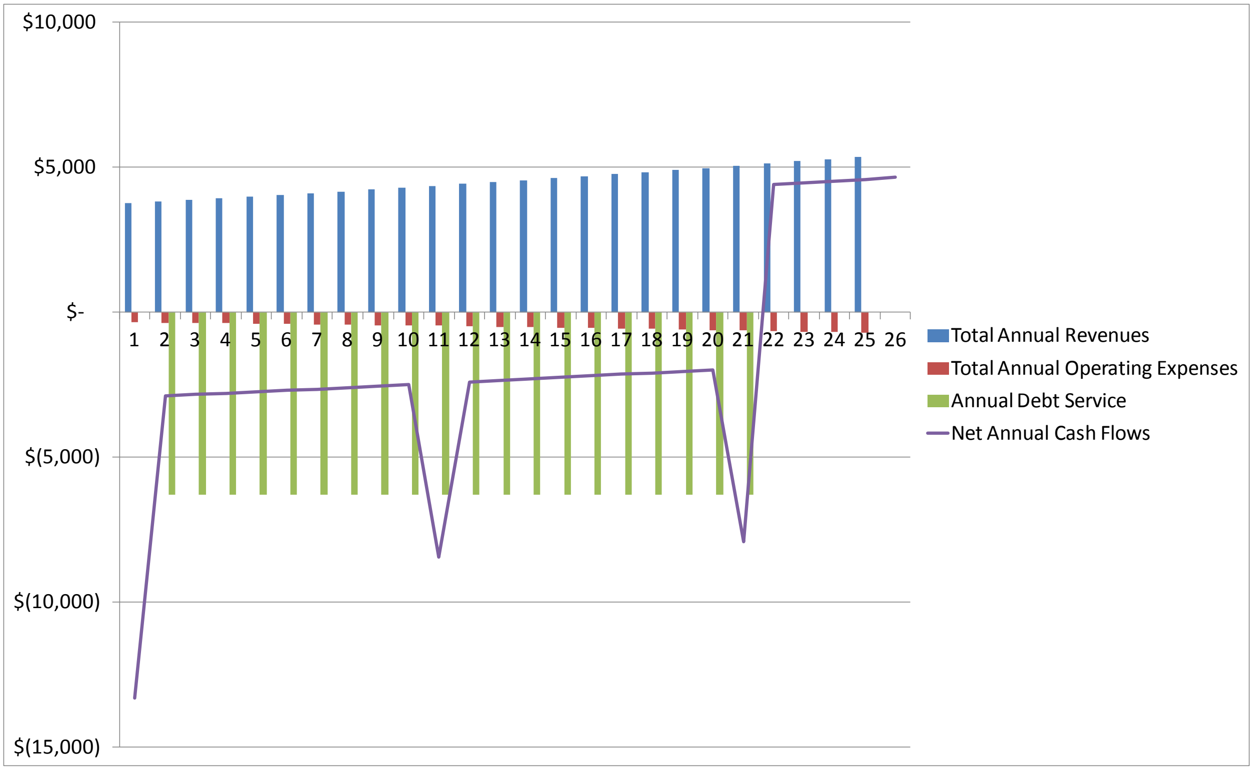


Community Food Warehouse (without grant)

The 20 kW scenario at New Day with the assumptions outlined above represents a negative 25 year investment return for the Community, with the following high level returns:

- Total Investment amount (including debt): $80,000
- Net Present Value assuming 8% discount rate: -$41,513
- Internal Rate of Return: N/A (Negative)
- Payback Period: N/A – longer than 25 years

Projected Revenues and debt service:

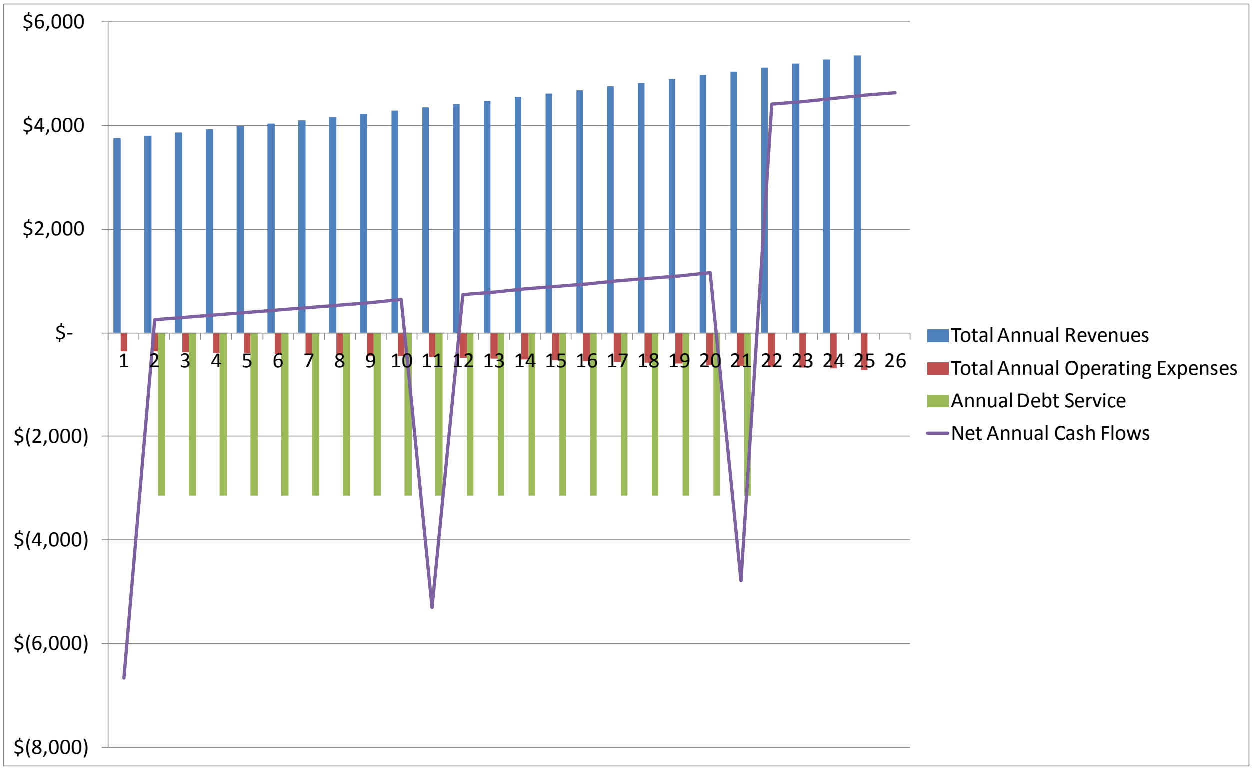


Community Food Warehouse (with grant)

The 20 kW scenario at New Day with the assumptions outlined above represents a negative 25 year investment return for the Community, with the following high level returns:

- Total Investment amount (including debt): $40,000
- Net Present Value assuming 8% discount rate: $1,243
- Internal Rate of Return: 7%
- Payback Period: 13 years

Projected Revenues and debt service:



As these two examples illustrate, net-metered solar with a 50% grant has the potential to be an attractive investment for the Community. Without grants, the projects are not expected to make money over the life of the investment.

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UTILITY USAGE

To determine the cost effectiveness of energy improvements, the cost of energy must be determined and that cost applied to the measures recommended. An excellent report on utility usage and costs had already been prepared using 2009 and 2010 energy usage and costs broken down by building and also in total for the entire community. Since this data was very recent, based on consumption and costs in the last couple of years, we re-analyzed the data taking current and past utility billings and verified the information. We would like to thank Char Spruce for providing us with this information.

This utility data already collected and our verification process all combined to give us a good picture of the energy consumption and areas of opportunity to improve. In using this utility data, we were able to concentrate our focus on working with those numbers, analyzing current usage and costs and then applying that information for recommendations to reduce the consumption and costs.

The utility information follows in table form and also in raw monthly data from the utility company monthly bills. To breakdown the lines to each meter and establish usage through each meter is something beyond the scope of this report. Our utility cost estimates were based on information taken from the last two years of utility billings, detailed by meter in this report and also from utility data gathered by Char Spruce. Char did an excellent job in gathering, analyzing, and presenting the data. We appreciate her efforts and her cooperation in working with us. Dianne Waara was also very helpful in assisting us, looking up utility billings and assisting in identifying a number of utility meters.

Included as part of the energy efficiency review prepared for the Keweenaw Bay Indian Community was an assessment of the utility costs. As with many larger organizations, the monitoring of the utility billing is a job onto itself. The KBIC proved to be no exception to this.

We would recommend that a map of electric lines flowing from each meter be established so that costs can be assigned to the proper department. This would be a benefit to maintenance, to accounting, and to those who plan the future growth of the Keweenaw Bay Indian Community.

It should be noted that a couple of the buildings have been changed. The Tribal Police were located in the Tribal Council building are now located next to the Pines Convenience Store. The Early Childhood Education Center has been opened since the utility costs were determined.

Electric Consumption

Facility	Annual Consumption (kWh)
Ojibwa Casino & Resort	2,492,181
Ojibwa Casino II	1,327,412
Eagle Radio (Station & Towers)	555,346
OCC - Community College	366,328
Pines Convenience Store	359,520
Natural Resources / Hatchery	282,720
Tribal Center	180,170
Health Center	170,667
Zeba Street Lights	96,156
Childhood Development Center	66,400
Tubcraft	58,991
Commodity Foods	57,371
Senior Center	52,522
Zeba Water Plant	30,696
New Day	24,751
OCC Annex	20,184
Zeba Lift Station	17,029
Court	14,641
Planning & Development	14,406
Social Services	11,924
OCC Science Lab / Library	11,860
Firefighter	7,672
Maintenance Garage	6,296
Cultural Center	5,167
Even Start	4,304
Police Station	3,648
Lighthouse	3,610
Anokii	2,677
Zeba Trailer Park Lights	2,457
Zeba Water Tower	1,553
Campground Lights	502
GLIFWC	127

Electricity - Breakdown by Facility

Ojibwa Casino Resort Complex

	Annual kWh	Annual Cost
Casino & Lanes	1,665,200	$ 198,048
Motel & Restaurant	580,400	$ 52,705
Bingo Hall	137,600	$ 16,450
Four Seasons	68,840	$ 8,261
RV Sites	23,406	$ 3,203
Signs	16,735	$ 2,099
		$ 280,766

Ojibwa II

Casino	1,294,400	$ 182,389
Well Pump	12,811	$ 2,134
Signs	10,253	$ 1,760
RV Sites	9,948	$ 1,935
		$ 188,218

Natural Gas Consumption

Facility	Consumption (Therms)
Ojibwa Casino & Resort	50,784
OCC / Niiwin Akeaa	24,972
Marquette Airport	21,513
Health Center	11,489
Ojibwa Casino II	10,776
Tribal Police	8,681
Tribal Center	8,510
Senior Center	7,963
Tubcraft	7,877
Childhood Development Center	7,770
OCC Annex	7,034
Pines Convenience Store	5,876
Commodity Foods	3,400
OCC Library / Science Lab	2,899
Social Services	2,764
Cultural Center	1,541
Tribal Court	1,384
Eagle Radio	1,281
Even Start	1,071
Planning & Development	951
Anokii	752
USDA Building	673

Propane Consumption

Facility	Consumption (Gallons)
New Day	5,557
Lighthouse	2,082
Hatchery	1,398
Campground	576

Total Energy Consumption & Cost by Facility

Facility	Annual MBTU	Annual Cost
Ojibwa Casino & Resort	9,029	$ 328,940
Ojibwa Casino II	4,641	$ 198,254
Eagle Radio	1,909	$ 69,398
OCC - Community College	1,507	$ 65,146
Pines Convenience Store	1,288	$ 48,670
Natural Resources / Hatchery	1,093	$ 38,211
Tribal Center	703	$ 28,082
Health Center	701	$ 30,537
New Day	594	$ 15,953
Zeba Street Lights	336	$ 15,962
Childhood Development Center	307	$ 20,731
Tubcraft	282	$ 17,888
Senior Center	261	$ 14,096
Commodity Foods	231	$ 12,650
Marquette Airport	223	$ 21,555
Lighthouse	203	$ 4,893
OCC Annex	145	$ 9,386
Zeba Treatment Plant	105	$ 4,786
Tribal Police	102	$ 9,659
OCC Library & Science Lab	70	$ 4,395
Social Services	69	$ 4,858
Court	64	$ 3,072
Planning & Development	59	$ 2,658
Zeba Lift Station	58	$ 2,743
Cultural Center	34	$ 2,190
Firefighter	26	$ 1,334
Even Start	26	$ 1,586
Maintenance Garage	22	$ 1,036
Anokii	17	$ 1,265
Zeba Water Tower	5	$ 502
Campground Lights	2	$ 83

Total Energy Costs

Electricity	$	776,877
Natural Gas	$	189,236
Propane	$	20,759
Water (estimated)	$	70,000

Building Size

Building	Sq Ft
Ojibwa Casino and Resort	57,660
Ojibwa Casino II	21,500
Eagle Radio	3,200
Niwinn Akea	26,151
Hatchery	6,105
Tribal Center	13,600
Health Center	12,532
Bingo Hall	9,600
Four Seasons Inn	15,700
Child Development Center	12,000
Former Tubcraft	18,900
Commodity Foods	3,240
Senior Center	7,800
Zeba Treatment Plant	910
New Day	10,500
USDA Bldg	2,600
Zeba Lift Station	-
Tribal Court	3,848
Planning and Development	1,338
Social Services	2,304
OCC Library/Science Lab	2,860
Firefighter	1,168
Maintenance Garage	2,016
Cultural Center	1,776
Even Start	1,728
Lighthouse	1,248
Anokii	1,225
OCC Annex	3,120
Zeba Water Tower	-
GLIFWC	960
Zeba Street Lights	-
Campground Lights	-
Zeba Trailer Park Lights	-
Pines Convenience Center	6,298
Tribal Police	5,414
OCC Std. Dev.	-
Marquette Airport	-
Campground	-

Name: USDA - Rental Building
Utility: UPPCo
Utility Type: Electric
Acct #: 0405935512-00002
Meter #: 802753
Address: 16403 Ojibwa Industrial Park
Multiplier: 1

Month	Read	Usage		Cost	Cost per Unit
Jan-09		1,383	$	248	0.1792
Feb-09		2,007	$	348	0.1733
Mar-09		1,841	$	321	0.1743
Apr-09		1,712	$	300	0.1754
May-09		2,112	$	356	0.1683
Jun-09		1,742	$	298	0.1709
Jul-09		2,430	$	408	0.1677
Aug-09		1,718	$	304	0.1767
Sep-09		2,217	$	384	0.1731
Oct-09		2,433	$	418	0.1719
Nov-09		1,289	$	236	0.1827
Dec-09		2,191	$	380	0.1734
	Total	**23,075**	**$**	**3,999**	
	Average	**1,923**	**$**	**333**	**0.1739**
Jan-10		1,420	$	266	0.1874
Feb-10		1,967	$	363	0.1847
Mar-10		1,989	$	366	0.1842
Apr-10		1,544	$	292	0.1890
May-10		2,309	$	417	0.1807
Jun-10		1,595	$	298	0.1866
Jul-10		2,737	$	490	0.1791
Aug-10		1,969	$	359	0.1825
Sep-10		2,178	$	390	0.1791
Oct-10		2,430	$	412	0.1693
Nov-10		1,132	$	208	0.1836
Dec-10		2,324	$	394	0.1697
	Total	**23,594**	**$**	**4,256**	
	Average	**1,966**	**$**	**355**	**0.1813**
Jan-11					
Feb-11		3,039	$	596	0.1961
Mar-11		2,116	$	404	0.1910
Apr-11		2,124	$	406	0.1909
May-11		1,485	$	292	0.1969

Name: Radio Tower and Building - Houghton
Utility: UPPCo
Utility Type: Electric
Acct #: 0405935512-00004
Meter #:
Address: 47166 Paradise Road Twr Stre
Multiplier: 1

Month	kW	Usage		Cost	Cost per Unit
Jan-09	36	24,805	$	2,622	0.1057
Feb-09	36	23,091	$	2,484	0.1076
Mar-09	36	25,090	$	2,645	0.1054
Apr-09	34	23,746	$	2,502	0.1054
May-09	34	22,338	$	2,300	0.1029
Jun-09	33	24,078	$	2,415	0.1003
Jul-09	32	22,700	$	2,320	0.1022
Aug-09	34	22,646	$	2,442	0.1078
Sep-09	30	4,430	$	854	0.1927
Oct-09	33	22,043	$	2,375	0.1077
Nov-09	33	23,904	$	2,525	0.1056
Dec-09	34	25,042	$	2,634	0.1052
	Total	**263,913**	**$**	**28,118**	
	Average	**21,993**	**$**	**2,343**	**0.1124**
Jan-10	35	23,318	$	2,830	0.1214
Feb-10	34	22,462	$	2,729	0.1215
Mar-10	34	25,784	$	3,079	0.1194
Apr-10	34	23,200	$	2,808	0.1210
May-10	33	10,204	$	1,449	0.1420
Jun-10	29	10,691	$	1,463	0.1368
Jul-10	33	17,725	$	2,217	0.1251
Aug-10	33	23,233	$	2,781	0.1197
Sep-10	33	21,987	$	2,593	0.1179
Oct-10	30	20,704	$	2,265	0.1094
Nov-10	31	23,213	$	2,509	0.1081
Dec-10	32	22,363	$	2,441	0.1092
	Total	**244,884**	**$**	**29,164**	
	Average	**20,407**	**$**	**2,430**	**0.1210**
Jan-11	30	21,505	$	2,640	0.1228
Feb-11	31	19,117	$	2,404	0.1258
Mar-11	31	22,470	$	2,747	0.1223
Apr-11	31	19,600	$	2,440	0.1245
May-11	31	22,289	$	2,676	0.1201

Name: Firefighters Office - L'Anse (by New Day)
Utility: UPPCo
Utility Type: Electric
Acct #: 0405935512-00005
Meter #:
Address: 15911 Dynamite Hill Rd
Multiplier: 1

Month	Read	Usage		Cost	Cost per Unit
Jan-09		2,399	$	396	0.1651
Feb-09		1,381	$	233	0.1687
Mar-09		1,021	$	175	0.1714
Apr-09		1,017	$	174	0.1711
May-09		209	$	44	0.2105
Jun-09					
Jul-09		432	$	93	0.2153
Aug-09					
Sep-09		185	$	58	0.3135
Oct-09		113	$	32	0.2832
Nov-09		1,119	$	193	0.1725
Dec-09		716	$	129	0.1802
	Total	**8,592**	**$**	**1,527**	
	Average	**859**	**$**	**153**	**0.2051**
Jan-10		1,960	$	340	0.1735
Feb-10		1,457	$	261	0.1791
Mar-10		701	$	133	0.1897
Apr-10					
May-10		529	$	121	0.2287
Jun-10					
Jul-10		153	$	59	0.3856
Aug-10		69	$	26	0.3768
Sep-10		188	$	47	0.2500
Oct-10		150	$	40	0.2667
Nov-10		544	$	100	0.1838
Dec-10		474	$	90	0.1899
	Total	**6,225**	**$**	**1,217**	
	Average	**623**	**$**	**122**	**0.2424**
Jan-11		2,704	$	483	0.1786
Feb-11		1,427	$	266	0.1864
Mar-11		782	$	153	0.1957
Apr-11		998	$	190	0.1904
May-11		946	$	181	0.1913

Name: Zeba Pump Station - by lake
Utility: UPPCo
Utility Type: Electric
Acct #: 0405935512-00008
Meter #:
Address: 15795 Whirligig Road
Multiplier: 1

Month	kW	Usage		Cost	Cost per Unit
Jan-09		1,199	$	204	0.1701
Feb-09		1,194	$	203	0.1700
Mar-09		1,505	$	253	0.1681
Apr-09		1,437	$	242	0.1684
May-09		1,838	$	298	0.1621
Jun-09		3,962	$	630	0.1590
Jul-09		2,929	$	471	0.1608
Aug-09	27	1,609	$	497	0.3089
Sep-09	25	1,357	$	446	0.3287
Oct-09	27	2,141	$	557	0.2602
Nov-09	25	1,295	$	440	0.3398
Dec-09	25	1,245	$	434	0.3486
	Total	**21,711**	**$**	**4,675**	
	Average	**1,809**	**$**	**390**	**0.2287**
Jan-10	25	1,294	$	458	0.3539
Feb-10	25	1,215	$	448	0.3687
Mar-10	25	2,135	$	551	0.2581
Apr-10	25	1,493	$	480	0.3215
May-10	25	1,085	$	433	0.3991
Jun-10	31	1,442	$	544	0.3773
Jul-10	25	1,171	$	446	0.3809
Aug-10	25	1,244	$	456	0.3666
Sep-10	33	1,622	$	575	0.3545
Oct-10	25	2,233	$	528	0.2365
Nov-10	25	1,045	$	425	0.4067
Dec-10	25	1,074	$	426	0.3966
	Total	**17,053**	**$**	**5,770**	
	Average	**1,421**	**$**	**481**	**0.3517**
Jan-11	24	1,168	$	498	0.4264
Feb-11	24	1,057	$	481	0.4551
Mar-11	24	1,278	$	508	0.3975
Apr-11	24	1,497	$	527	0.3520
May-11	27	1,631	$	568	0.3483

Name: Social Services
Utility: UPPCo
Utility Type: Electric
Acct #: 0405935512-00009
Meter #: 811389
Address: 13765 State Road M38
Multiplier: 1

Month	Read	Usage		Cost	Cost per Unit
Jan-09		813	$	142	0.1747
Feb-09		1,037	$	178	0.1716
Mar-09		955	$	164	0.1717
Apr-09		886	$	153	0.1727
May-09		829	$	141	0.1701
Jun-09		781	$	133	0.1703
Jul-09		715	$	125	0.1748
Aug-09		616	$	112	0.1818
Sep-09		784	$	140	0.1786
Oct-09		865	$	152	0.1757
Nov-09		1,186	$	204	0.1720
Dec-09		1,207	$	207	0.1715
	Total	**10,674**	**$**	**1,851**	
	Average	**890**	**$**	**154**	**0.1738**
Jan-10		458	$	91	0.1987
Feb-10		907	$	169	0.1863
Mar-10		738	$	140	0.1897
Apr-10		642	$	124	0.1931
May-10		760	$	143	0.1882
Jun-10		580	$	112	0.1931
Jul-10		811	$	153	0.1887
Aug-10		632	$	120	0.1899
Sep-10		885	$	162	0.1831
Oct-10		888	$	155	0.1745
Nov-10		506	$	94	0.1858
Dec-10		909	$	158	0.1738
	Total	**8,716**	**$**	**1,621**	
	Average	**726**	**$**	**135**	**0.1871**
Jan-11		658	$	130	0.1976
Feb-11		713	$	141	0.1978
Mar-11		709	$	139	0.1961
Apr-11		676	$	134	0.1982
May-11		591	$	120	0.2030

Name: Residential Property
Utility: UPPCo
Utility Type: Electric
Acct #: 0405935512-00011
Meter #:
Address: 15614 Pequaming Road Tribe Coun L'Anse
Multiplier: 1

Month	Read	Usage		Cost	Cost per Unit
Jan-09		7,323	$	1,184	0.1617
Feb-09		6,668	$	1,079	0.1618
Mar-09		7,349	$	1,188	0.1617
Apr-09		5,872	$	952	0.1621
May-09		6,097	$	963	0.1579
Jun-09		4,809	$	762	0.1585
Jul-09		4,671	$	743	0.1591
Aug-09		4,771	$	778	0.1631
Sep-09		4,848	$	790	0.1630
Oct-09		4,283	$	700	0.1634
Nov-09		4,223	$	690	0.1634
Dec-09		4,654	$	759	0.1631
	Total	**65,568**	**$**	**10,588**	
	Average	**5,464**	**$**	**882**	**0.1616**
Jan-10		6,293	$	1,071	0.1702
Feb-10		6,663	$	1,133	0.1700
Mar-10		6,637	$	1,131	0.1704
Apr-10		3,659	$	630	0.1722
May-10		2,979	$	512	0.1719
Jun-10		3,729	$	639	0.1714
Jul-10		4,247	$	724	0.1705
Aug-10		3,898	$	667	0.1711
Sep-10		3,615	$	609	0.1685
Oct-10		3,407	$	547	0.1606
Nov-10		3,947	$	633	0.1604
Dec-10		5,557	$	884	0.1591
	Total	**54,631**	**$**	**9,180**	
	Average	**4,553**	**$**	**765**	**0.1680**
Jan-11		6,347	$	1,133	0.1785
Feb-11		5,690	$	1,016	0.1786
Mar-11		6,376	$	1,137	0.1783
Apr-11		5,363	$	955	0.1781
May-11		4,233	$	750	0.1772

Name: New Day
Utility: UPPCo
Utility Type: Electric
Acct #: 0405935512-00013
Meter #: 808978
Address: 16025 Brewery Road Treatment Ct L'Anse
Multiplier: 1

Month	Read	Usage		Cost	Cost per Unit
Jan-09		1,726	$	288	0.1669
Feb-09		1,625	$	272	0.1674
Mar-09		1,974	$	328	0.1662
Apr-09		1,525	$	256	0.1679
May-09		118	$	30	0.2542
Jun-09		690	$	119	0.1725
Jul-09		607	$	108	0.1779
Aug-09		625	$	114	0.1824
Sep-09		21,802	$	3,505	0.1608
Oct-09		7,405	$	1,200	0.1621
Nov-09		7,064	$	1,145	0.1621
Dec-09		73,674	$	11,532	0.1565
	Total	**118,835**	**$**	**18,897**	
	Average	**9,903**	**$**	**1,575**	**0.1747**
Jan-10		5,714	$	967	0.1692
Feb-10		9,291	$	1,577	0.1697
Mar-10		6,919	$	1,176	0.1700
Apr-10		7,806	$	1,328	0.1701
May-10		6,215	$	1,052	0.1693
Jun-10		6,000	$	1,016	0.1693
Jul-10		9,336	$	1,574	0.1686
Aug-10		9,200	$	1,550	0.1685
Sep-10		6,035	$	1,007	0.1669
Oct-10		6,500	$	1,031	0.1586
Nov-10		7,219	$	1,142	0.1582
Dec-10		7,300	$	1,156	0.1584
	Total	**87,535**	**$**	**14,576**	
	Average	**7,295**	**$**	**1,215**	**0.1664**
Jan-11		9,573	$	1,666	0.1740
Feb-11		8,000	$	1,423	0.1779
Mar-11		5,520	$	985	0.1784
Apr-11		7,000	$	1,241	0.1773
May-11		4,354	$	771	0.1771

Name: New Day
Utility: UPPCo
Utility Type: Electric
Acct #: 0405935512-00015
Meter #: 6608
Address: 16025 Brewery Road Treatment Ct
Multiplier: 1

Month	Read	Usage		Cost	Cost per Unit
Jan-09		1,483	$	249	0.1679
Feb-09		2,076	$	344	0.1657
Mar-09		3,403	$	556	0.1634
Apr-09		2,321	$	383	0.1650
May-09		2,031	$	329	0.1620
Jun-09		2,021	$	327	0.1618
Jul-09		3,434	$	550	0.1602
Aug-09		2,590	$	429	0.1656
Sep-09		2,622	$	434	0.1655
Oct-09		3,200	$	526	0.1644
Nov-09		1,120	$	193	0.1723
Dec-09		2,513	$	416	0.1655
	Total	**28,814**	**$**	**4,736**	
	Average	**2,401**	**$**	**395**	**0.1649**
Jan-10		1,772	$	309	0.1744
Feb-10		2,334	$	409	0.1752
Mar-10		2,295	$	401	0.1747
Apr-10		1,911	$	338	0.1769
May-10		2,226	$	387	0.1739
Jun-10		1,677	$	295	0.1759
Jul-10		4,121	$	704	0.1708
Aug-10		2,773	$	478	0.1724
Sep-10		2,922	$	496	0.1697
Oct-10		3,283	$	529	0.1611
Nov-10		1,015	$	173	0.1704
Dec-10		2,940	$	475	0.1616
	Total	**29,269**	**$**	**4,994**	
	Average	**2,439**	**$**	**416**	**0.1714**
Jan-11		1,979	$	358	0.1809
Feb-11		2,209	$	404	0.1829
Mar-11		1,564	$	290	0.1854
Apr-11		1,705	$	314	0.1842
May-11		2,546	$	458	0.1799

Name: Public Works
Utility: UPPCo
Utility Type: Electric
Acct #: 0405935512-00016
Meter #: 2448
Address: 16376 Ojibwa Industrial Park Rd GrtLk Fish
Multiplier: 1

Month	Read	Usage		Cost	Cost per Unit
Jan-09		715	$	126	0.1762
Feb-09		616	$	110	0.1786
Mar-09		375	$	72	0.1920
Apr-09		441	$	82	0.1859
May-09		434	$	79	0.1820
Jun-09		398	$	74	0.1859
Jul-09		205	$	46	0.2244
Aug-09		248	$	53	0.2137
Sep-09		270	$	57	0.2111
Oct-09		320	$	65	0.2031
Nov-09		265	$	57	0.2151
Dec-09		344	$	69	0.2006
	Total	**4,631**	**$**	**890**	
	Average	**386**	**$**	**74**	**0.1974**
Jan-10		321	$	68	0.2118
Feb-10		362	$	78	0.2155
Mar-10		278	$	63	0.2266
Apr-10		249	$	58	0.2329
May-10		241	$	56	0.2324
Jun-10		202	$	49	0.2426
Jul-10		277	$	64	0.2310
Aug-10		217	$	51	0.2350
Sep-10		269	$	60	0.2230
Oct-10		284	$	61	0.2148
Nov-10		335	$	68	0.2030
Dec-10		403	$	79	0.1960
	Total	**3,438**	**$**	**755**	
	Average	**287**	**$**	**63**	**0.2221**
Jan-11		419	$	89	0.2124
Feb-11		374	$	81	0.2166
Mar-11		393	$	84	0.2137
Apr-11		364	$	80	0.2198
May-11		313	$	72	0.2300

Name:
Utility: UPPCo
Utility Type: Electric
Acct #: 0405935512-00017
Meter #:
Address: 16347 Ojibwa Industrial Park Rd Ind Park
Multiplier: 1

Month	Read	Usage		Cost	Cost per Unit
Jan-09		590	$	106	0.1797
Feb-09		957	$	165	0.1724
Mar-09		936	$	161	0.1720
Apr-09		842	$	146	0.1734
May-09		1,180	$	196	0.1661
Jun-09		921	$	155	0.1683
Jul-09		1,332	$	222	0.1667
Aug-09		927	$	162	0.1748
Sep-09		1,329	$	227	0.1708
Oct-09		1,395	$	237	0.1699
Nov-09		754	$	135	0.1790
Dec-09		1,265	$	216	0.1708
	Total	**12,428**	**$**	**2,128**	
	Average	**1,036**	**$**	**177**	**0.1720**
Jan-10		547	$	106	0.1938
Feb-10		987	$	182	0.1844
Mar-10		1,141	$	208	0.1823
Apr-10		830	$	156	0.1880
May-10		1,282	$	230	0.1794
Jun-10		874	$	161	0.1842
Jul-10		1,458	$	261	0.1790
Aug-10		1,060	$	192	0.1811
Sep-10		1,279	$	226	0.1767
Oct-10		1,370	$	230	0.1679
Nov-10		1,030	$	176	0.1709
Dec-10		1,566	$	260	0.1660
	Total	**13,424**	**$**	**2,388**	
	Average	**1,119**	**$**	**199**	**0.1795**
Jan-11		1,004	$	190	0.1892
Feb-11		1,170	$	221	0.1889
Mar-11		986	$	188	0.1907
Apr-11		1,025	$	195	0.1902
May-11		1,829	$	334	0.1826

Name: Eagle Radio Station
Utility: UPPCo
Utility Type: Electric
Acct #: 04012805471-00001
Meter #: 805521
Address: 787 Market St Ste 7 Hancock
Multiplier: 1

Month	Read	Usage		Cost	Cost per Unit
Jan-09		1,984	$	329	0.1658
Feb-09		1,942	$	322	0.1658
Mar-09		2,031	$	337	0.1659
Apr-09		1,603	$	268	0.1672
May-09		1,419	$	233	0.1642
Jun-09		1,606	$	262	0.1631
Jul-09		1,710	$	280	0.1637
Aug-09		1,783	$	299	0.1677
Sep-09		2,187	$	364	0.1664
Oct-09		1,758	$	295	0.1678
Nov-09		1,650	$	278	0.1685
Dec-09		1,811	$	304	0.1679
	Total	**21,484**	**$**	**3,571**	
	Average	**1,790**	**$**	**298**	**0.1662**
Jan-10		1,796	$	312	0.1737
Feb-10		1,670	$	295	0.1766
Mar-10		1,843	$	327	0.1774
Apr-10		1,813	$	320	0.1765
May-10		1,700	$	300	0.1765
Jun-10		1,765	$	310	0.1756
Jul-10		2,286	$	398	0.1741
Aug-10		2,272	$	395	0.1739
Sep-10		2,025	$	348	0.1719
Oct-10		1,881	$	310	0.1648
Nov-10		1,973	$	324	0.1642
Dec-10		1,973	$	323	0.1637
	Total	**22,997**	**$**	**3,962**	
	Average	**1,916**	**$**	**330**	**0.1724**
Jan-11		2,103	$	376	0.1788
Feb-11		2,013	$	370	0.1838
Mar-11		1,827	$	336	0.1839
Apr-11		1,683	$	310	0.1842
May-11		1,782	$	325	0.1824

Name: Ojibwa Lanes Lounge, and Casino
Utility: Baraga
Utility Type: Electric
Acct #: MICH-000797-0000-01
Meter #:
Address: 797 Michigan Ave
Multiplier: 80

Month	Read	Usage	$	Cost	Cost per Unit
Jan-09		145,680	$	17,549	0.1205
Feb-09		141,040	$	17,343	0.1230
Mar-09		101,360	$	12,719	0.1255
Apr-09		133,280	$	16,722	0.1255
May-09		122,480	$	15,368	0.1255
Jun-09		141,520	$	17,755	0.1255
Jul-09		150,960	$	18,940	0.1255
Aug-09		188,560	$	23,654	0.1254
Sep-09		147,920	$	19,298	0.1305
Oct-09		123,920	$	16,169	0.1305
Nov-09		145,040	$	18,922	0.1305
Dec-09		173,440	$	22,626	0.1305
	Total	**1,715,200**	**$**	**217,065**	
	Average	**142,933**	**$**	**18,089**	**0.1265**
Jan-10		141,760	$	18,495	0.1305
Feb-10		155,120	$	20,236	0.1305
Mar-10		103,680	$	13,529	0.1305
Apr-10		119,520	$	15,594	0.1305
May-10		137,440	$	17,931	0.1305
Jun-10		177,760	$	23,189	0.1305
Jul-10		201,920	$	26,340	0.1304
Aug-10		189,680	$	24,743	0.1304
Sep-10		140,080	$	18,275	0.1305
Oct-10		147,840	$	19,288	0.1305
Nov-10		145,520	$	18,985	0.1305
Dec-10		171,600	$	22,386	0.1305
	Total	**1,831,920**	**$**	**238,991**	
	Average	**152,660**	**$**	**19,916**	**0.1305**
Jan-11		126,080	$	16,449	0.1305
Feb-11		106,800	$	13,936	0.1305
Mar-11		136,240	$	17,774	0.1305
Apr-11		111,760	$	14,583	0.1305
May-11		163,680	$	21,353	0.1305

Name: Keweenaw Bay Indian Comm - no record of paying
Utility: UPPCo
Utility Type: Electric
Acct #: 0405935512-00001
Meter #: 18909
Address: 16392 Ojibwa Industrial Park R
Multiplier: 1

Month	Read	Usage	Cost	Cost per Unit
Jan-09				
Feb-09				
Mar-09				
Apr-09				
May-09				
Jun-09				
Jul-09				
Aug-09				
Sep-09		2	$ 14	7.0000
Oct-09		1	$ 14	14.0000
Nov-09		4	$ 15	3.7500
Dec-09		2	$ 15	7.5000
	Total	**9**	**$ 58**	
	Average	**2**	**$ 15**	**8.0625**
Jan-10		-	$ 15	
Feb-10		1	$ 17	17.0000
Mar-10		2	$ 17	8.5000
Apr-10		1	$ 17	17.0000
May-10		4	$ 17	4.2500
Jun-10		2	$ 16	8.0000
Jul-10		-	$ 17	
Aug-10		-	$ 15	
Sep-10		2	$ 17	8.5000
Oct-10		1	$ 16	16.0000
Nov-10		-	$ 15	
Dec-10		-	$ 16	
	Total	**13**	**$ 195**	
	Average	**1**	**$ 16**	**11.3214**
Jan-11		-	$ 17	
Feb-11		-	$ 15	
Mar-11				
Apr-11				
May-11				

Name: Ojibwa Motel and Restaurant
Utility: Baraga
Utility Type: Electric
Acct #: BEAR-000103-0000-01
Meter #:
Address: 103 Beartown Road
Multiplier: 80

Month	Read	Usage		Cost	Cost per Unit
Jan-09		59,600	$	5,555	0.0932
Feb-09		83,440	$	7,498	0.0899
Mar-09		48,320	$	4,709	0.0975
Apr-09		51,600	$	4,969	0.0963
May-09		39,360	$	3,997	0.1015
Jun-09		36,640	$	3,781	0.1032
Jul-09		44,000	$	4,366	0.0992
Aug-09		47,360	$	4,633	0.0978
Sep-09		39,840	$	4,105	0.1030
Oct-09		40,080	$	4,124	0.1029
Nov-09		43,680	$	4,410	0.1010
Dec-09		49,440	$	4,868	0.0985
	Total	**583,360**	**$**	**57,015**	
	Average	**48,613**	**$**	**4,751**	**0.0987**
Jan-10		63,120	$	5,953	0.0943
Feb-10		54,400	$	5,262	0.0967
Mar-10		45,680	$	4,569	0.1000
Apr-10		31,440	$	3,439	0.1094
May-10		32,480	$	3,521	0.1084
Jun-10		35,520	$	3,762	0.1059
Jul-10		40,240	$	4,137	0.1028
Aug-10		42,320	$	4,302	0.1017
Sep-10		34,000	$	3,742	0.1101
Oct-10		34,320	$	3,667	0.1068
Nov-10		39,600	$	4,086	0.1032
Dec-10		53,440	$	5,186	0.0970
	Total	**506,560**	**$**	**51,626**	
	Average	**42,213**	**$**	**4,302**	**0.1030**
Jan-11		51,360	$	5,020	0.0977
Feb-11		45,200	$	4,531	0.1002
Mar-11		44,880	$	4,506	0.1004
Apr-11		46,640	$	4,645	0.0996
May-11		48,160	$	4,766	0.0990

Name: Ojibwa Casino
Utility: Baraga
Utility Type: Electric
Acct #: MICH-000797-00RV-01
Meter #:
Address: 797 Michigan Ave
Multiplier: 1

Month	Read	Usage		Cost	Cost per Unit
Jan-09		32	$	13	0.4063
Feb-09		-	$	10	
Mar-09		-	$	10	
Apr-09		-	$	10	
May-09		134	$	26	0.1940
Jun-09		116	$	24	0.2069
Jul-09		601	$	85	0.1414
Aug-09		933	$	127	0.1361
Sep-09		832	$	118	0.1418
Oct-09		865	$	122	0.1410
Nov-09		332	$	53	0.1596
Dec-09		80	$	20	0.2500
	Total	**3,925**	**$**	**618**	
	Average	**327**	**$**	**52**	**0.1975**
Jan-10		-	$	10	
Feb-10		-	$	10	
Mar-10		-	$	10	
Apr-10		175	$	32	0.1829
May-10		67	$	19	0.2836
Jun-10		140	$	28	0.2000
Jul-10		148	$	81	0.5473
Aug-10		1,791	$	243	0.1357
Sep-10		527	$	78	0.1480
Oct-10		872	$	123	0.1411
Nov-10		137	$	27	0.1971
Dec-10		-	$	10	
	Total	**3,857**	**$**	**671**	
	Average	**321**	**$**	**56**	**0.2294**
Jan-11		-	$	10	
Feb-11		-	$	10	
Mar-11		23	$	13	0.5652
Apr-11		-	$	10	
May-11		-	$	10	

Name: Four Seasons Inn
Utility: Baraga
Utility Type: Electric
Acct #: MICH-000790-0000-03
Meter #:
Address: 790 Michigan Ave
Multiplier: 80

Month	Read	Usage		Cost	Cost per Unit
Jan-09		6,640	$	808	0.1217
Feb-09		8,720	$	1,080	0.1239
Mar-09		4,400	$	561	0.1275
Apr-09		6,000	$	762	0.1270
May-09		4,320	$	552	0.1278
Jun-09		4,240	$	541	0.1276
Jul-09		5,120	$	651	0.1271
Aug-09		6,560	$	651	0.0992
Sep-09		5,600	$	739	0.1320
Oct-09		5,840	$	771	0.1320
Nov-09		5,520	$	729	0.1321
Dec-09		6,320	$	833	0.1318
	Total	**69,280**	**$**	**8,678**	
	Average	**5,773**	**$**	**723**	**0.1258**
Jan-10		7,040	$	927	0.1317
Feb-10		5,920	$	782	0.1321
Mar-10		5,200	$	687	0.1321
Apr-10		4,000	$	531	0.1328
May-10		4,000	$	532	0.1330
Jun-10		5,520	$	729	0.1321
Jul-10		7,360	$	969	0.1317
Aug-10		9,120	$	1,198	0.1314
Sep-10		5,520	$	729	0.1321
Oct-10		5,760	$	760	0.1319
Nov-10		5,280	$	698	0.1322
Dec-10		6,800	$	896	0.1318
	Total	**71,520**	**$**	**9,438**	
	Average	**5,960**	**$**	**787**	**0.1321**
Jan-11		6,080	$	802	0.1319
Feb-11		4,720	$	625	0.1324
Mar-11		5,280	$	698	0.1322
Apr-11		5,520	$	729	0.1321
May-11		6,000	$	792	0.1320

Name: Ojibwa Casino - RV
Utility: Baraga
Utility Type: Electric
Acct #: MICH-000797-0RV2-01
Meter #:
Address: 797 Michigan Ave
Multiplier: 1

Month	Read	Usage		Cost	Cost per Unit
Jan-09		842	$	111	0.1318
Feb-09		1,129	$	148	0.1311
Mar-09		7,247	$	100	0.0138
Apr-09		1,035	$	139	0.1343
May-09		989	$	133	0.1345
Jun-09		1,071	$	143	0.1335
Jul-09		1,226	$	163	0.1330
Aug-09		1,201	$	160	0.1332
Sep-09		1,244	$	172	0.1383
Oct-09		1,283	$	177	0.1380
Nov-09		1,334	$	183	0.1372
Dec-09		1,145	$	159	0.1389
	Total	**19,746**	**$**	**1,788**	
	Average	**1,646**	**$**	**149**	**0.1248**
Jan-10		1,325	$	182	0.1374
Feb-10		1,110	$	154	0.1387
Mar-10		1,161	$	161	0.1387
Apr-10		1,105	$	154	0.1394
May-10		1,318	$	181	0.1373
Jun-10		1,581	$	216	0.1366
Jul-10		1,553	$	212	0.1365
Aug-10		1,398	$	192	0.1373
Sep-10		1,203	$	166	0.1380
Oct-10		1,322	$	181	0.1369
Nov-10		1,437	$	197	0.1371
Dec-10		1,390	$	191	0.1374
	Total	**15,903**	**$**	**2,187**	
	Average	**1,325**	**$**	**182**	**0.1376**
Jan-11		1,158	$	160	0.1382
Feb-11		939	$	132	0.1406
Mar-11		1,096	$	153	0.1396
Apr-11		1,318	$	181	0.1373
May-11		1,704	$	232	0.1362

Name: Ojibwa Casino - RV
Utility: Baraga
Utility Type: Electric
Acct #: MICH-000797-00RV-03
Meter #:
Address: 797 Michigan Ave RV
Multiplier: 1

Month	Read	Usage		Cost	Cost per Unit
Jan-09		-	$	10	
Feb-09		-	$	10	
Mar-09		1	$	10	10.0000
Apr-09		-	$	10	
May-09		109	$	24	0.2202
Jun-09		371	$	56	0.1509
Jul-09		1,226	$	164	0.1338
Aug-09		1,596	$	210	0.1316
Sep-09		1,135	$	157	0.1383
Oct-09		1,483	$	203	0.1369
Nov-09		922	$	130	0.1410
Dec-09		1	$	10	10.0000
	Total	**6,844**	**$**	**994**	
	Average	**570**	**$**	**83**	**2.3392**
Jan-10		-	$	10	
Feb-10		-	$	10	
Mar-10		-	$	10	
Apr-10		45	$	16	0.3556
May-10		132	$	27	0.2045
Jun-10		387	$	60	0.1550
Jul-10		1,441	$	198	0.1374
Aug-10		2,436	$	328	0.1346
Sep-10		1,086	$	151	0.1390
Oct-10		1,222	$	169	0.1383
Nov-10		684	$	99	0.1447
Dec-10		67	$	19	0.2836
	Total	**7,500**	**$**	**1,097**	
	Average	**625**	**$**	**91**	**0.1881**
Jan-11		22	$	12	0.5455
Feb-11		53	$	17	0.3208
Mar-11		24	$	13	0.5417
Apr-11		-	$	10	
May-11		242	$	41	0.1694

Name: Big Bucks Bingo Hall
Utility: Baraga
Utility Type: Electric
Acct #: MICH-000795-0000-01
Meter #:
Address: 795 Michigan Ave
Multiplier: 80

Month	Read	Usage		Cost	Cost per Unit
Jan-09		12,400	$	1,502	0.1211
Feb-09		16,480	$	2,035	0.1235
Mar-09		9,760	$	1,233	0.1263
Apr-09		12,880	$	1,624	0.1261
May-09		10,000	$	1,264	0.1264
Jun-09		9,680	$	1,223	0.1263
Jul-09		12,160	$	1,534	0.1262
Aug-09		12,960	$	1,635	0.1262
Sep-09		10,240	$	1,344	0.1313
Oct-09		9,840	$	1,293	0.1314
Nov-09		11,360	$	1,491	0.1313
Dec-09		10,720	$	1,407	0.1313
	Total	**138,480**	**$**	**17,585**	
	Average	**11,540**	**$**	**1,465**	**0.1273**
Jan-10		12,960	$	1,700	0.1312
Feb-10		10,960	$	1,439	0.1313
Mar-10		10,800	$	1,418	0.1313
Apr-10		8,560	$	1,125	0.1314
May-10		9,840	$	1,293	0.1314
Jun-10		12,080	$	1,584	0.1311
Jul-10		12,160	$	1,595	0.1312
Aug-10		12,320	$	1,616	0.1312
Sep-10		9,440	$	1,240	0.1314
Oct-10		10,400	$	1,365	0.1313
Nov-10		11,520	$	1,511	0.1312
Dec-10		15,840	$	2,075	0.1310
	Total	**136,880**	**$**	**17,961**	
	Average	**11,407**	**$**	**1,497**	**0.1312**
Jan-11		12,640	$	1,658	0.1312
Feb-11		11,680	$	1,532	0.1312
Mar-11		10,880	$	1,422	0.1307
Apr-11		12,320	$	1,616	0.1312
May-11		14,560	$	1,908	0.1310

Name: Casino Sign - On Highway (front of building)
Utility: Baraga
Utility Type: Electric
Acct #: MICH-000003-0000-01
Meter #:
Address: 797 Michigan Ave
Multiplier: 1

Month	Read	Usage		Cost	Cost per Unit
Jan-09		1,339	$	171	0.1277
Feb-09		1,315	$	171	0.1300
Mar-09		1,073	$	143	0.1333
Apr-09		1,460	$	192	0.1315
May-09		1,564	$	206	0.1317
Jun-09		1,629	$	204	0.1252
Jul-09		1,881	$	245	0.1302
Aug-09		1,896	$	247	0.1303
Sep-09		1,935	$	261	0.1349
Oct-09		1,580	$	216	0.1367
Nov-09		1,677	$	227	0.1354
Dec-09		1,368	$	187	0.1367
	Total	**18,717**	**$**	**2,470**	
	Average	**1,560**	**$**	**206**	**0.1320**
Jan-10		1,477	$	202	0.1368
Feb-10		1,169	$	162	0.1386
Mar-10		1,283	$	177	0.1380
Apr-10		1,646	$	224	0.1361
May-10		1,325	$	182	0.1374
Jun-10		1,810	$	245	0.1354
Jul-10		1,715	$	233	0.1359
Aug-10		1,576	$	215	0.1364
Sep-10		1,823	$	247	0.1355
Oct-10		1,447	$	198	0.1368
Nov-10		1,628	$	221	0.1357
Dec-10		1,185	$	163	0.1376
	Total	**18,084**	**$**	**2,469**	
	Average	**1,507**	**$**	**206**	**0.1367**
Jan-11		1,296	$	178	0.1373
Feb-11		1,045	$	145	0.1388
Mar-11		978	$	137	0.1401
Apr-11		1,202	$	166	0.1381
May-11		1,453	$	199	0.1370

Name: KBIC Tribal Police Dept - on US 41
Utility: Baraga
Utility Type: Electric
Acct #: U41N-000503-0000-01
Meter #:
Address: 503 US 41 North
Multiplier: 1

Month	Read	Usage		Cost	Cost per Unit
Jan-09		625	$	85	0.1360
Feb-09		657	$	90	0.1370
Mar-09		405	$	60	0.1481
Apr-09		537	$	77	0.1434
May-09		373	$	56	0.1501
Jun-09		299	$	47	0.1572
Jul-09		244	$	40	0.1639
Aug-09		64	$	18	0.2813
Sep-09		-	$	10	
Oct-09		-	$	10	
Nov-09		91	$	22	0.2418
Dec-09		353	$	56	0.1586
	Total	**3,648**	**$**	**571**	
	Average	**304**	**$**	**48**	**0.1717**
Jan-10		454	$	69	0.1520
Feb-10		686	$	100	0.1458
Mar-10		678	$	98	0.1445
Apr-10		1,534	$	210	0.1369
May-10		1,276	$	176	0.1379
Jun-10		1,344	$	185	0.1376
Jul-10		1,746	$	237	0.1357
Aug-10		1,466	$	200	0.1364
Sep-10		1,641	$	224	0.1365
Oct-10		1,291	$	178	0.1379
Nov-10		1,780	$	241	0.1354
Dec-10		2,271	$	306	0.1347
	Total	**16,167**	**$**	**2,224**	
	Average	**1,347**	**$**	**185**	**0.1393**
Jan-11		1,609	$	306	0.1902
Feb-11		1,601	$	218	0.1362
Mar-11		1,332	$	218	0.1637
Apr-11		1,500	$	183	0.1220
May-11		1,715	$	206	0.1201

Name: Pines Convenience Center
Utility: Baraga
Utility Type: Electric
Acct #: U41N-000501-0000-02
Meter #:
Address: 501 US 41 North
Multiplier: 40

Month	Read	Usage		Cost	Cost per Unit
Jan-09		33,520	$	4,046	0.1207
Feb-09		36,000	$	4,434	0.1232
Mar-09		21,120	$	2,658	0.1259
Apr-09		30,640	$	3,852	0.1257
May-09		26,360	$	3,314	0.1257
Jun-09		26,680	$	3,354	0.1257
Jul-09		29,120	$	3,661	0.1257
Aug-09		31,000	$	3,897	0.1257
Sep-09		25,400	$	3,321	0.1307
Oct-09		32,800	$	4,286	0.1307
Nov-09		31,880	$	4,167	0.1307
Dec-09		35,000	$	4,574	0.1307
	Total	**359,520**	**$**	**45,564**	
	Average	**29,960**	**$**	**3,797**	**0.1268**
Jan-10		27,640	$	3,613	0.1307
Feb-10		30,680	$	4,010	0.1307
Mar-10		21,280	$	2,784	0.1308
Apr-10		31,640	$	4,135	0.1307
May-10		22,200	$	2,904	0.1308
Jun-10		24,880	$	3,254	0.1308
Jul-10		34,080	$	4,453	0.1307
Aug-10		28,920	$	3,781	0.1307
Sep-10		30,440	$	3,978	0.1307
Oct-10		25,880	$	3,384	0.1308
Nov-10		29,960	$	3,916	0.1307
Dec-10		35,520	$	4,641	0.1307
	Total	**343,120**	**$**	**44,853**	
	Average	**28,593**	**$**	**3,738**	**0.1307**
Jan-11		27,120	$	3,545	0.1307
Feb-11		29,040	$	3,795	0.1307
Mar-11		25,480	$	3,332	0.1308
Apr-11		27,120	$	3,545	0.1307
May-11		30,480	$	3,984	0.1307

Name: Keweenaw Bay Indian Community - half college / half library
Utility: Baraga
Utility Type: Electric
Acct #: SUPS-000415-0000-02
Meter #:
Address: 415 Superior Ave - labs and classrooms
Multiplier: 1

Month	Read	Usage		Cost	Cost per Unit
Jan-09		1,400	$	178	0.1271
Feb-09		1,910	$	244	0.1277
Mar-09		1,210	$	160	0.1322
Apr-09		1,410	$	186	0.1319
May-09		1,120	$	150	0.1339
Jun-09		940	$	127	0.1351
Jul-09		900	$	122	0.1356
Aug-09		820	$	112	0.1366
Sep-09		1,050	$	147	0.1400
Oct-09		1,030	$	143	0.1388
Nov-09		1,250	$	146	0.1168
Dec-09		1,060	$	148	0.1396
	Total	**14,100**	**$**	**1,863**	
	Average	**1,175**	**$**	**155**	**0.1330**
Jan-10		1,270	$	175	0.1378
Feb-10		1,200	$	165	0.1375
Mar-10		1,210	$	167	0.1380
Apr-10		1,200	$	165	0.1375
May-10		860	$	121	0.1407
Jun-10		1,150	$	159	0.1383
Jul-10		1,040	$	144	0.1385
Aug-10		1,630	$	222	0.1362
Sep-10		1,580	$	215	0.1361
Oct-10		690	$	99	0.1435
Nov-10		930	$	131	0.1409
Dec-10		1,120	$	155	0.1384
	Total	**13,880**	**$**	**1,918**	
	Average	**1,157**	**$**	**160**	**0.1386**
Jan-11		1,280	$	176	0.1375
Feb-11		1,140	$	158	0.1386
Mar-11		1,170	$	162	0.1385
Apr-11		1,320	$	181	0.1371
May-11		1,100	$	153	0.1391

Name: KBIC Tribal Police Dept
Utility: Baraga
Utility Type: Electric
Acct #: U41N-000000-0GAR-02
Meter #:
Address: US 41 North #Gar
Multiplier: 1

Month	Read	Usage		Cost	Cost per Unit
Jan-09		492	$	69	0.1402
Feb-09		533	$	75	0.1407
Mar-09		342	$	53	0.1550
Apr-09		388	$	59	0.1521
May-09		266	$	43	0.1617
Jun-09		221	$	37	0.1674
Jul-09		181	$	32	0.1768
Aug-09		187	$	33	0.1765
Sep-09		144	$	29	0.2014
Oct-09		224	$	39	0.1741
Nov-09		325	$	52	0.1600
Dec-09		484	$	73	0.1508
	Total	**3,787**	**$**	**594**	
	Average	**316**	**$**	**50**	**0.1631**
Jan-10		436	$	66	0.1514
Feb-10		468	$	71	0.1517
Mar-10		321	$	51	0.1589
Apr-10		500	$	75	0.1500
May-10		666	$	96	0.1441
Jun-10		226	$	39	0.1726
Jul-10		205	$	36	0.1756
Aug-10		159	$	30	0.1887
Sep-10		185	$	34	0.1838
Oct-10		215	$	37	0.1721
Nov-10		344	$	54	0.1570
Dec-10		539	$	79	0.1466
	Total	**4,264**	**$**	**668**	
	Average	**355**	**$**	**56**	**0.1627**
Jan-11		599	$	88	0.1469
Feb-11		527	$	78	0.1480
Mar-11		421	$	78	0.1853
Apr-11		405	$	64	0.1580
May-11		829	$	117	0.1411

Name: Tribal Maintenance Garage - Police
Utility: Baraga
Utility Type: Electric
Acct #: U41N-000503-GAR-01
Meter #:
Address: 503 US 41 N Garage
Multiplier: 1

Month	Read	Usage	Cost	Cost per Unit
Jan-09		-	$ 10	
Feb-09		-	$ 10	
Mar-09		-	$ 10	
Apr-09		-	$ 10	
May-09		-	$ 10	
Jun-09		-	$ 10	
Jul-09		-	$ 10	
Aug-09		-	$ 10	
Sep-09		-	$ 10	
Oct-09		-	$ 10	
Nov-09		-	$ 10	
Dec-09		-	$ 10	
	Total	**-**	**$ 120**	
	Average	**-**	**$ 10**	
Jan-10		-	$ 10	
Feb-10		-	$ 10	
Mar-10		-	$ 10	
Apr-10		-	$ 10	
May-10		-	$ 10	
Jun-10		-	$ 10	
Jul-10		-	$ 10	
Aug-10		-	$ 10	
Sep-10		-	$ 10	
Oct-10		-	$ 10	
Nov-10		-	$ 10	
Dec-10		-	$ 10	
	Total	**-**	**$ 120**	
	Average	**-**	**$ 10**	
Jan-11		-	$ 10	
Feb-11		-	$ 10	
Mar-11		-	$ 10	
Apr-11		-	$ 10	
May-11		-	$ 10	

Name: KBOCC - College
Utility: Baraga
Utility Type: Electric
Acct #: SUPS-000325-0000-02
Meter #:
Address: 658 Superior Ave
Multiplier: 1

Month	Read	Usage		Cost	Cost per Unit
Jan-09		319	$	40	0.1254
Feb-09		358	$	45	0.1257
Mar-09		253	$	33	0.1304
Apr-09		255	$	33	0.1294
May-09		166	$	23	0.1386
Jun-09		96	$	14	0.1458
Jul-09		97	$	14	0.1443
Aug-09		83	$	13	0.1566
Sep-09		85	$	14	0.1647
Oct-09		93	$	14	0.1505
Nov-09		169	$	14	0.0828
Dec-09		164	$	23	0.1402
	Total	**2,138**	**$**	**280**	
	Average	**178**	**$**	**23**	**0.1362**
Jan-10		169	$	24	0.1420
Feb-10		160	$	23	0.1438
Mar-10		119	$	18	0.1513
Apr-10		98	$	15	0.1531
May-10		79	$	13	0.1646
Jun-10		71	$	12	0.1690
Jul-10		80	$	13	0.1625
Aug-10		61	$	13	0.2131
Sep-10		97	$	11	0.1134
Oct-10		85	$	15	0.1765
Nov-10		120	$	14	0.1167
Dec-10		162	$	18	0.1111
	Total	**1,301**	**$**	**189**	
	Average	**108**	**$**	**16**	**0.1514**
Jan-11		271	$	37	0.1365
Feb-11		251	$	34	0.1355
Mar-11		210	$	29	0.1381
Apr-11		144	$	21	0.1458
May-11		93	$	15	0.1613

Name: Keweenaw Bay Indian Community - Planning & Development Office
Utility: Baraga
Utility Type: Electric
Acct #: U41S-000807-0000-02
Meter #:
Address: 807 US 41 South
Multiplier: 1

Month	Read	Usage		Cost	Cost per Unit
Jan-09		800	$	106	0.1325
Feb-09		1,486	$	192	0.1292
Mar-09		1,246	$	166	0.1332
Apr-09		980	$	132	0.1347
May-09		832	$	114	0.1370
Jun-09		868	$	118	0.1359
Jul-09		1,112	$	216	0.1942
Aug-09		921	$	125	0.1357
Sep-09		1,123	$	156	0.1389
Oct-09		790	$	113	0.1430
Nov-09		1,033	$	144	0.1394
Dec-09		1,123	$	156	0.1389
	Total	**12,314**	**$**	**1,738**	
	Average	**1,026**	**$**	**145**	**0.1411**
Jan-10		915	$	128	0.1399
Feb-10		1,377	$	188	0.1365
Mar-10		1,195	$	165	0.1381
Apr-10		1,345	$	184	0.1368
May-10		880	$	124	0.1409
Jun-10		1,079	$	149	0.1381
Jul-10		1,602	$	218	0.1361
Aug-10		1,734	$	218	0.1257
Sep-10		1,738	$	236	0.1358
Oct-10		932	$	131	0.1406
Nov-10		1,125	$	156	0.1387
Dec-10		1,265	$	174	0.1375
	Total	**15,187**	**$**	**2,071**	
	Average	**1,266**	**$**	**173**	**0.1371**
Jan-11		1,039	$	174	0.1675
Feb-11		1,000	$	144	0.1440
Mar-11		1,104	$	140	0.1268
Apr-11		1,183	$	163	0.1378
May-11		884	$	124	0.1403

Name: Ojibwa College
Utility: Baraga
Utility Type: Electric
Acct #: BEAR-000111-0000-01
Meter #:
Address: 109 Beartown Road
Multiplier: 40

Month	Read	Usage		Cost	Cost per Unit
Jan-09		17,760	$	2,147	0.1209
Feb-09		25,280	$	3,116	0.1233
Mar-09		15,680	$	1,975	0.1260
Apr-09		23,600	$	2,969	0.1258
May-09		20,960	$	2,638	0.1259
Jun-09		23,360	$	2,938	0.1258
Jul-09		26,320	$	3,310	0.1258
Aug-09		27,560	$	3,310	0.1201
Sep-09		23,800	$	3,113	0.1308
Oct-09		21,280	$	2,784	0.1308
Nov-09		21,080	$	2,757	0.1308
Dec-09		19,280	$	2,523	0.1309
	Total	**265,960**	**$**	**33,580**	
	Average	**22,163**	**$**	**2,798**	**0.1264**
Jan-10		20,360	$	2,664	0.1308
Feb-10		17,840	$	2,336	0.1309
Mar-10		18,560	$	2,429	0.1309
Apr-10		16,280	$	2,132	0.1310
May-10		18,360	$	2,403	0.1309
Jun-10		22,160	$	2,898	0.1308
Jul-10		29,160	$	3,811	0.1307
Aug-10		29,600	$	3,811	0.1288
Sep-10		20,960	$	2,743	0.1309
Oct-10		21,680	$	2,836	0.1308
Nov-10		19,360	$	2,533	0.1308
Dec-10		24,440	$	3,196	0.1308
	Total	**258,760**	**$**	**33,792**	
	Average	**21,563**	**$**	**2,816**	**0.1307**
Jan-11		27,680	$	3,196	0.1155
Feb-11		22,040	$	2,883	0.1308
Mar-11		21,960	$	2,883	0.1313
Apr-11		20,800	$	2,722	0.1309
May-11		22,720	$	2,972	0.1308

Name: Tribal Senior Center
Utility: Baraga
Utility Type: Electric
Acct #: MAIN-000208-0000-01
Meter #:
Address: 208 Main Street
Multiplier: 60

Month	Read	Usage		Cost	Cost per Unit
Jan-09		5,280	$	644	0.1220
Feb-09		5,640	$	703	0.1246
Mar-09		3,540	$	453	0.1280
Apr-09		5,940	$	754	0.1269
May-09		4,200	$	535	0.1274
Jun-09		4,920	$	626	0.1272
Jul-09		4,380	$	559	0.1276
Aug-09		5,880	$	746	0.1269
Sep-09		3,240	$	431	0.1330
Oct-09		5,340	$	706	0.1322
Nov-09		5,520	$	729	0.1321
Dec-09		6,300	$	831	0.1319
	Total	**60,180**	**$**	**7,717**	
	Average	**5,015**	**$**	**643**	**0.1283**
Jan-10		5,760	$	760	0.1319
Feb-10		6,420	$	847	0.1319
Mar-10		5,760	$	760	0.1319
Apr-10		5,280	$	697	0.1320
May-10		3,360	$	447	0.1330
Jun-10		6,540	$	861	0.1317
Jul-10		6,960	$	917	0.1318
Aug-10		7,260	$	956	0.1317
Sep-10		5,160	$	682	0.1322
Oct-10		4,860	$	643	0.1323
Nov-10		5,580	$	736	0.1319
Dec-10		4,560	$	604	0.1325
	Total	**67,500**	**$**	**8,910**	
	Average	**5,625**	**$**	**743**	**0.1321**
Jan-11		3,360	$	447	0.1330
Feb-11		4,500	$	596	0.1324
Mar-11		4,200	$	556	0.1324
Apr-11		4,080	$	541	0.1326
May-11		4,440	$	588	0.1324

Name: La Pointe Health Clinic
Utility: Baraga
Utility Type: Electric
Acct #: SUPS-000102-000B-01
Meter #:
Address: 102 Superior Street
Multiplier: 40

Month	Read	Usage		Cost	Cost per Unit
Jan-09		12,000	$	1,454	0.1212
Feb-09		13,400	$	1,656	0.1236
Mar-09		10,440	$	1,318	0.1262
Apr-09		13,840	$	1,744	0.1260
May-09		12,160	$	1,534	0.1262
Jun-09		12,440	$	1,569	0.1261
Jul-09		16,640	$	2,096	0.1260
Aug-09		16,800	$	2,116	0.1260
Sep-09		18,320	$	2,398	0.1309
Oct-09		12,760	$	1,673	0.1311
Nov-09		12,240	$	1,605	0.1311
Dec-09		9,840	$	1,292	0.1313
	Total	**160,880**	**$**	**20,455**	
	Average	**13,407**	**$**	**1,705**	**0.1271**
Jan-10		11,080	$	1,453	0.1311
Feb-10		9,560	$	1,256	0.1314
Mar-10		9,840	$	1,292	0.1313
Apr-10		12,000	$	1,574	0.1312
May-10		11,880	$	1,559	0.1312
Jun-10		14,360	$	1,881	0.1310
Jul-10		17,000	$	2,226	0.1309
Aug-10		16,920	$	2,216	0.1310
Sep-10		20,480	$	2,680	0.1309
Oct-10		15,840	$	2,075	0.1310
Nov-10		15,720	$	2,059	0.1310
Dec-10		15,400	$	2,017	0.1310
	Total	**170,080**	**$**	**22,288**	
	Average	**14,173**	**$**	**1,857**	**0.1311**
Jan-11		18,880	$	2,471	0.1309
Feb-11		16,520	$	2,163	0.1309
Mar-11		16,680	$	2,184	0.1309
Apr-11		18,520	$	2,424	0.1309
May-11		20,280	$	2,653	0.1308

Name: KBIC Court
Utility: Baraga
Utility Type: Electric
Acct #: SUPN-000472-0000-03
Meter #:
Address: 472 North Superior Avenue
Multiplier: 1

Month	Read	Usage		Cost	Cost per Unit
Jan-09		1,158	$	149	0.1287
Feb-09		1,418	$	184	0.1298
Mar-09		790	$	109	0.1380
Apr-09		1,264	$	168	0.1329
May-09		1,293	$	171	0.1323
Jun-09		1,169	$	156	0.1334
Jul-09		923	$	125	0.1354
Aug-09		1,294	$	171	0.1321
Sep-09		1,028	$	143	0.1391
Oct-09		930	$	131	0.1409
Nov-09		1,050	$	146	0.1390
Dec-09		1,122	$	156	0.1390
	Total	**13,439**	**$**	**1,809**	
	Average	**1,120**	**$**	**151**	**0.1351**
Jan-10		945	$	133	0.1407
Feb-10		1,198	$	165	0.1377
Mar-10		913	$	128	0.1402
Apr-10		1,110	$	154	0.1387
May-10		971	$	136	0.1401
Jun-10		1,082	$	151	0.1396
Jul-10		1,052	$	146	0.1388
Aug-10		1,507	$	205	0.1360
Sep-10		1,207	$	166	0.1375
Oct-10		951	$	133	0.1399
Nov-10		1,181	$	163	0.1380
Dec-10		1,205	$	166	0.1378
	Total	**13,322**	**$**	**1,846**	
	Average	**1,110**	**$**	**154**	**0.1388**
Jan-11		919	$	130	0.1415
Feb-11		1,308	$	180	0.1376
Mar-11		1,250	$	173	0.1384
Apr-11		1,198	$	166	0.1386
May-11		1,263	$	174	0.1378

Name: Ojibwa Tribal Center - Marina or Park
Utility: Baraga
Utility Type: Electric
Acct #: LTHS-000000-0000-02
Meter #:
Address: Lake Meter
Multiplier: 1

Month	Read	Usage		Cost	Cost per Unit
Jan-09		511	$	71	0.1389
Feb-09		404	$	59	0.1460
Mar-09		314	$	49	0.1561
Apr-09		357	$	54	0.1513
May-09		226	$	38	0.1681
Jun-09		1,390	$	184	0.1324
Jul-09		1,935	$	252	0.1302
Aug-09		2,619	$	338	0.1291
Sep-09		1,711	$	233	0.1362
Oct-09		1,438	$	197	0.1370
Nov-09		368	$	57	0.1549
Dec-09		412	$	63	0.1529
	Total	**11,685**	**$**	**1,595**	
	Average	**974**	**$**	**133**	**0.1444**
Jan-10		412	$	63	0.1529
Feb-10		410	$	63	0.1537
Mar-10		189	$	34	0.1799
Apr-10		260	$	44	0.1692
May-10		111	$	24	0.2162
Jun-10		1,533	$	210	0.1370
Jul-10		2,495	$	335	0.1343
Aug-10		1,332	$	183	0.1374
Sep-10		1,171	$	162	0.1383
Oct-10		971	$	136	0.1401
Nov-10		542	$	80	0.1476
Dec-10		454	$	68	0.1498
	Total	**9,880**	**$**	**1,402**	
	Average	**823**	**$**	**117**	**0.1547**
Jan-11		352	$	55	0.1563
Feb-11		352	$	55	0.1563
Mar-11		319	$	55	0.1724
Apr-11		297	$	51	0.1717
May-11		332	$	51	0.1536

Name: KBIC - Transitional House (Yellow House)
Utility: Baraga
Utility Type: Electric
Acct #: MICH-000755-0000-02
Meter #:
Address: 755 Michigan Ave
Multiplier: 1

Month	Read	Usage		Cost	Cost per Unit
Jan-09		334	$	42	0.1257
Feb-09		487	$	60	0.1232
Mar-09		252	$	33	0.1310
Apr-09		371	$	48	0.1294
May-09		298	$	39	0.1309
Jun-09		250	$	33	0.1320
Jul-09		329	$	43	0.1307
Aug-09		331	$	43	0.1299
Sep-09		432	$	58	0.1343
Oct-09		483	$	64	0.1325
Nov-09		508	$	64	0.1260
Dec-09		359	$	48	0.1337
	Total	**4,434**	**$**	**575**	
	Average	**370**	**$**	**48**	**0.1299**
Jan-10		610	$	79	0.1295
Feb-10		510	$	67	0.1314
Mar-10		639	$	84	0.1315
Apr-10		407	$	54	0.1327
May-10		527	$	69	0.1309
Jun-10		559	$	73	0.1306
Jul-10		688	$	89	0.1294
Aug-10		536	$	70	0.1306
Sep-10		417	$	55	0.1319
Oct-10		819	$	106	0.1294
Nov-10		695	$	90	0.1295
Dec-10		693	$	90	0.1299
	Total	**7,100**	**$**	**926**	
	Average	**592**	**$**	**77**	**0.1306**
Jan-11		502	$	66	0.1315
Feb-11		562	$	74	0.1317
Mar-11		680	$	89	0.1309
Apr-11		620	$	80	0.1290
May-11		706	$	91	0.1289

Name: Tribal Center Annex
Utility: Baraga
Utility Type: Electric
Acct #: BEAR-000107-0000-01
Meter #:
Address: 107 Beartown Road
Multiplier: 40

Month	Read	Usage		Cost	Cost per Unit
Jan-09		13,480	$	1,632	0.1211
Feb-09		17,560	$	2,167	0.1234
Mar-09		10,440	$	1,318	0.1262
Apr-09		15,040	$	1,895	0.1260
May-09		12,800	$	1,614	0.1261
Jun-09		13,880	$	1,749	0.1260
Jul-09		15,520	$	1,955	0.1260
Aug-09		15,840	$	1,995	0.1259
Sep-09		14,000	$	1,835	0.1311
Oct-09		13,200	$	1,730	0.1311
Nov-09		13,520	$	1,772	0.1311
Dec-09		12,720	$	1,668	0.1311
	Total	**168,000**	**$**	**21,330**	
	Average	**14,000**	**$**	**1,778**	**0.1271**
Jan-10		14,560	$	1,908	0.1310
Feb-10		13,240	$	1,735	0.1310
Mar-10		13,200	$	1,730	0.1311
Apr-10		10,480	$	1,376	0.1313
May-10		11,720	$	1,538	0.1312
Jun-10		14,640	$	1,918	0.1310
Jul-10		16,080	$	2,105	0.1309
Aug-10		15,000	$	1,966	0.1311
Sep-10		11,960	$	1,569	0.1312
Oct-10		13,560	$	1,777	0.1310
Nov-10		12,360	$	1,621	0.1311
Dec-10		14,560	$	1,908	0.1310
	Total	**161,360**	**$**	**21,151**	
	Average	**13,447**	**$**	**1,763**	**0.1311**
Jan-11		12,040	$	1,579	0.1311
Feb-11		9,680	$	1,271	0.1313
Mar-11		11,200	$	1,469	0.1312
Apr-11		12,680	$	1,663	0.1312
May-11		15,560	$	2,038	0.1310

Name: WCUP Radio
Utility: Baraga
Utility Type: Electric
Acct #: U41S-000805-000B-03
Meter #:
Address: 805 US 41 South #B
Multiplier: 1

Month	Read	Usage		Cost	Cost per Unit
Jan-09		1,824	$	228	0.1250
Feb-09		2,419	$	306	0.1265
Mar-09		1,836	$	239	0.1302
Apr-09		2,101	$	273	0.1299
May-09		2,018	$	262	0.1298
Jun-09		1,782	$	233	0.1308
Jul-09		2,230	$	289	0.1296
Aug-09		2,220	$	288	0.1297
Sep-09		2,826	$	378	0.1338
Oct-09		1,876	$	254	0.1354
Nov-09		1,931	$	261	0.1352
Dec-09		2,080	$	280	0.1346
	Total	**25,143**	**$**	**3,291**	
	Average	**2,095**	**$**	**274**	**0.1309**
Jan-10		1,509	$	206	0.1365
Feb-10		1,882	$	255	0.1355
Mar-10		1,435	$	196	0.1366
Apr-10		2,065	$	279	0.1351
May-10		1,548	$	210	0.1357
Jun-10		1,905	$	258	0.1354
Jul-10		2,367	$	318	0.1343
Aug-10		2,492	$	334	0.1340
Sep-10		1,889	$	256	0.1355
Oct-10		1,291	$	178	0.1379
Nov-10		1,316	$	181	0.1375
Dec-10		1,650	$	224	0.1358
	Total	**21,349**	**$**	**2,895**	
	Average	**1,779**	**$**	**241**	**0.1358**
Jan-11		1,376	$	188	0.1366
Feb-11		1,352	$	185	0.1368
Mar-11		1,444	$	198	0.1371
Apr-11		1,802	$	244	0.1354
May-11		1,367	$	187	0.1368

Name: Keweenaw Bay Indian Community - Cultural Building
Utility: Baraga
Utility Type: Electric
Acct #: U41N-000000-CAMP-02
Meter #:
Address: US 41 North #Camp
Multiplier: 1

Month	Read	Usage		Cost	Cost per Unit
Jan-09		492	$	60	0.1220
Feb-09		870	$	105	0.1207
Mar-09		745	$	92	0.1235
Apr-09		1,042	$	129	0.1238
May-09		885	$	109	0.1232
Jun-09		705	$	88	0.1248
Jul-09		821	$	102	0.1242
Aug-09		964	$	119	0.1234
Sep-09		635	$	83	0.1307
Oct-09		589	$	76	0.1290
Nov-09		1,004	$	129	0.1285
Dec-09		1,078	$	139	0.1289
	Total	**9,830**	**$**	**1,231**	
	Average	**819**	**$**	**103**	**0.1252**
Jan-10		865	$	111	0.1283
Feb-10		1,028	$	132	0.1284
Mar-10		775	$	100	0.1290
Apr-10		1,062	$	136	0.1281
May-10		559	$	73	0.1306
Jun-10		482	$	63	0.1307
Jul-10		759	$	98	0.1291
Aug-10		548	$	71	0.1296
Sep-10		547	$	71	0.1298
Oct-10		396	$	52	0.1313
Nov-10		435	$	57	0.1310
Dec-10		1,134	$	146	0.1287
	Total	**8,590**	**$**	**1,110**	
	Average	**716**	**$**	**93**	**0.1296**
Jan-11		814	$	105	0.1290
Feb-11		986	$	127	0.1288
Mar-11		812	$	105	0.1293
Apr-11		656	$	85	0.1296
May-11		534	$	70	0.1311

Name: Ojibwa Park
Utility: Baraga
Utility Type: Electric
Acct #: U41N-00PARK-0002-01
Meter #:
Address: Park US 41 North #2
Multiplier: 1

Month	Read	Usage		Cost	Cost per Unit
Jan-09		-	$	10	
Feb-09		-	$	10	
Mar-09		-	$	10	
Apr-09		-	$	10	
May-09		-	$	10	
Jun-09		328	$	51	0.1555
Jul-09		413	$	61	0.1477
Aug-09		1,175	$	156	0.1328
Sep-09		449	$	68	0.1514
Oct-09		470	$	71	0.1511
Nov-09		147	$	29	0.1973
Dec-09		-	$	10	
	Total	**2,982**	**$**	**496**	
	Average	**249**	**$**	**41**	**0.1560**
Apr-10		-	$	10	
May-10		-	$	10	
Jun-10		175	$	32	0.1829
Jul-10		391	$	60	0.1535
Aug-10		1,289	$	177	0.1373
Sep-10		413	$	63	0.1525
Oct-10		373	$	58	0.1555
Nov-10		221	$	38	0.1719
Dec-10		-	$	10	
	Total	**6,093**	**$**	**995**	
	Average	**554**	**$**	**90**	**0.1585**
Apr-11		-	$	10	
May-11		-	$	10	

Name: Ojibwa Park
Utility: Baraga
Utility Type: Electric
Acct #: U41N-00PARK-0001-01
Meter #:
Address: US 41 North
Multiplier: 1

Month	Read	Usage		Cost	Cost per Unit
Jan-09		-	$	47	
Feb-09		-	$	47	
Mar-09		-	$	47	
Apr-09		-	$	51	
May-09		-	$	51	
Jun-09		381	$	57	0.1496
Jul-09		539	$	77	0.1429
Aug-09		1,642	$	215	0.1309
Sep-09		543	$	80	0.1473
Oct-09		708	$	101	0.1427
Nov-09		860	$	121	0.1407
Dec-09		-	$	51	
	Total	**4,673**	**$**	**945**	
	Average	**389**	**$**	**79**	**0.1423**
Jan-10		-	$	51	
Feb-10		-	$	51	
Mar-10		-	$	51	
Apr-10		-	$	51	
May-10		-	$	51	
Jun-10		557	$	82	0.1472
Jul-10		974	$	136	0.1396
Aug-10		2,509	$	206	0.0821
Sep-10		364	$	57	0.1566
Oct-10		381	$	59	0.1549
Nov-10		439	$	66	0.1503
Dec-10		510	$	76	0.1490
	Total	**5,734**	**$**	**937**	
	Average	**478**	**$**	**78**	**0.1400**
Jan-11		396	$	61	0.1540
Feb-11		416	$	63	0.1514
Mar-11		334	$	53	0.1587
Apr-11		297	$	48	0.1616
May-11		303	$	49	0.1617

Name: Ojibwa Park
Utility: Baraga
Utility Type: Electric
Acct #: U41N-00PARK-0003-01
Meter #:
Address: US 41 North #3
Multiplier: 1

Month	Read	Usage		Cost	Cost per Unit
Jan-09		-	$	10	
Feb-09		-	$	10	
Mar-09		-	$	10	
Apr-09		-	$	10	
May-09		-	$	10	
Jun-09		1,030	$	138	0.1340
Jul-09		1,930	$	251	0.1301
Aug-09		4,820	$	603	0.1251
Sep-09		2,470	$	331	0.1340
Oct-09		2,880	$	556	0.1931
Nov-09		490	$	74	0.1510
Dec-09		-	$	10	
	Total	**13,620**	**$**	**2,013**	
	Average	**1,135**	**$**	**168**	**0.1445**
Jan-10		-	$	10	
Feb-10		-	$	10	
Mar-10		-	$	10	
Apr-10		-	$	10	
May-10		-	$	10	
Jun-10		1,380	$	189	0.1370
Jul-10		3,590	$	477	0.1329
Aug-10		4,270	$	566	0.1326
Sep-10		2,330	$	312	0.1339
Oct-10		1,160	$	160	0.1379
Nov-10		-	$	10	
Dec-10		-	$	10	
	Total	**12,730**	**$**	**1,774**	
	Average	**1,061**	**$**	**148**	**0.1348**
Jan-11		-	$	10	
Feb-11		-	$	10	
Mar-11		-	$	10	
Apr-11		-	$	10	
May-11		-	$	10	

Name: Ojibwa Tribal Center
Utility: Baraga
Utility Type: Electric
Acct #: LTHS-000000-0000-02
Meter #:
Address: Lake Meter
Multiplier: 1

Month	Read	Usage		Cost	Cost per Unit
Jan-09		511	$	71	0.1389
Feb-09		404	$	59	0.1460
Mar-09		314	$	49	0.1561
Apr-09		357	$	54	0.1513
May-09		226	$	38	0.1681
Jun-09		1,390	$	183	0.1317
Jul-09		1,935	$	252	0.1302
Aug-09		2,619	$	338	0.1291
Sep-09		1,711	$	232	0.1356
Oct-09		1,438	$	197	0.1370
Nov-09		368	$	574	1.5598
Dec-09		412	$	63	0.1529
	Total	**11,685**	**$**	**2,110**	
	Average	**974**	**$**	**176**	**0.2614**
Jan-10		412	$	63	0.1529
Feb-10		410	$	62	0.1512
Mar-10		189	$	34	0.1799
Apr-10		260	$	43	0.1654
May-10		111	$	24	0.2162
Jun-10		1,533	$	209	0.1363
Jul-10		2,495	$	334	0.1339
Aug-10		1,332	$	183	0.1374
Sep-10		1,171	$	162	0.1383
Oct-10		971	$	136	0.1401
Nov-10		542	$	80	0.1476
Dec-10		454	$	68	0.1498
	Total	**9,880**	**$**	**1,398**	
	Average	**823**	**$**	**117**	**0.1541**
Jan-11		352	$	55	0.1563
Feb-11		352	$	55	0.1563
Mar-11		319	$	55	0.1724
Apr-11		297	$	48	0.1616
May-11		332	$	53	0.1596

Name: Ojibwa Tribal Center
Utility: Baraga
Utility Type: Electric
Acct #: LTHS-000000-0001-01
Meter #:
Address: Lake Meter 2
Multiplier: 1

Month	Read	Usage		Cost	Cost per Unit
Jan-09		170	$	30	0.1765
Feb-09		230	$	38	0.1652
Mar-09		140	$	27	0.1929
Apr-09		200	$	35	0.1750
May-09		140	$	27	0.1929
Jun-09		300	$	48	0.1600
Jul-09		2,910	$	374	0.1285
Aug-09		2,860	$	368	0.1287
Sep-09		1,480	$	203	0.1372
Oct-09		560	$	82	0.1464
Nov-09		180	$	33	0.1833
Dec-09		190	$	34	0.1789
	Total	**9,360**	**$**	**1,299**	
	Average	**780**	**$**	**108**	**0.1638**
Jan-10		160	$	30	0.1875
Feb-10		170	$	32	0.1882
Mar-10		140	$	28	0.2000
Apr-10		170	$	32	0.1882
May-10		150	$	30	0.2000
Jun-10		580	$	85	0.1466
Jul-10		3,860	$	512	0.1326
Aug-10		2,970	$	397	0.1337
Sep-10		2,110	$	284	0.1346
Oct-10		260	$	43	0.1654
Nov-10		260	$	43	0.1654
Dec-10		260	$	43	0.1654
	Total	**11,090**	**$**	**1,559**	
	Average	**924**	**$**	**130**	**0.1673**
Jan-11		210	$	37	0.1762
Feb-11		210	$	3	0.0143
Mar-11		110	$	24	0.2182
Apr-11		290	$	48	0.1655
May-11		240	$	42	0.1750

Name: Ojibwa Casino II - Marquette
Utility: Alger Delta Coop
Utility Type: Electric
Acct #: 493100
Meter #: P155
Address: 105 Acre Trail Casino
Multiplier: 80

Month	Read	Usage		Cost	Cost per Unit
Jan-09					
Feb-09					
Mar-09					
Apr-09		93,920	$	12,992	0.1383
May-09		111,280	$	12,643	0.1136
Jun-09		114,560	$	15,812	0.1380
Jul-09		114,240	$	16,010	0.1401
Aug-09		134,320	$	18,628	0.1387
Sep-09		132,320	$	18,209	0.1376
Oct-09		118,480	$	16,227	0.1370
Nov-09		99,200	$	13,632	0.1374
Dec-09		100,400	$	13,543	0.1349
	Total	**1,018,720**	**$**	**137,696**	
	Average	**113,191**	**$**	**15,300**	**0.1351**
Jan-10		100,800	$	13,490	0.1338
Feb-10		97,360	$	13,263	0.1362
Mar-10		90,800	$	12,558	0.1383
Apr-10		102,800	$	14,314	0.1392
May-10		109,920	$	15,444	0.1405
Jun-10		126,720	$	17,439	0.1376
Jul-10		130,880	$	18,017	0.1377
Aug-10		139,120	$	18,966	0.1363
Sep-10		121,520	$	16,901	0.1391
Oct-10		104,880	$	14,546	0.1387
Nov-10		103,040	$	14,047	0.1363
Dec-10		104,160	$	14,050	0.1349
	Total	**1,332,000**	**$**	**183,035**	
	Average	**111,000**	**$**	**15,253**	**0.1374**
Jan-11		104,720	$	14,114	0.1348
Feb-11		105,600	$	14,164	0.1341
Mar-11		91,680	$	12,565	0.1371
Apr-11		101,520	$	13,850	0.1364
May-11		102,720	$	14,313	0.1393

Name: Ojibwa Casino - Marquette
Utility: Alger Delta Coop
Utility Type: Electric
Acct #: 1542300
Meter #: 28861
Address: RV Park
Multiplier: 1

Month	Read	Usage		Cost	Cost per Unit
Jan-09					
Feb-09					
Mar-09					
Apr-09		405	$	98	0.2420
May-09		626	$	130	0.2077
Jun-09		1,368	$	240	0.1754
Jul-09		1,409	$	248	0.1760
Aug-09		1,836	$	311	0.1694
Sep-09		1,672	$	287	0.1717
Oct-09		1,150	$	210	0.1826
Nov-09		68	$	50	0.7353
Dec-09		306	$	85	0.2778
	Total	**8,840**	**$**	**1,659**	
	Average	**982**	**$**	**184**	**0.2598**
Jan-10		470	$	109	0.2319
Feb-10		451	$	107	0.2373
Mar-10		327	$	88	0.2691
Apr-10		217	$	72	0.3318
May-10		338	$	90	0.2663
Jun-10		809	$	159	0.1965
Jul-10		2,520	$	412	0.1635
Aug-10		2,500	$	409	0.1636
Sep-10		1,337	$	237	0.1773
Oct-10		537	$	124	0.2309
Nov-10		163	$	69	0.4233
Dec-10		457	$	112	0.2451
	Total	**10,126**	**$**	**1,988**	
	Average	**844**	**$**	**166**	**0.2447**
Jan-11		417	$	106	0.2542
Feb-11		190	$	73	0.3842
Mar-11		-	$	45	
Apr-11		111	$	61	0.5495
May-11		679	$	145	0.2135

Name: Ojibwa Casino II - Marquette
Utility: Alger Delta Coop
Utility Type: Electric
Acct #: 494400
Meter #: 27367
Address: M28E Sign
Multiplier: 1

Month	Read	Usage		Cost	Cost per Unit
Jan-09					
Feb-09					
Mar-09					
Apr-09		1,037	$	173	0.1668
May-09		1,219	$	200	0.1641
Jun-09		1,204	$	197	0.1636
Jul-09		1,023	$	173	0.1691
Aug-09		1,071	$	180	0.1681
Sep-09		929	$	159	0.1712
Oct-09		824	$	143	0.1735
Nov-09		893	$	153	0.1713
Dec-09		758	$	133	0.1755
	Total	**8,958**	**$**	**1,511**	
	Average	**995**	**$**	**168**	**0.1692**
Jan-10		606	$	111	0.1832
Feb-10		541	$	101	0.1867
Mar-10		714	$	127	0.1779
Apr-10		762	$	134	0.1759
May-10		801	$	140	0.1748
Jun-10		1,028	$	173	0.1683
Jul-10		893	$	153	0.1713
Aug-10		993	$	168	0.1692
Sep-10		1,017	$	172	0.1691
Oct-10		908	$	160	0.1762
Nov-10		662	$	124	0.1873
Dec-10		620	$	118	0.1903
	Total	**9,545**	**$**	**1,681**	
	Average	**795**	**$**	**140**	**0.1775**
Jan-11		631	$	119	0.1886
Feb-11		556	$	108	0.1942
Mar-11		610	$	116	0.1902
Apr-11		646	$	121	0.1873
May-11		837	$	150	0.1792

Name: Ojibwa Casino II - Marquette
Utility: Alger Delta Coop
Utility Type: Electric
Acct #: 1433600
Meter #: 27913
Address: Water Conditioner
Multiplier: 1

Month	Read	Usage		Cost	Cost per Unit
Jan-09					
Feb-09					
Mar-09					
Apr-09		1,177	$	193	0.1640
May-09		716	$	125	0.1746
Jun-09		569	$	104	0.1828
Jul-09		425	$	84	0.1976
Aug-09		374	$	77	0.2059
Sep-09		357	$	74	0.2073
Oct-09		793	$	136	0.1715
Nov-09		1,473	$	239	0.1623
Dec-09		1,829	$	292	0.1597
	Total	**7,713**	**$**	**1,324**	
	Average	**857**	**$**	**147**	**0.1806**
Jan-10		1,629	$	262	0.1608
Feb-10		2,180	$	344	0.1578
Mar-10		2,361	$	370	0.1567
Apr-10		1,679	$	270	0.1608
May-10		889	$	153	0.1721
Jun-10		956	$	163	0.1705
Jul-10		768	$	135	0.1758
Aug-10		887	$	153	0.1725
Sep-10		914	$	157	0.1718
Oct-10		1,287	$	216	0.1678
Nov-10		1,696	$	276	0.1627
Dec-10		2,030	$	325	0.1601
	Total	**17,276**	**$**	**2,824**	
	Average	**1,440**	**$**	**235**	**0.1658**
Jan-11		2,121	$	338	0.1594
Feb-11		1,830	$	295	0.1612
Mar-11		1,995	$	320	0.1604
Apr-11		1,687	$	274	0.1624
May-11		1,145	$	195	0.1703

Name: Comm Food Warehouse
Utility: Ontongan REA
Utility Type: Electric
Acct #: 901522500
Meter #: 16443490
Address:
Multiplier: 1

Month	Read	Usage		Cost	Cost per Unit
Jan-09		4,529	$	787	0.1738
Feb-09		3,496	$	613	0.1753
Mar-09		3,927	$	686	0.1747
Apr-09		3,606	$	631	0.1750
May-09		3,650	$	639	0.1751
Jun-09		5,159	$	894	0.1733
Jul-09		5,339	$	924	0.1731
Aug-09		6,232	$	1,075	0.1725
Sep-09		4,159	$	725	0.1743
Oct-09		3,962	$	692	0.1747
Nov-09		3,747	$	595	0.1588
Dec-09		4,448	$	702	0.1578
	Total	**52,254**	**$**	**8,963**	
	Average	**4,355**	**$**	**747**	**0.1715**
Jan-10		3,702	$	588	0.1588
Feb-10		3,739	$	593	0.1586
Mar-10		3,633	$	577	0.1588
Apr-10		3,666	$	582	0.1588
May-10		5,507	$	863	0.1567
Jun-10		5,999	$	938	0.1564
Jul-10		5,057	$	795	0.1572
Aug-10		6,410	$	1,001	0.1562
Sep-10		3,665	$	582	0.1588
Oct-10		2,976	$	477	0.1603
Nov-10		3,544	$	564	0.1591
Dec-10		4,436	$	700	0.1578
	Total	**52,334**	**$**	**8,260**	
	Average	**4,361**	**$**	**688**	**0.1581**
Jan-11		4,589	$	723	0.1576
Feb-11		4,203	$	704	0.1675
Mar-11		4,136	$	693	0.1676
Apr-11		2,595	$	443	0.1707
May-11					

Name: KBIC Cust# 901546600 - Zeba Water Tower
Utility: Ontonagan REA
Utility Type: Electric
Acct #: 901590000
Meter #: 17237035
Address: Zeba Water Tower
Multiplier: 1

Month	Read	Usage		Cost	Cost per Unit
Jan-09		143	$	47	0.3287
Feb-09		129	$	44	0.3411
Mar-09		138	$	46	0.3333
Apr-09		116	$	42	0.3621
May-09		101	$	40	0.3960
Jun-09		93	$	38	0.4086
Jul-09		89	$	38	0.4270
Aug-09		85	$	37	0.4353
Sep-09		101	$	40	0.3960
Oct-09		119	$	43	0.3613
Nov-09		130	$	42	0.3231
Dec-09		154	$	46	0.2987
	Total	**1,398**	**$**	**503**	
	Average	**117**	**$**	**42**	**0.3676**
Jan-10		132	$	43	0.3258
Feb-10		127	$	42	0.3307
Mar-10		121	$	41	0.3388
Apr-10		106	$	39	0.3679
May-10		81	$	35	0.4321
Jun-10		37	$	28	0.7568
Jul-10		75	$	34	0.4533
Aug-10		(35)	$	17	(0.4857)
Sep-10		99	$	38	0.3838
Oct-10		113	$	40	0.3540
Nov-10		129	$	42	0.3256
Dec-10		133	$	43	0.3233
	Total	**1,118**	**$**	**442**	
	Average	**93**	**$**	**37**	**0.3255**
Jan-11		121	$	41	0.3388
Feb-11		100	$	39	0.3900
Mar-11		113	$	41	0.3628
Apr-11		95	$	38	0.4000
May-11					

Name: KBIC Child Development Center - Head Start
Utility: Ontonagan REA
Utility Type: Electric
Acct #: 901546601
Meter #: 4497075
Address:
Multiplier: 1

Month	Demand	Usage		Total Cost	Cost per Unit
Jan-09	0.826	5,680	$	1,105	0.1945
Feb-09	0.845	4,880	$	1,029	0.2109
Mar-09	0.835	4,840	$	1,019	0.2105
Apr-09	0.816	4,600	$	981	0.2133
May-09	0.768	4,240	$	914	0.2156
Jun-09	1.046	4,400	$	1,095	0.2489
Jul-09	1.046	4,800	$	1,139	0.2373
Aug-09	1.142	4,760	$	1,191	0.2502
Sep-09	1.066	7,240	$	1,281	0.1769
Oct-09	0.758	6,520	$	995	0.1526
Nov-09	0.778	5,760	$	982	0.1705
Dec-09	0.730	5,680	$	1,088	0.1915
	Total	**63,400**	**$**	**12,819**	
	Average	**5,283**	**$**	**1,068**	**0.2061**
Jan-10	0.854	6,840	$	1,164	0.1702
Feb-10	0.845	7,120	$	1,132	0.1590
Mar-10	0.758	7,080	$	973	0.1374
Apr-10	0.806	5,640	$	1,009	0.1789
May-10	1.037	5,040	$	1,216	0.2413
Jun-10	1.018	6,000	$	1,272	0.2120
Jul-10	-	6,520	$	607	0.0931
Aug-10	0.806	6,200	$	1,050	0.1694
Sep-10	0.806	6,400	$	1,068	0.1669
Oct-10	0.778	6,280	$	1,041	0.1658
Nov-10	0.826	7,040	$	1,140	0.1619
Dec-10	0.864	6,400	$	1,103	0.1723
	Total	**76,560**	**$**	**12,775**	
	Average	**6,380**	**$**	**1,065**	**0.1690**
Jan-11	0.864	7,520	$	1,208	0.1606
Feb-11	0.845	6,320	$	1,144	0.1810
Mar-11	0.758	6,600	$	1,122	0.1700
Apr-11	0.835	6,280	$	1,134	0.1806
May-11					

Name: Keweenaw Bay Natural Resources - Hatchery
Utility: Ontonagan REA
Utility Type: Electric
Acct #: 901566000
Meter #: 4492321
Address:
Multiplier: 40

Month	Demand	Usage		Cost	Cost per Unit
Jan-09	1.006	24,360	$	3,253	0.1335
Feb-09	0.963	20,560	$	2,813	0.1368
Mar-09	0.963	25,040	$	3,303	0.1319
Apr-09	0.881	14,160	$	2,065	0.1458
May-09	0.850	18,280	$	2,497	0.1366
Jun-09	0.975	20,040	$	2,763	0.1379
Jul-09	0.813	15,920	$	2,218	0.1393
Aug-09	0.619	14,040	$	1,897	0.1351
Sep-09	0.950	17,480	$	2,468	0.1412
Oct-09	0.975	24,320	$	3,231	0.1329
Nov-09	1.038	23,440	$	2,792	0.1191
Dec-09	1.044	26,000	$	3,033	0.1167
	Total	**243,640**	**$**	**32,333**	
	Average	**20,303**	**$**	**2,694**	**0.1339**
Jan-10	1.006	21,880	$	2,628	0.1201
Feb-10	0.994	22,560	$	2,684	0.1190
Mar-10	1.206	22,280	$	2,783	0.1249
Apr-10	1.019	22,880	$	2,729	0.1193
May-10	0.938	23,400	$	2,729	0.1166
Jun-10	1.081	21,960	$	2,679	0.1220
Jul-10	-	22,760	$	2,118	0.0931
Aug-10	0.938	18,200	$	2,245	0.1234
Sep-10	0.950	17,200	$	2,159	0.1255
Oct-10	0.744	15,840	$	1,911	0.1206
Nov-10	0.963	19,160	$	2,349	0.1226
Dec-10	0.956	22,400	$	2,647	0.1182
	Total	**250,520**	**$**	**29,661**	
	Average	**20,877**	**$**	**2,472**	**0.1188**
Jan-11	1.006	23,120	$	2,743	0.1186
Feb-11	0.963	20,440	$	2,664	0.1303
Mar-11	0.838	19,800	$	2,524	0.1275
Apr-11	1.181	16,720	$	2,410	0.1441
May-11					

Name: WCUP Radio - Hancock Station
Utility: Ontonagan REA
Utility Type: Electric
Acct #: 1010162301
Meter #:
Address: Herman Tower - Hancock Station
Multiplier: 1

Month	Demand	Usage		Total Cost	Cost per Unit
Jan-09	25.75	17,041	$	2,240	0.1314
Feb-09	24.50	15,677	$	2,073	0.1322
Mar-09	23.75	16,844	$	2,190	0.1300
Apr-09	24.75	16,268	$	2,141	0.1316
May-09	25.75	16,872	$	2,222	0.1317
Jun-09	26.25	17,899	$	2,254	0.1259
Jul-09	26.50	16,544	$	2,197	0.1328
Aug-09	27.00	18,848	$	2,456	0.1303
Sep-09	26.75	17,362	$	2,290	0.1319
Oct-09	25.50	17,152	$	2,248	0.1311
Nov-09	24.25	16,280	$	1,871	0.1149
Dec-09	24.00	18,891	$	2,110	0.1117
	Total	**205,678**	**$**	**26,292**	
	Average	**17,140**	**$**	**2,191**	**0.1280**
Jan-10	24.75	15,504	$	1,806	0.1165
Feb-10	23.75	16,009	$	1,839	0.1149
Mar-10	25.50	16,553	$	1,915	0.1157
Apr-10	23.50	16,585	$	1,889	0.1139
May-10	29.00	18,237	$	2,123	0.1164
Jun-10	28.25	18,888	$	2,171	0.1149
Jul-10	29.00	19,611	$	2,251	0.1148
Aug-10	31.00	20,108	$	2,327	0.1157
Sep-10	29.25	17,994	$	2,104	0.1169
Oct-10	27.00	18,613	$	2,128	0.1143
Nov-10	27.75	18,362	$	2,116	0.1152
Dec-10	27.75	20,266	$	2,293	0.1131
	Total	**216,730**	**$**	**24,962**	
	Average	**18,061**	**$**	**2,080**	**0.1152**
Jan-11	27.50	19,481	$	2,217	0.1138
Feb-11	27.25	17,075	$	2,152	0.1260
Mar-11	26.75	18,845	$	2,327	0.1235
Apr-11	30.00	18,480	$	2,337	0.1265
May-11					

Name: Ojibwa Lanes Lounge, and Casino
Utility: Baraga
Utility Type: Water
Acct #: MICH-000797-0000-01
Meter #:
Address: 797 Michigan Ave
Multiplier: 10,000

Month	Read	Usage		Cost	Cost per Unit
Jan-09		102,000	$	1,481	0.0145
Feb-09		111,000	$	1,613	0.0145
Mar-09		89,000	$	1,291	0.0145
Apr-09		120,000	$	1,744	0.0145
May-09		105,000	$	1,525	0.0145
Jun-09		111,000	$	1,613	0.0145
Jul-09		114,000	$	1,656	0.0145
Aug-09		146,000	$	2,123	0.0145
Sep-09		117,000	$	1,700	0.0145
Oct-09		102,000	$	1,481	0.0145
Nov-09		112,000	$	1,627	0.0145
Dec-09		120,000	$	1,744	0.0145
	Total	**1,349,000**	**$**	**19,598**	
	Average	**112,417**	**$**	**1,633**	**0.0145**
Jan-10		91,000	$	1,321	0.0145
Feb-10		133,000	$	1,934	0.0145
Mar-10		109,000	$	1,583	0.0145
Apr-10		93,000	$	1,350	0.0145
May-10		104,000	$	1,511	0.0145
Jun-10		114,000	$	1,656	0.0145
Jul-10		142,000	$	2,064	0.0145
Aug-10		151,000	$	2,196	0.0145
Sep-10		116,000	$	1,686	0.0145
Oct-10		137,000	$	1,992	0.0145
Nov-10		128,000	$	1,861	0.0145
Dec-10		128,000	$	1,861	0.0145
	Total	**1,446,000**	**$**	**21,015**	
	Average	**120,500**	**$**	**1,751**	**0.0145**
Jan-11		91,000	$	1,259	0.0138
Feb-11		92,000	$	1,272	0.0138
Mar-11		146,000	$	2,020	0.0138
Apr-11		104,000	$	1,439	0.0138
May-11		146,000	$	2,020	0.0138

Name: Casino Maintenance Building
Utility: Baraga
Utility Type: Water
Acct #: MICH-000793-0000-01
Meter #:
Address: 793 Michigan Ave
Multiplier:

Month	Read	Usage		Cost	Cost per Unit
Jan-09		2,000	$	58	0.0290
Feb-09		3,000	$	58	0.0193
Mar-09		2,000	$	62	0.0310
Apr-09		2,000	$	62	0.0310
May-09		2,000	$	62	0.0310
Jun-09		2,000	$	62	0.0310
Jul-09		2,000	$	62	0.0310
Aug-09		1,000	$	62	0.0620
Sep-09		1,000	$	62	0.0620
Oct-09		1,000	$	62	0.0620
Nov-09		1,000	$	62	0.0620
Dec-09		1,000	$	62	0.0620
	Total	**20,000**	**$**	**736**	
	Average	**1,667**	**$**	**61**	**0.0428**
Jan-10		1,000	$	62	0.0620
Feb-10		1,000	$	62	0.0620
Mar-10		1,000	$	62	0.0620
Apr-10		1,000	$	62	0.0620
May-10		1,000	$	62	0.0620
Jun-10		1,000	$	62	0.0620
Jul-10		1,000	$	62	0.0620
Aug-10		1,000	$	62	0.0620
Sep-10		1,000	$	62	0.0620
Oct-10		-	$	62	
Nov-10		1,000	$	62	0.0620
Dec-10		1,000	$	62	0.0620
	Total	**11,000**	**$**	**744**	
	Average	**917**	**$**	**62**	**0.0620**
Jan-11		-	$	65	
Feb-11		-	$	65	
Mar-11		-	$	65	
Apr-11		-	$	65	
May-11		-	$	65	

Name: Ojibwa Motel and Restaurant
Utility: Baraga
Utility Type: Water
Acct #: BEAR-000103-0000-01
Meter #:
Address: 103 Beartown Road
Multiplier: 1000

Month	Read	Usage		Cost	Cost per Unit
Jan-09		26,000	$	372	0.0143
Feb-09		24,000	$	343	0.0143
Mar-09		40,000	$	577	0.0144
Apr-09		50,000	$	723	0.0145
May-09		53,000	$	766	0.0145
Jun-09		59,000	$	853	0.0145
Jul-09		78,000	$	1,131	0.0145
Aug-09		90,000	$	1,306	0.0145
Sep-09		96,000	$	1,393	0.0145
Oct-09		75,000	$	1,088	0.0145
Nov-09		50,000	$	723	0.0145
Dec-09		18,000	$	255	0.0142
	Total	**659,000**	**$**	**9,530**	
	Average	**54,917**	**$**	**794**	**0.0144**
Jan-10		1,000	$	62	0.0620
Feb-10		-	$	62	
Mar-10		22,000	$	314	0.0143
Apr-10		47,000	$	679	0.0144
May-10		40,000	$	577	0.0144
Jun-10		80,000	$	1,160	0.0145
Jul-10		81,000	$	1,175	0.0145
Aug-10		100,000	$	1,453	0.0145
Sep-10		60,000	$	868	0.0145
Oct-10		70,000	$	1,015	0.0145
Nov-10		44,000	$	635	0.0144
Dec-10		26,000	$	372	0.0143
	Total	**571,000**	**$**	**8,372**	
	Average	**47,583**	**$**	**698**	**0.0188**
Jan-11		1,000	$	136	0.1360
Feb-11		-	$	65	
Mar-11		5,000	$	72	0.0144
Apr-11		32,000	$	441	0.0138
May-11		69,000	$	954	0.0138

Name: Ojibwa Casino
Utility: Baraga
Utility Type: Water
Acct #: MICH-000797-00RV-01
Meter #:
Address: 797 Michigan Ave
Multiplier: 1

Month	Read	Usage	Cost	Cost per Unit
Jan-09				
Feb-09				
Mar-09				
Apr-09				
May-09				
Jun-09				
Jul-09				
Aug-09				
Sep-09				
Oct-09				
Nov-09				
Dec-09				
	Total	**-**	**$ -**	
	Average			
Jan-10				
Feb-10				
Mar-10				
Apr-10				
May-10			$ 282	
Jun-10			$ 282	
Jul-10			$ 282	
Aug-10			$ 282	
Sep-10			$ 282	
Oct-10			$ 282	
Nov-10			$ 282	
Dec-10			$ 282	
	Total	**-**	**$ 2,256**	
	Average		**$ 282**	
Jan-11			$ 282	
Feb-11			$ 282	
Mar-11			$ 282	
Apr-11			$ 282	
May-11			$ 282	

Name: Four Seasons Inn
Utility: Baraga
Utility Type: Water
Acct #: MICH-000790-0000-03
Meter #:
Address: 790 Michigan Ave
Multiplier: 1000

Month	Read	Usage		Cost	Cost per Unit
Jan-09		24,000	$	344	0.0143
Feb-09		46,000	$	665	0.0145
Mar-09		24,000	$	344	0.0143
Apr-09		32,000	$	460	0.0144
May-09		29,000	$	417	0.0144
Jun-09		27,000	$	387	0.0143
Jul-09		26,000	$	372	0.0143
Aug-09		37,000	$	533	0.0144
Sep-09		34,000	$	489	0.0144
Oct-09		38,000	$	547	0.0144
Nov-09		27,000	$	387	0.0143
Dec-09		20,000	$	285	0.0143
	Total	**364,000**	**$**	**5,230**	
	Average	**30,333**	**$**	**436**	**0.0144**
Jan-10		27,000	$	387	0.0143
Feb-10		26,000	$	372	0.0143
Mar-10		31,000	$	445	0.0144
Apr-10		23,000	$	329	0.0143
May-10		19,000	$	270	0.0142
Jun-10		22,000	$	314	0.0143
Jul-10		32,000	$	460	0.0144
Aug-10		35,000	$	504	0.0144
Sep-10		25,000	$	358	0.0143
Oct-10		41,000	$	592	0.0144
Nov-10		17,000	$	241	0.0142
Dec-10		13,000	$	182	0.0140
	Total	**311,000**	**$**	**4,454**	
	Average	**25,917**	**$**	**371**	**0.0143**
Jan-11		15,000	$	205	0.0137
Feb-11		17,000	$	233	0.0137
Mar-11		20,000	$	275	0.0138
Apr-11		20,000	$	275	0.0138
May-11		28,000	$	386	0.0138

Name: Big Bucks Bingo Hall
Utility: Baraga
Utility Type: Water
Acct #: MICH-000795-0000-01
Meter #:
Address: 795 Michigan Ave
Multiplier: 100

Month	Read	Usage		Cost	Cost per Unit
Jan-09		5,400	$	72	0.0133
Feb-09		7,100	$	97	0.0137
Mar-09		4,300	$	65	0.0151
Apr-09		6,100	$	82	0.0134
May-09		5,500	$	74	0.0135
Jun-09		6,000	$	80	0.0133
Jul-09		6,600	$	89	0.0135
Aug-09		7,700	$	106	0.0138
Sep-09		6,500	$	87	0.0134
Oct-09		6,200	$	83	0.0134
Nov-09		6,900	$	94	0.0136
Dec-09		6,100	$	82	0.0134
	Total	**74,400**	**$**	**1,011**	
	Average	**6,200**	**$**	**84**	**0.0136**
Jan-10		7,600	$	104	0.0137
Feb-10		5,500	$	74	0.0135
Mar-10		1,900	$	62	0.0326
Apr-10		1,600	$	62	0.0388
May-10		2,100	$	62	0.0295
Jun-10		2,400	$	62	0.0258
Jul-10		2,800	$	62	0.0221
Aug-10		3,300	$	62	0.0188
Sep-10		3,700	$	62	0.0168
Oct-10		3,800	$	62	0.0163
Nov-10		3,600	$	62	0.0172
Dec-10		3,200	$	62	0.0194
	Total	**41,500**	**$**	**798**	
	Average	**3,458**	**$**	**67**	**0.0220**
Jan-11		2,700	$	62	0.0230
Feb-11		2,400	$	65	0.0271
Mar-11		2,600	$	65	0.0250
Apr-11		3,300	$	65	0.0197
May-11		4,100	$	65	0.0159

Name: KBIC Tribal Police Dept
Utility: Baraga
Utility Type: Water
Acct #: U41N-000503-0000-01
Meter #:
Address: 503 US 41 North
Multiplier: 100

Month	Read	Usage		Cost	Cost per Unit
Jan-09		100	$	36	0.3600
Feb-09		300	$	36	0.1200
Mar-09		100	$	36	0.3600
Apr-09		2,700	$	36	0.0133
May-09		100	$	36	0.3600
Jun-09		100	$	36	0.3600
Jul-09		100	$	36	0.3600
Aug-09		100	$	36	0.3600
Sep-09		-	$	36	
Oct-09		100	$	36	0.3600
Nov-09		-	$	36	
Dec-09		100	$	36	0.3600
	Total	**3,800**	**$**	**432**	
	Average	**317**	**$**	**36**	**0.3013**
Jan-10		1,900	$	36	0.0189
Feb-10		500	$	36	0.0720
Mar-10		600	$	36	0.0600
Apr-10		1,900	$	36	0.0189
May-10		1,700	$	36	0.0212
Jun-10		2,600	$	36	0.0138
Jul-10		2,700	$	36	0.0133
Aug-10		2,100	$	36	0.0171
Sep-10		1,700	$	36	0.0212
Oct-10		2,400	$	36	0.0150
Nov-10		1,500	$	36	0.0240
Dec-10		1,700	$	36	0.0212
	Total	**21,300**	**$**	**432**	
	Average	**1,775**	**$**	**36**	**0.0264**
Jan-11		2,600	$	39	0.0150
Feb-11		3,300	$	39	0.0118
Mar-11		2,300	$	39	0.0170
Apr-11		3,100	$	39	0.0126
May-11		2,900	$	39	0.0134

Name: Pines Convenience Center
Utility: Baraga
Utility Type: Water
Acct #: U41N-000501-0000-02
Meter #:
Address: 501 US 41 North
Multiplier: 1000

Month	Read	Usage		Cost	Cost per Unit
Jan-09		34,000	$	260	0.0076
Feb-09		31,000	$	236	0.0076
Mar-09		19,000	$	142	0.0075
Apr-09		28,000	$	213	0.0076
May-09		26,000	$	197	0.0076
Jun-09		30,000	$	228	0.0076
Jul-09		38,000	$	291	0.0077
Aug-09		38,000	$	291	0.0077
Sep-09		28,000	$	213	0.0076
Oct-09		33,000	$	252	0.0076
Nov-09		27,000	$	205	0.0076
Dec-09		28,000	$	213	0.0076
	Total	**360,000**	**$**	**2,741**	
	Average	**30,000**	**$**	**228**	**0.0076**
Jan-10		22,000	$	166	0.0075
Feb-10		26,000	$	197	0.0076
Mar-10		20,000	$	150	0.0075
Apr-10		28,000	$	213	0.0076
May-10		21,000	$	158	0.0075
Jun-10		24,000	$	181	0.0075
Jul-10		31,000	$	236	0.0076
Aug-10		28,000	$	213	0.0076
Sep-10		27,000	$	205	0.0076
Oct-10		22,000	$	166	0.0075
Nov-10		20,000	$	150	0.0075
Dec-10		21,000	$	158	0.0075
	Total	**290,000**	**$**	**2,193**	
	Average	**24,167**	**$**	**183**	**0.0076**
Jan-11		15,000	$	104	0.0069
Feb-11		18,000	$	126	0.0070
Mar-11		17,000	$	119	0.0070
Apr-11		18,000	$	126	0.0070
May-11		25,000	$	175	0.0070

Name: Keweenaw Bay Indian Community - half college / half library
Utility: Baraga
Utility Type: Water
Acct #: SUPS-000409-0001-02
Meter #:
Address: 409 Superior Ave #1
Multiplier: 1

Month	Read	Usage	Cost	Cost per Unit
Jan-09		-	$ 47	
Feb-09		-	$ 47	
Mar-09		-	$ 47	
Apr-09		-	$ 51	
May-09		-	$ 51	
Jun-09		-	$ 51	
Jul-09		-	$ 51	
Aug-09		-	$ 51	
Sep-09		-	$ 51	
Oct-09		-	$ 51	
Nov-09		-	$ 51	
Dec-09		-	$ 51	
	Total	**-**	**$ 600**	
	Average	**-**	**$ 50**	
Jan-10		-	$ 51	
Feb-10		-	$ 51	
Mar-10		-	$ 51	
Apr-10		-	$ 51	
May-10		-	$ 51	
Jun-10		-	$ 51	
Jul-10		-	$ 51	
Aug-10		-	$ 51	
Sep-10		-	$ 51	
Oct-10		-	$ 51	
Nov-10		-	$ 51	
Dec-10		-	$ 51	
	Total	**-**	**$ 612**	
	Average	**-**	**$ 51**	
Jan-11		-	$ 54	
Feb-11		-	$ 54	
Mar-11		-	$ 54	
Apr-11		-	$ 54	
May-11		-	$ 54	

Name: Tubcraft South
Utility: Baraga
Utility Type: Water
Acct #: INDP-016364-0000-01
Meter #: 24060217
Address: 16364 W Industrial Park Street
Multiplier: 1

Month	Read	Usage		Cost	Cost per Unit
Jan-09		-	$	58	
Feb-09		-	$	58	
Mar-09		-	$	58	
Apr-09		-	$	62	
May-09		-	$	62	
Jun-09		-	$	62	
Jul-09		-	$	62	
Aug-09		-	$	62	
Sep-09		-	$	62	
Oct-09		-	$	62	
Nov-09		-	$	62	
Dec-09		-	$	62	
	Total	**-**	**$**	**732**	
	Average	**-**	**$**	**61**	
Jan-10		-	$	62	
Feb-10		-	$	62	
Mar-10		-	$	62	
Apr-10		-	$	62	
May-10		-	$	62	
Jun-10		-	$	62	
Jul-10		-	$	62	
Aug-10		-	$	62	
Sep-10		-	$	62	
Oct-10		-	$	62	
Nov-10		-	$	62	
Dec-10		-	$	62	
	Total	**-**	**$**	**744**	
	Average	**-**	**$**	**62**	
Jan-11		-	$	62	
Feb-11		-	$	65	
Mar-11		-	$	65	
Apr-11		-	$	65	
May-11		-	$	65	

Name: Tubcraft North
Utility: Baraga
Utility Type: Water
Acct #: INDP-016360-0000-01
Meter #: 66499153
Address: 13 W Industrial Park Street
Multiplier: 1

Month	Read	Usage	Cost		Cost per Unit
Jan-09		-	$	58	
Feb-09		-	$	58	
Mar-09		-	$	58	
Apr-09		-	$	62	
May-09		-	$	62	
Jun-09		-	$	62	
Jul-09		-	$	62	
Aug-09		-	$	62	
Sep-09		-	$	62	
Oct-09		-	$	62	
Nov-09		-	$	62	
Dec-09		-	$	62	
	Total	**-**	**$**	**732**	
	Average	**-**	**$**	**61**	
Jan-10		-	$	62	
Feb-10		-	$	62	
Mar-10		-	$	62	
Apr-10		-	$	62	
May-10		-	$	62	
Jun-10		-	$	62	
Jul-10		-	$	62	
Aug-10		-	$	62	
Sep-10		-	$	62	
Oct-10		-	$	62	
Nov-10		-	$	62	
Dec-10		-	$	62	
	Total	**-**	**$**	**744**	
	Average	**-**	**$**	**62**	
Jan-11		-	$	62	
Feb-11		-	$	65	
Mar-11		-	$	65	
Apr-11		-	$	65	
May-11		-	$	65	

Name: Anishininaabe Anoki
Utility: Baraga
Utility Type: Water
Acct #: INDP-016366-0000-01
Meter #:
Address: 11 W Industrial Park Street
Multiplier: 1

Month	Read	Usage		Cost	Cost per Unit
Jan-09		-	$	58	
Feb-09		-	$	58	
Mar-09		-	$	58	
Apr-09		-	$	62	
May-09		-	$	62	
Jun-09		-	$	62	
Jul-09		-	$	62	
Aug-09		-	$	62	
Sep-09		-	$	62	
Oct-09		-	$	62	
Nov-09		-	$	62	
Dec-09		-	$	62	
	Total	**-**	**$**	**732**	
	Average	**-**	**$**	**61**	
Jan-10		-	$	62	
Feb-10		-	$	62	
Mar-10		-	$	62	
Apr-10		-	$	62	
May-10		-	$	62	
Jun-10		-	$	62	
Jul-10		-	$	62	
Aug-10		-	$	62	
Sep-10		-	$	62	
Oct-10		-	$	62	
Nov-10		-	$	62	
Dec-10		-	$	62	
	Total	**-**	**$**	**744**	
	Average	**-**	**$**	**62**	
Jan-11		-	$	62	
Feb-11		-	$	65	
Mar-11		-	$	65	
Apr-11		-	$	65	
May-11		-	$	65	

Name: Ojibwa Housing Garage - Gregg's old office (now Public Works
Utility: Baraga
Utility Type: Water
Acct #: INDP-016319-0000-01
Meter #:
Address: 18 W Industrial Park
Multiplier: 100

Month	Read	Usage		Cost	Cost per Unit
Jan-09		200	$	58	0.2900
Feb-09		400	$	58	0.1450
Mar-09		400	$	58	0.1450
Apr-09		400	$	62	0.1550
May-09		400	$	62	0.1550
Jun-09		-	$	62	
Jul-09		1,000	$	62	0.0620
Aug-09		400	$	62	0.1550
Sep-09		400	$	62	0.1550
Oct-09		600	$	62	0.1033
Nov-09		400	$	62	0.1550
Dec-09		400	$	62	0.1550
	Total	**5,000**	**$**	**732**	
	Average	**417**	**$**	**61**	**0.1523**
Jan-10		400	$	62	0.1550
Feb-10		600	$	62	0.1033
Mar-10		400	$	62	0.1550
Apr-10		200	$	62	0.3100
May-10		-	$	62	
Jun-10		600	$	62	0.1033
Jul-10		600	$	62	0.1033
Aug-10		400	$	62	0.1550
Sep-10		400	$	62	0.1550
Oct-10		400	$	62	0.1550
Nov-10		600	$	62	0.1033
Dec-10		400	$	62	0.1550
	Total	**5,000**	**$**	**744**	
	Average	**417**	**$**	**62**	**0.1503**
Jan-11		400	$	65	0.1625
Feb-11		400	$	65	0.1625
Mar-11		600	$	65	0.1083
Apr-11		500	$	65	0.1300
May-11		400	$	65	0.1625

Name: KBOCC
Utility: Baraga
Utility Type: Water
Acct #: SUPS-000325-0000-02
Meter #:
Address: 658 Superior Ave
Multiplier: 100

Month	Read	Usage		Cost	Cost per Unit
Jan-09		8,800	$	109	0.0124
Feb-09		10,700	$	133	0.0124
Mar-09		9,600	$	118	0.0123
Apr-09		12,400	$	156	0.0126
May-09		12,200	$	153	0.0125
Jun-09		10,600	$	131	0.0124
Jul-09		11,500	$	143	0.0124
Aug-09		11,100	$	139	0.0125
Sep-09		9,500	$	117	0.0123
Oct-09		7,900	$	96	0.0122
Nov-09		9,800	$	96	0.0098
Dec-09		9,000	$	110	0.0122
	Total	**123,100**	**$**	**1,501**	
	Average	**10,258**	**$**	**125**	**0.0122**
Jan-10		11,400	$	142	0.0125
Feb-10		8,600	$	106	0.0123
Mar-10		8,400	$	102	0.0121
Apr-10		8,800	$	108	0.0123
May-10		7,300	$	88	0.0121
Jun-10		5,000	$	58	0.0116
Jul-10		4,400	$	54	0.0123
Aug-10		4,700	$	54	0.0115
Sep-10		3,000	$	51	0.0170
Oct-10		400	$	51	0.1275
Nov-10		300	$	51	0.1700
Dec-10		300	$	51	0.1700
	Total	**62,600**	**$**	**916**	
	Average	**5,217**	**$**	**76**	**0.0484**
Jan-11		100	$	51	0.5100
Feb-11		200	$	51	0.2550
Mar-11		100	$	51	0.5100
Apr-11		-	$	51	
May-11		-	$	51	

Name: Keweenaw Bay Indian Community
Utility: Baraga
Utility Type: Water
Acct #: U41S-000807-0000-02
Meter #:
Address: 807 US 41 South

THIS SEEMS HIGH

Multiplier: 1

Month	Read	Usage	Cost	Cost per Unit
Jan-09		-	$ 58	
Feb-09		-	$ 58	
Mar-09		-	$ 58	
Apr-09		-	$ 62	
May-09		-	$ 62	
Jun-09		-	$ 62	
Jul-09		-	$ 62	
Aug-09		-	$ 62	
Sep-09		-	$ 62	
Oct-09		-	$ 62	
Nov-09		-	$ 62	
Dec-09		-	$ 62	
	Total	**-**	**$ 732**	
	Average	**-**	**$ 61**	
Jan-10		-	$ 62	
Feb-10		-	$ 62	
Mar-10		-	$ 62	
Apr-10		-	$ 62	
May-10		-	$ 62	
Jun-10		-	$ 62	
Jul-10		-	$ 62	
Aug-10		-	$ 62	
Sep-10		-	$ 62	
Oct-10		-	$ 62	
Nov-10		-	$ 62	
Dec-10		-	$ 62	
	Total	**-**	**$ 744**	
	Average	**-**	**$ 62**	
Jan-11		-	$ 62	
Feb-11		-	$ 65	
Mar-11		-	$ 65	
Apr-11		-	$ 65	
May-11		-	$ 65	

Name: Ojibwa College
Utility: Baraga
Utility Type: Water
Acct #: BEAR-000111-0000-01
Meter #:
Address: 109 Beartown Road
Multiplier: 1000

Month	Read	Usage		Cost	Cost per Unit
Jan-09	3,160	80,000	$	1,045	0.0131
Feb-09	3,240	70,000	$	914	0.0131
Mar-09	3,310	90,000	$	1,177	0.0131
Apr-09	3,400	100,000	$	1,309	0.0131
May-09	3,500	70,000	$	914	0.0131
Jun-09	3,570	70,000	$	914	0.0131
Jul-09	3,640	60,000	$	782	0.0130
Aug-09	3,700	80,000	$	1,045	0.0131
Sep-09	3,780	60,000	$	782	0.0130
Oct-09	3,840	50,000	$	651	0.0130
Nov-09	3,890	80,000	$	1,045	0.0131
Dec-09	3,970	70,000	$	914	0.0131
	Total	**880,000**	**$**	**11,492**	
	Average	**73,333**	**$**	**958**	**0.0131**
Jan-10	4,040	100,000	$	1,309	0.0131
Feb-10	4,140	100,000	$	1,309	0.0131
Mar-10	4,240	70,000	$	914	0.0131
Apr-10	4,310	80,000	$	1,045	0.0131
May-10	4,390	80,000	$	1,045	0.0131
Jun-10	4,470	80,000	$	1,045	0.0131
Jul-10	4,550	90,000	$	1,177	0.0131
Aug-10	4,640	60,000	$	782	0.0130
Sep-10	4,700	80,000	$	1,045	0.0131
Oct-10	4,780	70,000	$	914	0.0131
Nov-10	4,850	80,000	$	1,045	0.0131
Dec-10	4,930	80,000	$	1,045	0.0131
	Total	**970,000**	**$**	**12,675**	
	Average	**80,833**	**$**	**1,056**	**0.0131**
Jan-11	5,010	80,000	$	1,045	0.0131
Feb-11	5,090	80,000	$	1,045	0.0131
Mar-11	5,170	90,000	$	1,100	0.0122
Apr-11	5,260	100,000	$	1,239	0.0124
May-11	5,360	70,000	$	1,378	0.0197
	5,430				

Name: Tribal Senior Center
Utility: Baraga
Utility Type: Water
Acct #: MAIN-000208-0000-01
Meter #:
Address: 208 Main Street
Multiplier: 1

Month	Read	Usage		Cost	Cost per Unit
Jan-09		600	$	47	0.0783
Feb-09		300	$	47	0.1567
Mar-09		700	$	47	0.0671
Apr-09		400	$	51	0.1275
May-09		500	$	51	0.1020
Jun-09		400	$	51	0.1275
Jul-09		600	$	51	0.0850
Aug-09		400	$	51	0.1275
Sep-09		700	$	51	0.0729
Oct-09		-	$	51	
Nov-09		1,100	$	51	0.0464
Dec-09		700	$	51	0.0729
	Total	**6,400**	**$**	**600**	
	Average	**533**	**$**	**50**	**0.0967**
Jan-10		100	$	51	0.5100
Feb-10		500	$	51	0.1020
Mar-10		500	$	51	0.1020
Apr-10		500	$	51	0.1020
May-10		600	$	51	0.0850
Jun-10		700	$	51	0.0729
Jul-10		500	$	51	0.1020
Aug-10		700	$	51	0.0729
Sep-10		400	$	51	0.1275
Oct-10		600	$	51	0.0850
Nov-10		500	$	51	0.1020
Dec-10		500	$	51	0.1020
	Total	**6,100**	**$**	**612**	
	Average	**508**	**$**	**51**	**0.1304**
Jan-11		100	$	54	0.5400
Feb-11		400	$	54	0.1350
Mar-11		500	$	54	0.1080
Apr-11		400	$	54	0.1350
May-11		700	$	54	0.0771

Name: La Pointe Health Clinic
Utility: Baraga
Utility Type: Water
Acct #: SUPS-000102-000B-01
Meter #:
Address: 102 Superior Street
Multiplier: 1000

Month	Read	Usage		Cost	Cost per Unit
Jan-09		10,000	$	124	0.0124
Feb-09		6,000	$	71	0.0118
Mar-09		4,000	$	27	0.0068
Apr-09		7,000	$	84	0.0120
May-09		7,000	$	84	0.0120
Jun-09		8,000	$	98	0.0123
Jul-09		11,000	$	137	0.0125
Aug-09		32,000	$	413	0.0129
Sep-09		19,000	$	242	0.0127
Oct-09		7,000	$	84	0.0120
Nov-09		8,000	$	98	0.0123
Dec-09		6,000	$	71	0.0118
	Total	**125,000**	**$**	**1,533**	
	Average	**10,417**	**$**	**128**	**0.0118**
Jan-10		6,000	$	71	0.0118
Feb-10		7,000	$	84	0.0120
Mar-10		7,000	$	84	0.0120
Apr-10		9,000	$	110	0.0122
May-10		7,000	$	84	0.0120
Jun-10		10,000	$	124	0.0124
Jul-10		11,000	$	137	0.0125
Aug-10		8,000	$	98	0.0123
Sep-10		17,000	$	215	0.0126
Oct-10		19,000	$	242	0.0127
Nov-10		27,000	$	347	0.0129
Dec-10		12,000	$	150	0.0125
	Total	**140,000**	**$**	**1,746**	
	Average	**11,667**	**$**	**146**	**0.0123**
Jan-11		13,000	$	171	0.0132
Feb-11		8,000	$	103	0.0129
Mar-11		6,000	$	75	0.0125
Apr-11		6,000	$	75	0.0125
May-11		7,000	$	89	0.0127

Name: KBIC Court
Utility: Baraga
Utility Type: Water
Acct #: SUPN-000472-0000-03
Meter #:
Address: 472 North Superior Avenue
Multiplier: 1

Month	Read	Usage		Cost	Cost per Unit
Jan-09		1,600	$	47	0.0294
Feb-09		3,200	$	47	0.0147
Mar-09		2,600	$	47	0.0181
Apr-09		3,000	$	51	0.0170
May-09		3,800	$	51	0.0134
Jun-09		4,700	$	51	0.0109
Jul-09		3,200	$	51	0.0159
Aug-09		3,500	$	51	0.0146
Sep-09		3,500	$	51	0.0146
Oct-09		1,600	$	51	0.0319
Nov-09		2,100	$	51	0.0243
Dec-09		2,200	$	51	0.0232
	Total	**35,000**	**$**	**600**	
	Average	**2,917**	**$**	**50**	**0.0190**
Jan-10		1,500	$	51	0.0340
Feb-10		3,100	$	51	0.0165
Mar-10		2,000	$	51	0.0255
Apr-10		2,300	$	51	0.0222
May-10		3,500	$	51	0.0146
Jun-10		3,800	$	51	0.0134
Jul-10		3,100	$	51	0.0165
Aug-10		2,800	$	51	0.0182
Sep-10		3,100	$	51	0.0165
Oct-10		2,200	$	51	0.0232
Nov-10		3,100	$	51	0.0165
Dec-10		3,000	$	51	0.0170
	Total	**33,500**	**$**	**612**	
	Average	**2,792**	**$**	**51**	**0.0195**
Jan-11		2,300	$	53	0.0230
Feb-11		3,000	$	53	0.0177
Mar-11		2,800	$	53	0.0189
Apr-11		3,400	$	53	0.0156
May-11		3,900	$	53	0.0136

Name: KBIC - Transitional House (Yellow House)
Utility: Baraga
Utility Type: Water
Acct #: MICH-000755-0000-02
Meter #:
Address: 755 Michigan Ave
Multiplier: 1

Month	Read	Usage		Cost	Cost per Unit
Jan-09		600	$	47	0.0783
Feb-09		1,600	$	47	0.0294
Mar-09		600	$	47	0.0783
Apr-09		1,100	$	51	0.0464
May-09		1,000	$	51	0.0510
Jun-09		1,200	$	51	0.0425
Jul-09		1,100	$	51	0.0464
Aug-09		1,200	$	51	0.0425
Sep-09		1,200	$	51	0.0425
Oct-09		1,100	$	51	0.0464
Nov-09		1,100	$	51	0.0464
Dec-09		600	$	51	0.0850
	Total	**12,400**	**$**	**600**	
	Average	**1,033**	**$**	**50**	**0.0529**
Jan-10		800	$	51	0.0638
Feb-10		1,100	$	51	0.0464
Mar-10		1,200	$	51	0.0425
Apr-10		900	$	51	0.0567
May-10		1,400	$	51	0.0364
Jun-10		1,600	$	51	0.0319
Jul-10		1,800	$	51	0.0283
Aug-10		1,300	$	51	0.0392
Sep-10		1,100	$	51	0.0464
Oct-10		1,600	$	51	0.0319
Nov-10		1,400	$	51	0.0364
Dec-10		1,500	$	51	0.0340
	Total	**15,700**	**$**	**612**	
	Average	**1,308**	**$**	**51**	**0.0412**
Jan-11		1,000	$	54	0.0540
Feb-11		1,300	$	54	0.0415
Mar-11		1,200	$	54	0.0450
Apr-11		1,500	$	54	0.0360
May-11		2,100	$	54	0.0257

Name: Tribal Center Annex
Utility: Baraga
Utility Type: Water
Acct #: BEAR-000107-0000-01
Meter #:
Address: 107 Beartown Road
Multiplier: 1000

Month	Read	Usage		Cost	Cost per Unit
Jan-09		4,000	$	63	0.0158
Feb-09		8,000	$	110	0.0138
Mar-09		5,000	$	69	0.0138
Apr-09		9,000	$	124	0.0138
May-09		6,000	$	80	0.0133
Jun-09		9,000	$	124	0.0138
Jul-09		10,000	$	139	0.0139
Aug-09		9,000	$	124	0.0138
Sep-09		8,000	$	110	0.0138
Oct-09		9,000	$	124	0.0138
Nov-09		7,000	$	95	0.0136
Dec-09		6,000	$	80	0.0133
	Total	**90,000**	**$**	**1,242**	
	Average	**7,500**	**$**	**104**	**0.0139**
Jan-10		10,000	$	139	0.0139
Feb-10		6,000	$	80	0.0133
Mar-10		9,000	$	124	0.0138
Apr-10		5,000	$	69	0.0138
May-10		6,000	$	80	0.0133
Jun-10		8,000	$	110	0.0138
Jul-10		9,000	$	114	0.0127
Aug-10		8,000	$	110	0.0138
Sep-10		10,000	$	139	0.0139
Oct-10		9,000	$	124	0.0138
Nov-10		8,000	$	110	0.0138
Dec-10		7,000	$	95	0.0136
	Total	**95,000**	**$**	**1,294**	
	Average	**7,917**	**$**	**108**	**0.0136**
Jan-11		4,000	$	66	0.0165
Feb-11		6,000	$	80	0.0133
Mar-11		5,000	$	50	0.0100
Apr-11		7,000	$	72	0.0103
May-11		9,000	$	122	0.0136

Name: WCUP Radio
Utility: Baraga
Utility Type: Water
Acct #: U41S-000805-000B-03
Meter #:
Address: 805 US 41 South #B
Multiplier: 100

Month	Read	Usage		Cost	Cost per Unit
Jan-09		1,300	$	58	0.0446
Feb-09		1,700	$	58	0.0341
Mar-09		1,100	$	58	0.0527
Apr-09		1,700	$	62	0.0365
May-09		1,200	$	62	0.0517
Jun-09		1,400	$	62	0.0443
Jul-09		1,600	$	62	0.0388
Aug-09		1,000	$	62	0.0620
Sep-09		1,300	$	62	0.0477
Oct-09		1,100	$	62	0.0564
Nov-09		1,600	$	62	0.0388
Dec-09		1,400	$	62	0.0443
	Total	**16,400**	**$**	**732**	
	Average	**1,367**	**$**	**61**	**0.0460**
Jan-10		1,900	$	62	0.0326
Feb-10		1,400	$	62	0.0443
Mar-10		1,400	$	62	0.0443
Apr-10		1,500	$	62	0.0413
May-10		1,300	$	62	0.0477
Jun-10		1,000	$	62	0.0620
Jul-10		1,200	$	62	0.0517
Aug-10		1,300	$	62	0.0477
Sep-10		1,100	$	62	0.0564
Oct-10		700	$	62	0.0886
Nov-10		700	$	62	0.0886
Dec-10		1,100	$	62	0.0564
	Total	**14,600**	**$**	**744**	
	Average	**1,217**	**$**	**62**	**0.0551**
Jan-11		900	$	65	0.0722
Feb-11		1,200	$	65	0.0542
Mar-11		1,100	$	65	0.0591
Apr-11		1,400	$	65	0.0464
May-11		800	$	65	0.0813

Name: KBIC Social Services
Utility: Baraga
Utility Type: Water
Acct #: MICH-001518-0000-02
Meter #:
Address: 1515 Michigan Ave
Multiplier: 1

Month	Read	Usage	Cost	Cost per Unit
Jan-09		-	$ 27	
Feb-09		-	$ 27	
Mar-09		-	$ 27	
Apr-09		-	$ 27	
May-09		-	$ 27	
Jun-09		-	$ 27	
Jul-09		-	$ 27	
Aug-09		-	$ 27	
Sep-09		-	$ 27	
Oct-09		-	$ 27	
Nov-09		-	$ 27	
Dec-09		-	$ 27	
	Total	**-**	**$ 324**	
	Average	**-**	**$ 27**	
Jan-10		-	$ 27	
Feb-10		-	$ 27	
Mar-10		-	$ 27	
Apr-10		-	$ 27	
May-10		-	$ 27	
Jun-10		-	$ 27	
Jul-10		-	$ 27	
Aug-10		-	$ 27	
Sep-10		-	$ 27	
Oct-10		-	$ 27	
Nov-10		-	$ 27	
Dec-10		-	$ 27	
	Total	**-**	**$ 324**	
	Average	**-**	**$ 27**	
Jan-11		-	$ 30	
Feb-11		-	$ 30	
Mar-11		-	$ 30	
Apr-11		-	$ 30	
May-11		-	$ 30	

Name: Keweenaw Bay Indian Community - Cultural Building
Utility: Baraga
Utility Type: Water
Acct #: U41N-000000-CAMP-02
Meter #:
Address: US 41 North #Camp
Multiplier: 1

Month	Read	Usage	Cost	Cost per Unit
Jan-09		-	$ 47	
Feb-09		-	$ 47	
Mar-09		-	$ 47	
Apr-09		-	$ 51	
May-09		-	$ 51	
Jun-09		-	$ 51	
Jul-09		-	$ 51	
Aug-09		-	$ 51	
Sep-09		-	$ 51	
Oct-09		-	$ 51	
Nov-09		-	$ 51	
Dec-09		-	$ 51	
	Total	**-**	**$ 600**	
	Average	**-**	**$ 50**	
Jan-10		-	$ 51	
Feb-10		-	$ 51	
Mar-10		-	$ 51	
Apr-10		-	$ 51	
May-10		-	$ 51	
Jun-10		-	$ 51	
Jul-10		-	$ 51	
Aug-10		-	$ 51	
Sep-10		-	$ 51	
Oct-10		-	$ 51	
Nov-10		-	$ 51	
Dec-10		-	$ 51	
	Total	**-**	**$ 612**	
	Average	**-**	**$ 51**	
Jan-11		-	$ 53	
Feb-11		-	$ 53	
Mar-11		-	$ 53	
Apr-11		-	$ 53	
May-11		-	$ 53	

Name: Ojibwa Park - Marina
Utility: Baraga
Utility Type: Water
Acct #: U41N-00PARK-0002-01
Meter #:
Address: Park US 41 North #2
Multiplier: 1

Month	Read	Usage	Cost	Cost per Unit
Jan-09				
Feb-09				
Mar-09				
Apr-09				
May-09				
Jun-09				
Jul-09				
Aug-09				
Sep-09				
Oct-09				
Nov-09				
Dec-09				
	Total	**-**	**$ -**	
	Average	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**
Apr-10				
May-10				
Jun-10				
Jul-10		-	$ 51	
Aug-10		-	$ 51	
Sep-10		-	$ 51	
Oct-10		-	$ 51	
Nov-10		-	$ 51	
Dec-10		-	$ 51	
	Total			
	Average			
Apr-11		-	$ 53	
May-11		-	$ 53	

Name: Ojibwa Park - Marina
Utility: Baraga
Utility Type: Water
Acct #: U41N-00PARK-0001-01
Meter #:
Address: US 41 North
Multiplier: 1

Month	Read	Usage	Cost	Cost per Unit
Jan-09		-	$ 47	
Feb-09		-	$ 47	
Mar-09		-	$ 47	
Apr-09		-	$ 51	
May-09		-	$ 51	
Jun-09		-	$ 51	
Jul-09		-	$ 51	
Aug-09		-	$ 51	
Sep-09		-	$ 51	
Oct-09		-	$ 51	
Nov-09		-	$ 51	
Dec-09		-	$ 51	
	Total	**-**	**$ 600**	
	Average	**-**	**$ 50**	
Jan-10		-	$ 51	
Feb-10		-	$ 51	
Mar-10		-	$ 51	
Apr-10		-	$ 51	
May-10		-	$ 51	
Jun-10		-	$ 51	
Jul-10		-	$ 51	
Aug-10		-	$ 51	
Sep-10		-	$ 51	
Oct-10		-	$ 51	
Nov-10		-	$ 51	
Dec-10		-	$ 51	
	Total	**-**	**$ 612**	
	Average	**-**	**$ 51**	
Jan-11		-	$ 53	
Feb-11		-	$ 53	
Mar-11		-	$ 53	
Apr-11		-	$ 53	
May-11		-	$ 53	

Name: Ojibwa Park - Marina
Utility: Baraga
Utility Type: Water
Acct #: U41N-00PARK-0003-01
Meter #:
Address: US 41 North #3
Multiplier: 1

Month	Read	Usage	Cost		Cost per Unit
Jan-09		-	$	47	
Feb-09		-	$	47	
Mar-09		-	$	47	
Apr-09		-	$	51	
May-09		-	$	51	
Jun-09		-	$	51	
Jul-09		-	$	51	
Aug-09		-	$	51	
Sep-09		-	$	51	
Oct-09		-	$	51	
Nov-09		-	$	51	
Dec-09		-	$	51	
	Total	**-**	**$**	**600**	
	Average	**-**	**$**	**50**	
Jan-10		-	$	51	
Feb-10		-	$	51	
Mar-10		-	$	51	
Apr-10		-	$	51	
May-10		-	$	51	
Jun-10		-	$	51	
Jul-10		-	$	51	
Aug-10		-	$	51	
Sep-10		-	$	51	
Oct-10		-	$	51	
Nov-10		-	$	51	
Dec-10		-	$	51	
	Total	**-**	**$**	**612**	
	Average	**-**	**$**	**51**	
Jan-11		-	$	53	
Feb-11		-	$	53	
Mar-11		-	$	53	
Apr-11		-	$	53	
May-11		-	$	53	

Name: Planning and Development
Utility: Semco
Utility Type: Gas
Acct #: 26-0015501
Meter #: 208407
Address: 805 US Hwy 41
Multiplier: 1

Month	Read	Usage		Cost	Cost per Unit
Jan-09		179	$	204	1.1397
Feb-09		164	$	184	1.1220
Mar-09		138	$	153	1.1087
Apr-09		91	$	758	8.3297
May-09		50	$	34	0.6800
Jun-09		19	$	15	0.7895
Jul-09		-	$	-	
Aug-09		-	$	-	
Sep-09		-	$	-	
Oct-09		30	$	22	0.7333
Nov-09		60	$	46	0.7667
Dec-09		116	$	86	0.7414
	Total	**847**	**$**	**1,502**	
	Average	**71**	**$**	**125**	**1.7123**
Jan-10		156	$	116	0.7436
Feb-10		144	$	105	0.7292
Mar-10		108	$	79	0.7315
Apr-10		54	$	42	0.7778
May-10		28	$	22	0.7857
Jun-10		1	$	-	
Jul-10		-	$	-	
Aug-10		-	$	-	
Sep-10		-	$	-	
Oct-10		4	$	3	0.7500
Nov-10		32	$	24	0.7500
Dec-10		134	$	97	0.7239
	Total	**661**	**$**	**488**	
	Average	**55**	**$**	**41**	**0.7490**
Jan-11		175	$	127	0.7257
Feb-11		132	$	94	0.7121
Mar-11		101	$	70	0.6931
Apr-11		71	$	47	0.6620
May-11		43	$	31	0.7209

Name:	OCC
Utility:	Semco
Utility Type:	Gas
Acct #:	25-9952501
Meter #:	86445
Address:	
Multiplier:	1

Month	Read	Usage		Cost	Cost per Unit
Jan-09		301	$	344	1.1429
Feb-09		227	$	255	1.1233
Mar-09		213	$	236	1.1080
Apr-09		148	$	123	0.8311
May-09		72	$	50	0.6944
Jun-09		42	$	33	0.7857
Jul-09		6	$	4	0.6667
Aug-09		-	$	-	
Sep-09		1	$	1	1.0000
Oct-09		52	$	38	0.7308
Nov-09		100	$	76	0.7600
Dec-09		139	$	104	0.7482
	Total	**1,301**	**$**	**1,264**	
	Average	**108**	**$**	**105**	**0.8719**
Jan-10		173	$	129	0.7457
Feb-10		183	$	134	0.7322
Mar-10		170	$	124	0.7294
Apr-10		86	$	68	0.7907
May-10		67	$	53	0.7910
Jun-10		7	$	5	0.7143
Jul-10		1	$	1	1.0000
Aug-10		-	$	-	
Sep-10		10	$	8	0.8000
Oct-10		50	$	39	0.7800
Nov-10		89	$	66	0.7416
Dec-10		221	$	160	0.7240
	Total	**1,057**	**$**	**787**	
	Average	**88**	**$**	**66**	**0.7772**
Jan-11		238	$	173	0.7269
Feb-11		176	$	126	0.7159
Mar-11		137	$	95	0.6934
Apr-11		98	$	65	0.6633
May-11		57	$	42	0.7368

Name: Green Bldg Downtown Garage Darcy House - College
Utility: Semco
Utility Type: Gas
Acct #: 25-9950501
Meter #: 226577
Address: 325 Superior Avenue
Multiplier: 1

Month	Read	Usage		Cost	Cost per Unit
Jan-09		452	$	517	1.1438
Feb-09		412	$	463	1.1238
Mar-09		405	$	449	1.1086
Apr-09		289	$	241	0.8339
May-09		156	$	109	0.6987
Jun-09		99	$	79	0.7980
Jul-09		28	$	22	0.7857
Aug-09		15	$	12	0.8000
Sep-09		32	$	25	0.7813
Oct-09		106	$	79	0.7453
Nov-09		176	$	135	0.7670
Dec-09		286	$	214	0.7483
	Total	**2,456**	**$**	**2,345**	
	Average	**205**	**$**	**195**	**0.8612**
Jan-10		338	$	253	0.7485
Feb-10		291	$	213	0.7320
Mar-10		249	$	182	0.7309
Apr-10		148	$	117	0.7905
May-10		79	$	62	0.7848
Jun-10		10	$	7	0.7000
Jul-10		6	$	4	0.6667
Aug-10		2	$	1	0.5000
Sep-10		11	$	8	0.7273
Oct-10		81	$	64	0.7901
Nov-10		136	$	101	0.7426
Dec-10		362	$	262	0.7238
	Total	**1,713**	**$**	**1,274**	
	Average	**143**	**$**	**106**	**0.7198**
Jan-11		473	$	345	0.7294
Feb-11		417	$	299	0.7170
Mar-11		312	$	216	0.6923
Apr-11		207	$	139	0.6715
May-11		140	$	103	0.7357

Name: Former Emery Residence - Zeba
Utility: Semco
Utility Type: Gas
Acct #: 26-0716501
Meter #: 264391
Address:
Multiplier: 1

Month	Read	Usage		Cost	Cost per Unit
Jan-09		196	$	221	1.1276
Feb-09		194	$	214	1.1031
Mar-09		167	$	182	1.0898
Apr-09		125	$	102	0.8160
May-09		78	$	53	0.6795
Jun-09		51	$	39	0.7647
Jul-09		25	$	19	0.7600
Aug-09		17	$	13	0.7647
Sep-09		26	$	20	0.7692
Oct-09		59	$	44	0.7458
Nov-09		92	$	70	0.7609
Dec-09		145	$	108	0.7448
	Total	**1,175**	**$**	**1,085**	
	Average	**98**	**$**	**90**	**0.8438**
Jan-10		187	$	139	0.7433
Feb-10		164	$	120	0.7317
Mar-10		149	$	109	0.7315
Apr-10		110	$	87	0.7909
May-10		80	$	63	0.7875
Jun-10		37	$	29	0.7838
Jul-10		17	$	13	0.7647
Aug-10		17	$	13	0.7647
Sep-10		29	$	23	0.7931
Oct-10		56	$	44	0.7857
Nov-10		82	$	61	0.7439
Dec-10		159	$	115	0.7233
	Total	**1,087**	**$**	**816**	
	Average	**91**	**$**	**68**	**0.7620**
Jan-11		203	$	149	0.7340
Feb-11		179	$	130	0.7263
Mar-11		160	$	112	0.7000
Apr-11		102	$	69	0.6765
May-11		101	$	75	0.7426

Name: Radio - Hancock Office
Utility: Semco
Utility Type: Gas
Acct #: 33-3466500
Meter #: 263250
Address:
Multiplier: 1

Month	Read	Usage		Cost	Cost per Unit
Jan-09		209	$	235	1.1244
Feb-09		165	$	182	1.1030
Mar-09		135	$	147	1.0889
Apr-09		77	$	63	0.8182
May-09		24	$	16	0.6667
Jun-09		1	$	1	1.0000
Jul-09		-	$	-	
Aug-09		-	$	-	
Sep-09		-	$	-	
Oct-09		18	$	13	0.7222
Nov-09		75	$	57	0.7600
Dec-09		136	$	101	0.7426
	Total	**840**	**$**	**815**	
	Average	**70**	**$**	**68**	**0.8918**
Jan-10		183	$	136	0.7432
Feb-10		151	$	110	0.7285
Mar-10		84	$	61	0.7262
Apr-10		54	$	42	0.7778
May-10		28	$	22	0.7857
Jun-10		-	$	-	
Jul-10		-	$	-	
Aug-10		-	$	-	
Sep-10		-	$	-	
Oct-10		4	$	3	0.7500
Nov-10		42	$	31	0.7381
Dec-10		159	$	115	0.7233
	Total	**705**	**$**	**520**	
	Average	**59**	**$**	**43**	**0.7466**
Jan-11		165	$	121	0.7333
Feb-11		128	$	93	0.7266
Mar-11		90	$	63	0.7000
Apr-11		53	$	36	0.6792
May-11		10	$	7	0.7000

Name: Commodity Food
Utility: Semco
Utility Type: Gas
Acct #: 26-0570500
Meter #: 122521A
Address: 2591 Skanee Road
Multiplier: 1

Month	Read	Usage		Cost	Cost per Unit
Jan-09		605	$	692	1.1438
Feb-09		594	$	668	1.1246
Mar-09		513	$	569	1.1092
Apr-09		338	$	282	0.8343
May-09		154	$	107	0.6948
Jun-09		61	$	48	0.7869
Jul-09		15	$	12	0.8000
Aug-09		4	$	3	0.7500
Sep-09		4	$	3	0.7500
Oct-09		113	$	84	0.7434
Nov-09		222	$	170	0.7658
Dec-09		378	$	283	0.7487
	Total	**3,001**	**$**	**2,921**	
	Average	**250**	**$**	**243**	**0.8543**
Jan-10		622	$	466	0.7492
Feb-10		520	$	382	0.7346
Mar-10		436	$	320	0.7339
Apr-10		223	$	177	0.7937
May-10		135	$	107	0.7926
Jun-10		50	$	39	0.7800
Jul-10		4	$	3	0.7500
Aug-10		4	$	3	0.7500
Sep-10		10	$	7	0.7000
Oct-10		29	$	23	0.7931
Nov-10		133	$	99	0.7444
Dec-10		393	$	284	0.7226
	Total	**2,559**	**$**	**1,910**	
	Average	**213**	**$**	**159**	**0.7537**
Jan-11		514	$	374	0.7276
Feb-11		460	$	330	0.7174
Mar-11		353	$	245	0.6941
Apr-11		215	$	144	0.6698
May-11		163	$	120	0.7362

Name: Industrial Park - **Unknown Use of Building**
Utility: Semco
Utility Type: Gas
Acct #: 26-0490500
Meter #: 190560
Address:
Multiplier: 1

Month	Read	Usage		Cost	Cost per Unit
Jan-09		144	$	164	1.1389
Feb-09		122	$	137	1.1230
Mar-09		117	$	129	1.1026
Apr-09		71	$	59	0.8310
May-09		37	$	25	0.6757
Jun-09		11	$	8	0.7273
Jul-09		-	$	-	
Aug-09		-	$	-	
Sep-09		1	$	1	1.0000
Oct-09		18	$	13	0.7222
Nov-09		48	$	36	0.7500
Dec-09		89	$	66	0.7416
	Total	**658**	**$**	**638**	
	Average	**55**	**$**	**53**	**0.8812**
Jan-10		124	$	92	0.7419
Feb-10		104	$	76	0.7308
Mar-10		89	$	65	0.7303
Apr-10		48	$	38	0.7917
May-10		28	$	22	0.7857
Jun-10		2	$	1	0.5000
Jul-10		-	$	-	
Aug-10		-	$	-	
Sep-10		-	$	-	
Oct-10		4	$	3	0.7500
Nov-10		31	$	23	0.7419
Dec-10		88	$	63	0.7159
	Total	**518**	**$**	**383**	
	Average	**43**	**$**	**32**	**0.7209**
Jan-11		131	$	95	0.7252
Feb-11		107	$	76	0.7103
Mar-11		96	$	66	0.6875
Apr-11		66	$	44	0.6667
May-11		44	$	32	0.7273

Name: Industrial Park South - Old Tubcraft
Utility: Semco
Utility Type: Gas
Acct #: 26-0486500
Meter #: 196783
Address: BIA Office Industrial Park
Multiplier: 1

Month	Read	Usage		Cost	Cost per Unit
Jan-09		904	$	1,034	1.1438
Feb-09		837	$	941	1.1243
Mar-09		781	$	866	1.1088
Apr-09		466	$	389	0.8348
May-09		316	$	221	0.6994
Jun-09		94	$	75	0.7979
Jul-09		-	$	-	
Aug-09		-	$	-	
Sep-09		-	$	-	
Oct-09		79	$	59	0.7468
Nov-09		286	$	220	0.7692
Dec-09		467	$	350	0.7495
	Total	**4,230**	**$**	**4,155**	
	Average	**353**	**$**	**346**	**0.8860**
Jan-10		596	$	446	0.7483
Feb-10		529	$	388	0.7335
Mar-10		534	$	392	0.7341
Apr-10		208	$	165	0.7933
May-10		264	$	209	0.7917
Jun-10		155	$	123	0.7935
Jul-10		-	$	-	
Aug-10		-	$	-	
Sep-10		1	$	1	1.0000
Oct-10		18	$	14	0.7778
Nov-10		237	$	177	0.7468
Dec-10		604	$	437	0.7235
	Total	**3,146**	**$**	**2,352**	
	Average	**262**	**$**	**196**	**0.7842**
Jan-11		698	$	509	0.7292
Feb-11		637	$	457	0.7174
Mar-11		572	$	397	0.6941
Apr-11		322	$	216	0.6708
May-11		250	$	184	0.7360

Name: Social Services
Utility: Semco
Utility Type: Gas
Acct #: 26-0479502
Meter #: 127818A
Address: M-38
Multiplier: 1

Month	Read	Usage		Cost	Cost per Unit
Jan-09		430	$	492	1.1442
Feb-09		395	$	444	1.1241
Mar-09		378	$	419	1.1085
Apr-09		280	$	233	0.8321
May-09		171	$	119	0.6959
Jun-09		116	$	92	0.7931
Jul-09		41	$	32	0.7805
Aug-09		26	$	20	0.7692
Sep-09		26	$	20	0.7692
Oct-09		109	$	81	0.7431
Nov-09		220	$	169	0.7682
Dec-09		304	$	227	0.7467
	Total	**2,496**	**$**	**2,348**	
	Average	**208**	**$**	**196**	**0.8562**
Jan-10		371	$	278	0.7493
Feb-10		338	$	248	0.7337
Mar-10		312	$	229	0.7340
Apr-10		215	$	170	0.7907
May-10		155	$	123	0.7935
Jun-10		61	$	48	0.7869
Jul-10		31	$	24	0.7742
Aug-10		20	$	15	0.7500
Sep-10		48	$	38	0.7917
Oct-10		97	$	77	0.7938
Nov-10		180	$	134	0.7444
Dec-10		357	$	258	0.7227
	Total	**2,185**	**$**	**1,642**	
	Average	**182**	**$**	**137**	**0.7637**
Jan-11		444	$	323	0.7275
Feb-11		380	$	273	0.7184
Mar-11		344	$	239	0.6948
Apr-11		292	$	196	0.6712
May-11		239	$	176	0.7364

Name: Tribal Center
Utility: Semco
Utility Type: Gas
Acct #: 26-0472500
Meter #: 47953A
Address: 16429 Beartown Road
Multiplier: 1

Month	Read	Usage		Cost	Cost per Unit
Jan-09		1,026	$	1,126	1.0975
Feb-09		917	$	988	1.0774
Mar-09		885	$	940	1.0621
Apr-09		804	$	633	0.7873
May-09		888	$	579	0.6520
Jun-09		786	$	591	0.7519
Jul-09		366	$	275	0.7514
Aug-09		288	$	216	0.7500
Sep-09		383	$	288	0.7520
Oct-09		648	$	455	0.7022
Nov-09		834	$	603	0.7230
Dec-09		982	$	690	0.7026
	Total	**8,807**	**$**	**7,384**	
	Average	**734**	**$**	**615**	**0.8175**
Jan-10		1,318	$	926	0.7026
Feb-10		1,157	$	796	0.6880
Mar-10		1,172	$	806	0.6877
Apr-10		973	$	727	0.7472
May-10		878	$	656	0.7472
Jun-10		416	$	311	0.7476
Jul-10		137	$	102	0.7445
Aug-10		71	$	53	0.7465
Sep-10		383	$	286	0.7467
Oct-10		516	$	386	0.7481
Nov-10		670	$	471	0.7030
Dec-10		1,056	$	716	0.6780
	Total	**8,747**	**$**	**6,236**	
	Average	**729**	**$**	**520**	**0.7239**
Jan-11		1,253	$	857	0.6840
Feb-11		902	$	609	0.6752
Mar-11		958	$	625	0.6524
Apr-11		835	$	526	0.6299
May-11		685	$	475	0.6934

Name: Cultural Building
Utility: Semco
Utility Type: Gas
Acct #: 26-0163501
Meter #: 209258
Address:
Multiplier: 1

Month	Read	Usage		Cost	Cost per Unit
Jan-09		269	$	303	1.1264
Feb-09		235	$	260	1.1064
Mar-09		230	$	251	1.0913
Apr-09		140	$	114	0.8143
May-09		70	$	47	0.6714
Jun-09		52	$	40	0.7692
Jul-09		35	$	27	0.7714
Aug-09		30	$	23	0.7667
Sep-09		34	$	27	0.7941
Oct-09		59	$	44	0.7458
Nov-09		108	$	82	0.7593
Dec-09		158	$	118	0.7468
	Total	**1,420**	**$**	**1,336**	
	Average	**118**	**$**	**111**	**0.8469**
Jan-10		221	$	165	0.7466
Feb-10		199	$	145	0.7286
Mar-10		186	$	136	0.7312
Apr-10		105	$	83	0.7905
May-10		66	$	52	0.7879
Jun-10		35	$	27	0.7714
Jul-10		30	$	23	0.7667
Aug-10		28	$	22	0.7857
Sep-10		34	$	27	0.7941
Oct-10		54	$	42	0.7778
Nov-10		96	$	72	0.7500
Dec-10		181	$	131	0.7238
	Total	**1,235**	**$**	**925**	
	Average	**103**	**$**	**77**	**0.7629**
Jan-11		221	$	162	0.7330
Feb-11		208	$	151	0.7260
Mar-11		183	$	128	0.6995
Apr-11		143	$	97	0.6783
May-11		106	$	79	0.7453

Name: Pines Gas Station
Utility: Semco
Utility Type: Gas
Acct #: 26-0085501
Meter #: 273526
Address: 503 US Hwy 41
Multiplier: 1

Month	Read	Usage		Cost	Cost per Unit
Jan-09		987	$	1,130	1.1449
Feb-09		827	$	930	1.1245
Mar-09		821	$	911	1.1096
Apr-09		389	$	324	0.8329
May-09		175	$	122	0.6971
Jun-09		71	$	56	0.7887
Jul-09		6	$	4	0.6667
Aug-09		1	$	1	1.0000
Sep-09		10	$	8	0.8000
Oct-09		185	$	138	0.7459
Nov-09		256	$	197	0.7695
Dec-09		504	$	377	0.7480
	Total	**4,232**	**$**	**4,198**	
	Average	**353**	**$**	**350**	**0.8690**
Jan-10		845	$	633	0.7491
Feb-10		721	$	529	0.7337
Mar-10		581	$	426	0.7332
Apr-10		260	$	206	0.7923
May-10		153	$	121	0.7908
Jun-10		16	$	12	0.7500
Jul-10		-	$	-	
Aug-10		-	$	-	
Sep-10		8	$	6	0.7500
Oct-10		48	$	38	0.7917
Nov-10		172	$	128	0.7442
Dec-10		729	$	528	0.7243
	Total	**3,533**	**$**	**2,627**	
	Average	**294**	**$**	**219**	**0.7559**
Jan-11		975	$	711	0.7292
Feb-11		848	$	609	0.7182
Mar-11		627	$	436	0.6954
Apr-11		402	$	270	0.6716
May-11		251	$	184	0.7331

Name: Police Department
Utility: Semco
Utility Type: Gas
Acct #: 26-0083502
Meter #: 127813A / 304988
Address:
Multiplier: 1

Month	Read	Usage		Cost	Cost per Unit
Jan-09		597	$	683	1.1441
Feb-09		491	$	552	1.1242
Mar-09		471	$	522	1.1083
Apr-09		278	$	232	0.8345
May-09		157	$	109	0.6943
Jun-09		103	$	82	0.7961
Jul-09		10	$	8	0.8000
Aug-09		9	$	7	0.7778
Sep-09		13	$	10	0.7692
Oct-09		75	$	56	0.7467
Nov-09		207	$	159	0.7681
Dec-09		384	$	287	0.7474
	Total	**2,795**	**$**	**2,707**	
	Average	**233**	**$**	**226**	**0.8592**
Jan-10		537	$	402	0.7486
Feb-10		458	$	336	0.7336
Mar-10		416	$	305	0.7332
Apr-10		256	$	203	0.7930
May-10		158	$	125	0.7911
Jun-10		47	$	37	0.7872
Jul-10		9	$	7	0.7778
Aug-10		9	$	7	0.7778
Sep-10		12	$	9	0.7500
Oct-10		62	$	479	7.7258
Nov-10		209	$	156	0.7464
Dec-10		488	$	353	0.7234
	Total	**2,661**	**$**	**2,419**	
	Average	**222**	**$**	**202**	**1.3407**
Jan-11		616	$	449	0.7289
Feb-11		498	$	357	0.7169
Mar-11		455	$	316	0.6945
Apr-11		358	$	241	0.6732
May-11		67	$	49	0.7313

Name: Keweenaw Bay Indian
Utility: Semco
Utility Type: Gas
Acct #: 26-0312500
Meter #: 112230A
Address: 795 Michigan Ave Bingo Hall
Multiplier: 1

Month	Read	Usage	Cost	Cost per Unit
Jan-09				
Feb-09				
Mar-09				
Apr-09				
May-09				
Jun-09				
Jul-09				
Aug-09		67	$ 99	1.4776
Sep-09		181	$ 176	0.9724
Oct-09		483	$ 398	0.8240
Nov-09		724	$ 558	0.7707
Dec-09		1,097	$ 820	0.7475
	Total	**2,552**	**$ 2,051**	
	Average	**510**	**$ 410**	**0.9584**
Jan-10		1,036	$ 761	0.7346
Feb-10		853	$ 635	0.7444
Mar-10		547	$ 458	0.8373
Apr-10		299	$ 272	0.9097
May-10		83	$ 111	1.3373
Jun-10		51	$ 87	1.7059
Jul-10		52	$ 87	1.6731
Aug-10		76	$ 105	1.3816
Sep-10		96	$ 120	1.2500
Oct-10		319	$ 272	0.8527
Nov-10		816	$ 601	0.7365
Dec-10		1,271	$ 914	0.7191
	Total	**5,499**	**$ 4,423**	
	Average	**458**	**$ 369**	**1.0735**
Jan-11		1,159	$ 825	0.7118
Feb-11				
Mar-11				
Apr-11				
May-11				

Name: Ojibwa Motel Resort and Restaurant
Utility: Semco
Utility Type: Gas
Acct #: 26-0314500
Meter #: 304486
Address: 797 Michigan Avenue
Multiplier: 1

Month	Read	Usage	Cost	Cost per Unit
Jan-09				
Feb-09				
Mar-09				
Apr-09				
May-09				
Jun-09				
Jul-09				
Aug-09		1,286	$ 1,099	0.8546
Sep-09		1,483	$ 1,147	0.7734
Oct-09		1,529	$ 1,229	0.8038
Nov-09		2,070	$ 1,564	0.7556
Dec-09		3,329	$ 2,415	0.7254
	Total	**9,697**	**$ 7,454**	
	Average	**1,939**	**$ 1,491**	**0.7826**
Jan-10		2,920	$ 2,095	0.7175
Feb-10		2,693	$ 1,945	0.7222
Mar-10		2,039	$ 1,635	0.8019
Apr-10		1,820	$ 1,477	0.8115
May-10		1,298	$ 1,101	0.8482
Jun-10		920	$ 829	0.9011
Jul-10		1,191	$ 973	0.8170
Aug-10		1,276	$ 1,086	0.8511
Sep-10		1,339	$ 1,132	0.8454
Oct-10		1,683	$ 1,304	0.7748
Nov-10		3,226	$ 2,266	0.7024
Dec-10		4,377	$ 3,027	0.6916
	Total	**24,782**	**$ 18,870**	
	Average	**2,065**	**$ 1,573**	**0.7904**
Jan-11		3,469	$ 2,395	0.6904
Feb-11				
Mar-11				
Apr-11				
May-11				

Name: The Bay Inn - 4 Seasons
Utility: Semco
Utility Type: Gas
Acct #: 26-0311501
Meter #: 107238A
Address: 16449 Michigan Avenue
Multiplier: 1

Month	Read	Usage	Cost	Cost per Unit
Jan-09				
Feb-09				
Mar-09				
Apr-09				
May-09				
Jun-09				
Jul-09				
Aug-09		335	$ 301	0.8985
Sep-09		477	$ 384	0.8050
Oct-09		525	$ 528	1.0057
Nov-09		842	$ 640	0.7601
Dec-09		1,014	$ 761	0.7505
	Total	**3,193**	**$ 2,614**	
	Average	**639**	**$ 523**	**0.8440**
Jan-10		995	$ 733	0.7367
Feb-10		918	$ 680	0.7407
Mar-10		557	$ 465	0.8348
Apr-10		399	$ 347	0.8697
May-10		290	$ 265	0.9138
Jun-10		321	$ 289	0.9003
Jul-10		364	$ 320	0.8791
Aug-10		410	$ 354	0.8634
Sep-10		531	$ 445	0.8380
Oct-10		420	$ 343	0.8167
Nov-10		870	$ 638	0.7333
Dec-10		1,204	$ 869	0.7218
	Total	**7,279**	**$ 5,748**	
	Average	**607**	**$ 479**	**0.8207**
Jan-11		1,167	$ 830	0.7112
Feb-11				
Mar-11				
Apr-11				
May-11				

Name: Eagle Radio - **Nothing paid after January 2011**
Utility: Semco
Utility Type: Gas
Acct #: 26-0315500
Meter #: 261769
Address: 797 Michigan Avenue Maint Bldg
Multiplier: 1

Month	Read	Usage		Cost	Cost per Unit
Jan-09					
Feb-09					
Mar-09					
Apr-09					
May-09					
Jun-09					
Jul-09					
Aug-09		24	$	31	1.2917
Sep-09		161	$	133	0.8261
Oct-09		268	$	218	0.8134
Nov-09		283	$	224	0.7915
Dec-09		956	$	729	0.7626
	Total	**1,692**	**$**	**1,335**	
	Average	**338**	**$**	**267**	**0.8971**
Jan-10		587	$	443	0.7547
Feb-10		495	$	376	0.7596
Mar-10		357	$	303	0.8487
Apr-10		134	$	118	0.8806
May-10		5	$	16	3.2000
Jun-10		5	$	16	3.2000
Jul-10		4	$	15	3.7500
Aug-10		9	$	19	2.1111
Sep-10		32	$	37	1.1563
Oct-10		209	$	169	0.8086
Nov-10		608	$	453	0.7451
Dec-10		704	$	524	0.7443
	Total	**3,149**	**$**	**2,489**	
	Average	**262**	**$**	**207**	**1.5799**
Jan-11		552	$	407	0.7373
Feb-11					
Mar-11					
Apr-11					
May-11					

Name: Radio Station
Utility: Semco
Utility Type: Gas
Acct #: 26-0012502
Meter #: 264066
Address: US 41 Baraga
Multiplier: 1

Month	Read	Usage		Cost	Cost per Unit
Jan-09		49	$	56	1.1429
Feb-09		47	$	52	1.1064
Mar-09		54	$	59	1.0926
Apr-09		23	$	19	0.8261
May-09		8	$	5	0.6250
Jun-09		7	$	5	0.7143
Jul-09		5	$	4	0.8000
Aug-09		6	$	4	0.6667
Sep-09		5	$	4	0.8000
Oct-09		6	$	4	0.6667
Nov-09		5	$	4	0.8000
Dec-09		22	$	16	0.7273
	Total	**237**	**$**	**232**	
	Average	**20**	**$**	**19**	**0.8307**
Jan-10		48	$	35	0.7292
Feb-10		45	$	33	0.7333
Mar-10		30	$	22	0.7333
Apr-10		11	$	8	0.7273
May-10		6	$	4	0.6667
Jun-10		5	$	3	0.6000
Jul-10		6	$	4	0.6667
Aug-10		4	$	3	0.7500
Sep-10		5	$	3	0.6000
Oct-10		5	$	3	0.6000
Nov-10		5	$	3	0.6000
Dec-10		35	$	25	0.7143
	Total	**205**	**$**	**146**	
	Average	**17**	**$**	**12**	**0.6767**
Jan-11		57	$	41	0.7193
Feb-11		58	$	41	0.7069
Mar-11		40	$	27	0.6750
Apr-11		26	$	17	0.6538
May-11		22	$	16	0.7273

Name: Library - Downtown
Utility: Semco
Utility Type: Gas
Acct #: 25-9951501
Meter #: 126351A
Address: Downtown Baraga
Multiplier: 1

Month	Read	Usage		Cost	Cost per Unit
Jan-09		195	$	223	1.1436
Feb-09		178	$	200	1.1236
Mar-09		175	$	194	1.1086
Apr-09		107	$	89	0.8318
May-09		64	$	44	0.6875
Jun-09		36	$	28	0.7778
Jul-09		4	$	3	0.7500
Aug-09		2	$	1	0.5000
Sep-09		8	$	6	0.7500
Oct-09		42	$	31	0.7381
Nov-09		105	$	80	0.7619
Dec-09		160	$	119	0.7438
	Total	**1,076**	**$**	**1,018**	
	Average	**90**	**$**	**85**	**0.8264**
Jan-10		249	$	186	0.7470
Feb-10		186	$	136	0.7312
Mar-10		153	$	112	0.7320
Apr-10		93	$	73	0.7849
May-10		58	$	46	0.7931
Jun-10		14	$	11	0.7857
Jul-10		1	$	1	1.0000
Aug-10		-	$	-	
Sep-10		6	$	4	0.6667
Oct-10		36	$	28	0.7778
Nov-10		68	$	50	0.7353
Dec-10		149	$	108	0.7248
	Total	**1,013**	**$**	**755**	
	Average	**84**	**$**	**63**	**0.7708**
Jan-11		239	$	174	0.7280
Feb-11		211	$	151	0.7156
Mar-11		198	$	137	0.6919
Apr-11		155	$	104	0.6710
May-11		122	$	89	0.7295

Name: Old Airport
Utility: Semco
Utility Type: Gas
Acct #: 25-5008501
Meter #: 109758A
Address: Marquette
Multiplier: 1

Month	Read	Usage		Cost	Cost per Unit
Jan-09		2,605	$	2,860	1.0979
Feb-09		2,022	$	2,179	1.0776
Mar-09		1,480	$	1,573	1.0628
Apr-09		1,199	$	944	0.7873
May-09		252	$	164	0.6508
Jun-09		268	$	201	0.7500
Jul-09		44	$	33	0.7500
Aug-09		-	$	-	
Sep-09		7	$	5	0.7143
Oct-09		199	$	139	0.6985
Nov-09		728	$	526	0.7225
Dec-09		1,190	$	836	0.7025
	Total	**9,994**	**$**	**9,460**	
	Average	**833**	**$**	**788**	**0.8195**
Jan-10		1,478	$	1,039	0.7030
Feb-10		1,136	$	781	0.6875
Mar-10		1,097	$	754	0.6873
Apr-10		674	$	504	0.7478
May-10		511	$	382	0.7476
Jun-10		145	$	108	0.7448
Jul-10		64	$	47	0.7344
Aug-10		-	$	-	
Sep-10		44	$	32	0.7273
Oct-10		256	$	191	0.7461
Nov-10		563	$	395	0.7016
Dec-10		1,083	$	734	0.6777
	Total	**7,051**	**$**	**4,967**	
	Average	**588**	**$**	**414**	**0.7186**
Jan-11		1,563	$	1,066	0.6820
Feb-11		1,513	$	1,022	0.6755
Mar-11		1,432	$	934	0.6522
Apr-11		1,142	$	720	0.6305
May-11		786	$	545	0.6934

Name: Transitional House - Yellow House
Utility: Semco
Utility Type: Gas
Acct #: 26-0306501
Meter #: 261744
Address: M-38 just before the casino
Multiplier: 1

Month	Read	Usage		Cost	Cost per Unit
Jan-09		181	$	204	1.1271
Feb-09		159	$	176	1.1069
Mar-09		143	$	156	1.0909
Apr-09		98	$	80	0.8163
May-09		58	$	39	0.6724
Jun-09		33	$	25	0.7576
Jul-09		10	$	7	0.7000
Aug-09		6	$	4	0.6667
Sep-09		5	$	4	0.8000
Oct-09		22	$	16	0.7273
Nov-09		66	$	50	0.7576
Dec-09		113	$	84	0.7434
	Total	**894**	**$**	**845**	
	Average	**75**	**$**	**70**	**0.8305**
Jan-10		155	$	116	0.7484
Feb-10		124	$	90	0.7258
Mar-10		102	$	74	0.7255
Apr-10		62	$	49	0.7903
May-10		42	$	33	0.7857
Jun-10		12	$	9	0.7500
Jul-10		4	$	3	0.7500
Aug-10		4	$	3	0.7500
Sep-10		7	$	5	0.7143
Oct-10		14	$	11	0.7857
Nov-10		41	$	30	0.7317
Dec-10		111	$	80	0.7207
	Total	**678**	**$**	**503**	
	Average	**57**	**$**	**42**	**0.7482**
Jan-11		140	$	102	0.7286
Feb-11		118	$	85	0.7203
Mar-11		97	$	68	0.7010
Apr-11		72	$	49	0.6806
May-11		53	$	39	0.7358

Name: Pump House??? Zeba
Utility: Semco
Utility Type: Gas
Acct #: 26-0720500
Meter #: 120979A
Address: Zeba
Multiplier: 1

Month	Read	Usage		Cost	Cost per Unit
Jan-09		94	$	107	1.1383
Feb-09		78	$	87	1.1154
Mar-09		37	$	41	1.1081
Apr-09		66	$	55	0.8333
May-09		79	$	55	0.6962
Jun-09		24	$	19	0.7917
Jul-09		4	$	3	0.7500
Aug-09		4	$	3	0.7500
Sep-09		4	$	3	0.7500
Oct-09		8	$	6	0.7500
Nov-09		77	$	59	0.7662
Dec-09		88	$	65	0.7386
	Total	**563**	**$**	**503**	
	Average	**47**	**$**	**42**	**0.8490**
Jan-10		86	$	64	0.7442
Feb-10		73	$	53	0.7260
Mar-10		76	$	55	0.7237
Apr-10		80	$	63	0.7875
May-10		80	$	63	0.7875
Jun-10		31	$	24	0.7742
Jul-10		4	$	3	0.7500
Aug-10		4	$	3	0.7500
Sep-10		5	$	3	0.6000
Oct-10		-	$	-	
Nov-10		41	$	30	0.7317
Dec-10		85	$	61	0.7176
	Total	**565**	**$**	**422**	
	Average	**47**	**$**	**35**	**0.7357**
Jan-11		96	$	70	0.7292
Feb-11		75	$	53	0.7067
Mar-11		79	$	54	0.6835
Apr-11		81	$	54	0.6667
May-11		80	$	58	0.7250

Name: Early Head Start - Zeba
Utility: Semco
Utility Type: Gas
Acct #: 26-0564-500
Meter #: 255332
Address: Zeba
Multiplier: 1

Month	Read	Usage		Cost	Cost per Unit
Jan-09		1,220	$	1,396	1.1443
Feb-09		1,121	$	1,260	1.1240
Mar-09		1,068	$	1,185	1.1096
Apr-09		694	$	579	0.8343
May-09		410	$	286	0.6976
Jun-09		215	$	171	0.7953
Jul-09		74	$	59	0.7973
Aug-09		65	$	52	0.8000
Sep-09		72	$	57	0.7917
Oct-09		327	$	245	0.7492
Nov-09		541	$	416	0.7689
Dec-09		1,038	$	778	0.7495
	Total	**6,845**	**$**	**6,484**	
	Average	**570**	**$**	**540**	**0.8635**
Jan-10		1,431	$	1,073	0.7498
Feb-10		1,280	$	940	0.7344
Mar-10		1,082	$	795	0.7348
Apr-10		593	$	471	0.7943
May-10		357	$	283	0.7927
Jun-10		96	$	76	0.7917
Jul-10		48	$	38	0.7917
Aug-10		36	$	28	0.7778
Sep-10		120	$	95	0.7917
Oct-10		233	$	185	0.7940
Nov-10		496	$	369	0.7440
Dec-10		1,166	$	845	0.7247
	Total	**6,938**	**$**	**5,198**	
	Average	**578**	**$**	**433**	**0.7684**
Jan-11		1,521	$	1,109	0.7291
Feb-11		1,260	$	905	0.7183
Mar-11		1,077	$	749	0.6955
Apr-11		851	$	573	0.6733
May-11		589	$	434	0.7368

Name: Public Works
Utility: Semco
Utility Type: Gas
Acct #: 26-0489500
Meter #: 120552A
Address: Industrial Park
Multiplier: 1

Month	Read	Usage		Cost	Cost per Unit
Jan-09		130	$	148	1.1385
Feb-09		118	$	132	1.1186
Mar-09		115	$	127	1.1043
Apr-09		73	$	60	0.8219
May-09		35	$	24	0.6857
Jun-09		24	$	19	0.7917
Jul-09		1	$	1	1.0000
Aug-09		-	$	-	
Sep-09		-	$	-	
Oct-09		27	$	20	0.7407
Nov-09		48	$	36	0.7500
Dec-09		83	$	62	0.7470
	Total	**654**	**$**	**629**	
	Average	**55**	**$**	**52**	**0.8898**
Jan-10		111	$	83	0.7477
Feb-10		101	$	74	0.7327
Mar-10		83	$	61	0.7349
Apr-10		49	$	38	0.7755
May-10		25	$	19	0.7600
Jun-10		3	$	2	0.6667
Jul-10		2	$	1	0.5000
Aug-10		-	$	-	
Sep-10		3	$	2	0.6667
Oct-10		16	$	12	0.7500
Nov-10		44	$	32	0.7273
Dec-10		91	$	65	0.7143
	Total	**528**	**$**	**389**	
	Average	**44**	**$**	**32**	**0.7069**
Jan-11		110	$	80	0.7273
Feb-11		102	$	73	0.7157
Mar-11		87	$	60	0.6897
Apr-11		69	$	46	0.6667
May-11		53	$	39	0.7358

Name: Maintenance Garage
Utility: Semco
Utility Type: Gas
Acct #: 26-0485500
Meter #: 226575
Address: Industrial Park
Multiplier: 1

Month	Read	Usage		Cost	Cost per Unit
Jan-09		295	$	337	1.1424
Feb-09		276	$	310	1.1232
Mar-09		273	$	303	1.1099
Apr-09		154	$	128	0.8312
May-09		102	$	71	0.6961
Jun-09		16	$	12	0.7500
Jul-09		-	$	-	
Aug-09		-	$	-	
Sep-09		-	$	-	
Oct-09		66	$	49	0.7424
Nov-09		132	$	101	0.7652
Dec-09		197	$	147	0.7462
	Total	**1,511**	**$**	**1,458**	
	Average	**126**	**$**	**122**	**0.8785**
Jan-10		295	$	221	0.7492
Feb-10		216	$	158	0.7315
Mar-10		196	$	144	0.7347
Apr-10		117	$	93	0.7949
May-10		104	$	82	0.7885
Jun-10		15	$	11	0.7333
Jul-10		-	$	-	
Aug-10		-	$	-	
Sep-10		10	$	8	0.8000
Oct-10		51	$	40	0.7843
Nov-10		97	$	72	0.7423
Dec-10		227	$	164	0.7225
	Total	**1,328**	**$**	**993**	
	Average	**111**	**$**	**83**	**0.7581**
Jan-11		296	$	215	0.7264
Feb-11		262	$	188	0.7176
Mar-11		209	$	145	0.6938
Apr-11		126	$	84	0.6667
May-11		119	$	87	0.7311

Name: Community Center
Utility: Semco
Utility Type: Gas
Acct #: 26-0473501
Meter #: CDD191070
Address: behind tribal center - Beartown Road
Multiplier: 1

Month	Read	Usage		Cost	Cost per Unit
Jan-09					
Feb-09					
Mar-09					
Apr-09					
May-09					
Jun-09					
Jul-09					
Aug-09					
Sep-09					
Oct-09					
Nov-09					
Dec-09		2,541	$	1,786	0.7029
	Total	**2,541**	**$**	**1,786**	
	Average	**2,541**	**$**	**1,786**	**0.7029**
Jan-10		3,155	$	2,218	0.7030
Feb-10		2,603	$	1,791	0.6881
Mar-10		2,372	$	1,632	0.6880
Apr-10		1,385	$	1,036	0.7480
May-10		1,012	$	757	0.7480
Jun-10		552	$	412	0.7464
Jul-10		398	$	297	0.7462
Aug-10		467	$	349	0.7473
Sep-10		758	$	567	0.7480
Oct-10		1,000	$	748	0.7480
Nov-10		1,389	$	976	0.7027
Dec-10		2,754	$	1,867	0.6779
	Total	**17,845**	**$**	**12,650**	
	Average	**1,487**	**$**	**1,054**	**0.7243**
Jan-11		3,202	$	2,192	0.6846
Feb-11		2,173	$	1,468	0.6756
Mar-11		1,905	$	1,243	0.6525
Apr-11		1,559	$	983	0.6305
May-11		1,461	$	1,013	0.6934

Name: Senior Citizen Center
Utility: Semco
Utility Type: Gas
Acct #: 26-0228500
Meter #: 112502A
Address: up old US 41 Baraga
Multiplier: 1

Month	Read	Usage		Cost	Cost per Unit
Jan-09		1,267	$	1,450	1.1444
Feb-09		1,126	$	1,266	1.1243
Mar-09		1,105	$	1,226	1.1095
Apr-09		770	$	642	0.8338
May-09		419	$	293	0.6993
Jun-09		294	$	235	0.7993
Jul-09		112	$	89	0.7946
Aug-09		97	$	77	0.7938
Sep-09		104	$	83	0.7981
Oct-09		292	$	218	0.7466
Nov-09		513	$	394	0.7680
Dec-09		789	$	591	0.7490
	Total	**6,888**	**$**	**6,564**	
	Average	**574**	**$**	**547**	**0.8634**
Jan-10		1,060	$	794	0.7491
Feb-10		941	$	691	0.7343
Mar-10		780	$	573	0.7346
Apr-10		555	$	441	0.7946
May-10		401	$	318	0.7930
Jun-10		175	$	139	0.7943
Jul-10		125	$	99	0.7920
Aug-10		86	$	68	0.7907
Sep-10		100	$	79	0.7900
Oct-10		271	$	215	0.7934
Nov-10		379	$	284	0.7493
Dec-10		871	$	631	0.7245
	Total	**5,744**	**$**	**4,332**	
	Average	**479**	**$**	**361**	**0.7700**
Jan-11		1,301	$	949	0.7294
Feb-11		1,147	$	824	0.7184
Mar-11		856	$	595	0.6951
Apr-11		690	$	464	0.6725
May-11		535	$	394	0.7364

Name: Old Tubcraft Building
Utility: Semco
Utility Type: Gas
Acct #: 26-0086501
Meter #: 164336A
Address: Industrial Park
Multiplier: 1

Month	Read	Usage		Cost	Cost per Unit
Jan-09		451	$	516	1.1441
Feb-09		345	$	388	1.1246
Mar-09		305	$	338	1.1082
Apr-09		219	$	182	0.8311
May-09		137	$	95	0.6934
Jun-09		101	$	80	0.7921
Jul-09		30	$	24	0.8000
Aug-09		7	$	5	0.7143
Sep-09		5	$	4	0.8000
Oct-09		4	$	6	1.5000
Nov-09		62	$	47	0.7581
Dec-09		255	$	191	0.7490
	Total	**1,921**	**$**	**1,876**	
	Average	**160**	**$**	**156**	**0.9179**
Jan-10		329	$	246	0.7477
Feb-10		273	$	200	0.7326
Mar-10		306	$	224	0.7320
Apr-10		158	$	125	0.7911
May-10		67	$	53	0.7910
Jun-10		14	$	11	0.7857
Jul-10		5	$	3	0.6000
Aug-10		6	$	4	0.6667
Sep-10		11	$	8	0.7273
Oct-10		28	$	22	0.7857
Nov-10		46	$	34	0.7391
Dec-10		176	$	127	0.7216
	Total	**1,419**	**$**	**1,057**	
	Average	**118**	**$**	**88**	**0.7351**
Jan-11		233	$	169	0.7253
Feb-11		185	$	132	0.7135
Mar-11		163	$	113	0.6933
Apr-11		110	$	74	0.6727
May-11		82	$	60	0.7317

Name: Police Station
Utility: Semco
Utility Type: Gas
Acct #: 26-0084500
Meter #: 159740A
Address: US 41 just past convenience store north
Multiplier: 1

Month	Read	Usage		Cost	Cost per Unit
Jan-09		355	$	400	1.1268
Feb-09		382	$	423	1.1073
Mar-09		256	$	279	1.0898
Apr-09		214	$	175	0.8178
May-09		160	$	109	0.6813
Jun-09		48	$	37	0.7708
Jul-09		-	$	-	
Aug-09		-	$	-	
Sep-09		-	$	-	
Oct-09		87	$	65	0.7471
Nov-09		212	$	162	0.7642
Dec-09		281	$	210	0.7473
	Total	**1,995**	**$**	**1,860**	
	Average	**166**	**$**	**155**	**0.8725**
Jan-10		354	$	264	0.7458
Feb-10		360	$	264	0.7333
Mar-10		337	$	247	0.7329
Apr-10		149	$	118	0.7919
May-10		166	$	131	0.7892
Jun-10		6	$	4	0.6667
Jul-10		-	$	-	
Aug-10		-	$	-	
Sep-10		-	$	-	
Oct-10		4	$	3	0.7500
Nov-10		225	$	168	0.7467
Dec-10		336	$	243	0.7232
	Total	**1,937**	**$**	**1,442**	
	Average	**161**	**$**	**120**	**0.7422**
Jan-11		433	$	318	0.7344
Feb-11		478	$	347	0.7259
Mar-11		397	$	279	0.7028
Apr-11		359	$	245	0.6825
May-11		145	$	108	0.7448

Name: Tribal Court Office
Utility: Semco
Utility Type: Gas
Acct #: 26-0058500
Meter #: 180917
Address: US 41 just before Pines turn at Baraga Industrial
Multiplier: 1

Month	Read	Usage		Cost	Cost per Unit
Jan-09		241	$	275	1.1411
Feb-09		199	$	223	1.1206
Mar-09		181	$	200	1.1050
Apr-09		113	$	94	0.8319
May-09		65	$	45	0.6923
Jun-09		37	$	29	0.7838
Jul-09		5	$	4	0.8000
Aug-09		4	$	3	0.7500
Sep-09		5	$	4	0.8000
Oct-09		59	$	44	0.7458
Nov-09		106	$	81	0.7642
Dec-09		163	$	122	0.7485
	Total	**1,178**	**$**	**1,124**	
	Average	**98**	**$**	**94**	**0.8569**
Jan-10		207	$	155	0.7488
Feb-10		194	$	142	0.7320
Mar-10		169	$	124	0.7337
Apr-10		108	$	85	0.7870
May-10		71	$	56	0.7887
Jun-10		28	$	22	0.7857
Jul-10		7	$	5	0.7143
Aug-10		5	$	3	0.6000
Sep-10		16	$	12	0.7500
Oct-10		43	$	34	0.7907
Nov-10		89	$	66	0.7416
Dec-10		186	$	134	0.7204
	Total	**1,123**	**$**	**838**	
	Average	**94**	**$**	**70**	**0.7411**
Jan-11		232	$	169	0.7284
Feb-11		185	$	132	0.7135
Mar-11		169	$	117	0.6923
Apr-11		131	$	88	0.6718
May-11		106	$	78	0.7358

Name: ????????
Utility: Semco
Utility Type: Gas
Acct #: 26-0316500
Meter #: 66674A
Address: ?????????
Multiplier: 1

Month	Read	Usage		Cost	Cost per Unit
Jan-09					
Feb-09					
Mar-09					
Apr-09					
May-09					
Jun-09					
Jul-09					
Aug-09		238	$	228	0.9580
Sep-09		380	$	316	0.8316
Oct-09		539	$	438	0.8126
Nov-09		988	$	743	0.7520
Dec-09		1,622	$	1,189	0.7330
	Total	**3,767**	**$**	**2,914**	
	Average	**753**	**$**	**583**	**0.8174**
Jan-10		1,367	$	989	0.7235
Feb-10		978	$	721	0.7372
Mar-10		677	$	555	0.8198
Apr-10		484	$	411	0.8492
May-10		216	$	210	0.9722
Jun-10		192	$	192	1.0000
Jul-10		183	$	185	1.0109
Aug-10		281	$	258	0.9181
Sep-10		320	$	287	0.8969
Oct-10		425	$	347	0.8165
Nov-10		1,141	$	822	0.7204
Dec-10		1,583	$	1,127	0.7119
	Total	**7,847**	**$**	**6,104**	
	Average	**654**	**$**	**509**	**0.8481**
Jan-11		1,292	$	914	0.7074
Feb-11					
Mar-11					
Apr-11					
May-11					

Name: ????????
Utility: Semco
Utility Type: Gas
Acct #: 26-0315500
Meter #: 261769
Address: ????????
Multiplier: 1

Month	Read	Usage	Cost	Cost per Unit
Jan-09				
Feb-09				
Mar-09				
Apr-09				
May-09				
Jun-09				
Jul-09				
Aug-09		24	$ 31	1.2917
Sep-09		161	$ 133	0.8261
Oct-09		268	$ 218	0.8134
Nov-09		283	$ 224	0.7915
Dec-09		956	$ 729	0.7626
	Total	**1,692**	**$ 1,335**	
	Average	**338**	**$ 267**	**0.8971**
Jan-10		587	$ 443	0.7547
Feb-10		495	$ 376	0.7596
Mar-10		357	$ 296	0.8291
Apr-10		134	$ 118	0.8806
May-10		5	$ 16	3.2000
Jun-10		5	$ 16	3.2000
Jul-10		4	$ 15	3.7500
Aug-10		9	$ 19	2.1111
Sep-10		32	$ 37	1.1563
Oct-10		209	$ 169	0.8086
Nov-10		608	$ 453	0.7451
Dec-10		704	$ 524	0.7443
	Total	**3,149**	**$ 2,482**	
	Average	**262**	**$ 207**	**1.5783**
Jan-11		552	$ 407	0.7373
Feb-11				
Mar-11				
Apr-11				
May-11				

Name: Keweenaw Bay Indian Comm
Utility: Semco
Utility Type: Gas
Acct #: 26-0316500
Meter #: 66674A
Address: 799 Michigan Ave Bowling
Multiplier: 1

Month	Read	Usage		Cost	Cost per Unit
Jan-09					
Feb-09					
Mar-09					
Apr-09					
May-09					
Jun-09					
Jul-09					
Aug-09		238	$	228	0.9580
Sep-09		380	$	316	0.8316
Oct-09		539	$	438	0.8126
Nov-09		988	$	743	0.7520
Dec-09		1,622	$	1,189	0.7330
	Total	**3,767**	**$**	**2,914**	
	Average	**753**	**$**	**583**	**0.8174**
Jan-10		1,367	$	989	0.7235
Feb-10		978	$	721	0.7372
Mar-10		677	$	555	0.8198
Apr-10		484	$	411	0.8492
May-10		216	$	210	0.9722
Jun-10		192	$	192	1.0000
Jul-10		183	$	185	1.0109
Aug-10		281	$	258	0.9181
Sep-10		32	$	287	8.9688
Oct-10		425	$	347	0.8165
Nov-10		1,141	$	822	0.7204
Dec-10		1,583	$	1,127	0.7119
	Total	**7,559**	**$**	**6,104**	
	Average	**630**	**$**	**509**	**1.5207**
Jan-11		1,292	$	914	0.7074
Feb-11					
Mar-11					
Apr-11					
May-11					

Name: Keweenaw Bay Indian (Marquette Casino)??
Utility: Semco
Utility Type: Gas
Acct #: 24-6669501
Meter #: 38376A
Address: 101 Acre Trl
Multiplier: 1

Month	Read	Usage		Cost	Cost per Unit
Jan-09					
Feb-09					
Mar-09					
Apr-09					
May-09					
Jun-09					
Jul-09					
Aug-09					
Sep-09		361	$	302	0.8366
Oct-09		480	$	396	0.8250
Nov-09		492	$	394	0.8008
Dec-09		1,245	$	924	0.7422
	Total	**2,578**	**$**	**2,016**	
	Average	**645**	**$**	**504**	**0.8011**
Jan-10		596	$	459	0.7701
Feb-10		1,562	$	357	0.2286
Mar-10		500	$	423	0.8460
Apr-10		428	$	369	0.8621
May-10		409	$	354	0.8655
Jun-10		403	$	350	0.8685
Jul-10		333	$	297	0.8919
Aug-10		353	$	312	0.8839
Sep-10		449	$	384	0.8552
Oct-10		470	$	378	0.8043
Nov-10		815	$	600	0.7362
Dec-10		2,503	$	1,748	0.6984
	Total	**8,821**	**$**	**6,031**	
	Average	**735**	**$**	**503**	**0.7759**
Jan-11		2,629	$	1,810	0.6885
Feb-11					
Mar-11					
Apr-11					
May-11					