Alternative Energy Committee
Mid Term Progress Report with Chippewa Valley Alternative Energy
October 3, 2014

Members present:	Larry Bean, Chair; Burke Henry, Vice Chair and Glenn Carlson
Members absent:	Carl Frederickson and Tom Banner
Professional Participants:	Bill Bailey, Bailey's Greenhouse and Bay Area Energy Forum, Roger Aiken, Bay Area Energy Forum; Zach Montagne, Superintendent, Madeline Sanitary District (MSD); Gary Krubsack Commissioner, MSD; Scott and Cathy Robinson, Chippewa Valley Alternative Energy (CVAE); Dean Harrington, Sally Harrington, David Harrington, Amy Lorentz and Chris Gamer of Common Sense Development (CSD) and Michael Tiry, Tiry Engineering.
Public present:	

1. Call to order.
The Alternative Energy Committee (AEC) meeting called to order by Chair L. Bean on Friday, October 3, 2014 at 10:05am. Do not have a quorum at this time but G. Carlson will be here shortly.

2. Progress Report from Chippewa Valley Alternative Energy. (CVAE)
L. Bean said the purpose of this meeting is the mid-term progress report from Chippewa Valley Alternate Energy for the Planning and Design of a Solar/ Micro-grid for the Town of La Pointe's municipal operations.
Meeting is turned over to Chris Gamer, Common Sense Development and Scott Robinson of CVAE.
Have packets, zip drives for the meeting as well as an agenda which is hereby attached and made a part of these minutes.

Contract Review:
Dean Harrington: Contract review: CVAE has not signed and returned a contract as there is one issue regarding the insurance requirement. The professional liability, errors and omissions as described in the contract is a coverage CVAE does not have. CVAE has a modest insurance policy so CVAE would like to amend the contract to provide their insurance for a pre-proposal stage and when the final design/plan is presented they will have an elevated errors and omissions coverage. At that time an engineering firm will give approval to the plan and the engineering firm would have errors and omissions coverage as well.
The Committee agrees this is a discussion for the town attorney as all the committee can do is make a recommendation to the Town Board. The Town Board would then have the Town Administrator carry the recommendation to the Town Attorney. Committee suggests that CVAE contact Pete Clark, Town Administrator.

Zach Montagne, MSD, said the Town requires a certain level of bonding when doing street cuts. CVAE said street cuts would not happen during the plan/design phase. Once we get a satisfactory design and move into the implementation stage that would be a concern and CVAE would talk to their insurance agent at that time.

Glenn Carlson is now present (10:11am).
In the Zip files are a variety of inverters, mounting hardware and modules for committee review. At this time the design/plan team is looking at Solar World, Sun Power and TenK for this equipment. All the equipment is made in the USA so that would help on grant applications. The Federal financing guide and sizing calculations are included on the Zip files.

Discussion of sites.
All the buildings at the airport site could be tied together from one solar array and all electrical power needs would be met. The system is sized in two different parameters:

Net metering (create enough electricity to match what those electric loads are plus 20% - calculated annually, over the years).

Microgrid: Solar only. Calculated by looking at the time of the year when you are going to generate the least amount of power from solar and then compare that to your billing needs; how much energy you need that time of year in order to minimize the amount of storage you will need. The main components of a microgrid are generation and storage.

In order to see production calculations go to the National Renewable Energy Lab website and download the program. The System Advisor Model (SAM) is a performance and financial model designed to facilitate decision making for people involved in the renewable energy industry https://sam.nrel.gov/. There you can review the sizing calculations.

On the image of each site there is a different type of shading which indicates a net meter size array or a microgrid size array. As you change the kind of mounting hardware you will also change the size of the footprint which impacts land use. To be noted, the TenK installation has the least amount of impact on land use while producing the same amount of power.

The committee is interested in a microgrid because a microgrid would be able to provide peak usage (energy security) whereas net metering you are looking to get the electric bill reduced to zero. (financial).

EMS and Windsled Terminal: Microgrid. CVAE said because of the 20% overcapacity it would be possible to get a line from the EMS/Windsled building to where the windsled lands in winter (Grigg's Approach). Could do the same for net metering.

To be noted, the size of the array is always listed on the label of the file so if you are using Solar World, that is in that solar array.

Landfill: Ballast block might exceed the bearing capacity of the landfill. You cannot put too many pounds per sq inch on the cap or you will penetrate the landfill and be in trouble. Another concern is the amount of fill that will be needed to create a level field. Some trees would have to come down. Need to keep the grass and weeds mowed so that they do not block the sun. There could be snow issues also.
Discussion of various products.

Library: Use a different mounting structure such as top of pole mounts from DPW (Direct Power and Water). There would be 15 arrays, 15 poles each holding up 14 modules. These are seasonally adjustable. The image shading shows what the installation would look like as a microgrid and also as net metering. Net metering shows that only 5 poles are needed. Aesthetically, some trees would have to come down in order to get the best sun so the committee needs to give us guidance in regards to cosmetics as soon as possible.

Radio Tower site: the meter costs more than the energy the tower uses and is surrounded by trees. Could put solar on the telephone pole or remove the site from the list of sites.
Agreement by the committee to remove the Radio Tower site from the plan/design.

Discussion of snow load. Many manufacturers of mounting hardware said they would not deal with a 70lb snow load. When you talk about shading structures you want to talk about a top of pole mount so you would shed the snow rather than bear the weight. A shading structure over a parking lot is a great idea. This would also work on the Town dock.
Another consideration in regards to parking lots is plowing snow. You need to give the snowplows plenty of room to push the snow to the array.

The size of a module depends on the manufacturer. There is a 40" x 60-70" module from Solar World and Sun Power with 14 modules on one pole. The anchoring system price goes up with the number of modules. Once the arrays are sized and the layouts done and materials generated the information can be submitted to suppliers for bids.

What we have just reviewed are the facilities that are bunched together.
Question if there has been any discussion with the Bureau of Aeronautics or the FAA in regards to the airport. CVAE said that is why they are generating visual files so the BOA/FAA can see where we are going as part of the screening process.
Question about consolidating the meters as there are 4 meters in the airport site. If these meters could be consolidated that would be a considerable monthly savings but would the BOA/FAA agree to consolidation? CVAE said the airport might have to have a separate meter, but the other three meters in that area could be consolidated. First you have to go through FAA screening; the same process would have to happen at the landfill. CVAE is aware of this.

The Town Hall, Joni's Beach, and Rec Center would all have separate installations.
Could be possible to change these three sites into what fits into the Dept of Energy definition of a microgrid because you have a variety of loads you are serving with a power source and storage. You could take these sites and tie them together.
The other thing with a microgrid is the solar and the storage. Other products can reduce the amount of solar you need and opens up the possibility for other granting sources such as bio-mass, and anaerobic digesters which are forms of solar storage like wood. Wood is considered solar storage because the energy for wood is derived from the sun and stored in the trees. You could also have a biomass crop like switch grass that a digester can use. These could be forms of continuous power that would reduce the microgrid solar size required to handle the load in the winter months when there is less sun with the added benefit of having a waste heat stream where you could run a greenhouse. You could reduce the solar for net metering by just adding biogas

or biomass and there would be a potential for expanded grant funding. Question if you could use wood instead of switch grass? CVAE said yes, you could use chips or chunks.

Town Park.
CVAE does not have images for the Town Park. They only have the primitive bathroom and not the two new bathroom/shower buildings with LED and motion detectors. The committee thinks there are two new buildings in the old Town Park and one in the new Town Park across the street. CVAE asked if there is a meter for the new Town Park as that has not shown up in the electric bills and this information is needed. This would be mainly a summertime load. CVAE said they could put in a solar on the roof of the cement building or could put a structure on the two posts. CVAE will take a look at the new Town Park.

Battery Storage.
CVAE said with a solar microgrid the battery is the storage. If you look at involving other sources of power, you could use biogas or biomass as storage.
In order to do this, you would have to link a lot of these things together which would be a lot of digging. Question - if you use the right inverter, could you feed it right back into the power grid and get a rebate without involving the storage system? CVAE said this is true. Basically what you are talking about is a net meter array or a microgrid array. One is about the finances (net meter), the other is energy security (microgrid). However, the inverters that feed directly into the grid, if the grid goes down, by law the utility has to shut down and stop delivering power. So, do you want to have power when the grid goes down? That is the microgrid question. Discussion of various inverters.

To be aware of – shingles do not outlast a solar installation.

L. Bean said we are looking at two tracks – one, the easiest, is to meet the Town's municipal annual electric costs by solar and grid connected. Two, a microgrid costs more but adds security and emergency preparedness so the town would continue to operate if everything else went down. Microgrids got the buzz after Hurricane Sandy; those on the microgrid never lost electricity. A microgrid also has more appeal for funding/grants because it comes under emergency preparedness.

CVAE said the next step is to get all the data to manufacturers so they can calculate costs but before that we need to figure out what you want. The committee needs to fill in the blanks.

Museum Parking Lot – committee agrees to go the aesthetic route. Pushing snow is important.

CVAE said they talked to the Public Service Commission (PSC) about this project and excess generation of energy. CVAE would like to see Xcel Energy pay up front and own a piece of this project instead of having to give 3 cents per kWh for the next 25 years. That way you would eliminate the upfront costs. Xcel did not seem too open the first time around. L. Bean said once there is a good plan in place perhaps we could have better luck; not asking for much, just enough to make it work.

Town Dock
Getting the power there when you have right of way issues is difficult, however there is one row of poles down the side of the dock that is holding this all up that could be a shading structure people would walk under. That would be about 80% of the electrical load. If it were possible to come back further you could get to 100% of the net meter. This would also be a strong commitment to solar that everyone would see as soon as they got off the ferry. You could walk or drive under the structure; part of it would be over the water. Concern expressed about the barges with high cranes that use the dock and unload boulders, gravel, etc.

Discussion of using the breakwall. Freezing spray would affect the modules so that is not an option.
CVAE looked at the roof of the Beach Club which could generate about 45/50% of the energy. There is also a small building before Main Street that could become a waiting area. This building faces east but with prices dropping you could justify having an array that faces east. This would generate about 15% of the load. Could also have an outdoor shading area.
Discussion of new snow clearing technologies which CVAE will check out.
CVAE said there could be a canopy over the mini golf or an installation on the museum roof but that would involve lease agreements.
Right of way issues have to be worked out with Xcel to allow us to bring power under the road.

Net metering covers costs.
CVAE said the way the tariff language works is that you can go up to 100kW on any premise with a premise number and that is your legal limit. If you go over that limit you have to negotiate the price point for everything you do not use and it goes back on the grid. If you are thinking about using biogas or biomass they will give you a different price point than if it is coming from solar because now there is more of a focus on biomass or biogas because solar is working. We can compete with the grid with solar so now they are looking to support other alternatives.
MN and WI tariffs are different. Basically, what the tariffs say is that you can net meter up to 100kW per premise.
The Public Service Commission (PSC) explained that there is a tariff and then there is how the tariff is interpreted; these are two different things. CVAE called the PSC a couple of days ago about concerns about the changes affecting solar could negatively impact this project. The PSC said the only thing in the works for Xcel is a standard rate hike. To be noted is that a co-op is self-governing; they do not have to abide by the PSC. The PSC is kind of like the police – they want to work with the utilities and have a strong grid but they also want to work with the homeowner and consumer. They are kind of in the middle. A co-op does not have to offer net-metering; if they did they could have a meter charge so enormous you would have to put in a 3.5kW solar array just to cover the fee.

Question if we put something at the landfill that generates the 100kW – do we get that or do we only get the amount up to the usage on the actual meters that are there. CVAE said that is how the tariff is written and how the tariff is interpreted. Asked the PSC about this and the PSC was a little grey in the answer and that was where CVAE asked if you need a lawyer and the PSC said a lawyer is not the worst thing in the world to have in that scenario.

The easiest way to go is to pick a couple of types of solar, move forward on the landfill that would include the exemption and get that finished. Then say we put on a 100kW system and feed it to the MRF, and we send a letter to the proper person at Xcel and simultaneously send the same letter to the contact at the PSC and let them both look at the information, knowing the other is looking at the information at the same time so instead of running out and hiring a lawyer we see how it flows and wait for their response. Question if that would take a long time. CVAE said it is pretty straightforward because of the way the arrays get sized. The PSC said the utilities are fearful because you would be taking money away from them and coops are even worse. Where the PSC stands is that you should be allowed to put in the amount of solar you need to cover your bill; that is your right and should not be taken away. That interpretation is where you are pushing the button.

Maybe CVAE should submit two options: 1. put a 100kW system at the landfill. 2. If you left one of the meters at the firehall, you would have room for a 200kW system because you are serving two premises, but you can also downgrade to 100kW and make it easier to negotiate with the utility.

CVAE thinks the best way, if you are going forward with the microgrid is to have other forms of energy.
L. Bean said net metering, nationwide is intended to match load and not overproduce, so if we had an installation just for the MRF that overproduced that would not be looked upon favorably. Because we are a town, that also throws a monkey wrench into the mix. To his thinking, you have two of the highest energy users for the town – the MRF and EMS so if we can serve them both he thinks a 100 kW system would be fully justified. G. Carlson said if it is 100kW per premise number we have several premises. What is the Town's annual municipal usage? CVAE said if you went with the net meter you would need about 124kW installed: you would have a microgrid at the airport, landfill, the library that would also serve the museum bathrooms and clinic. The landfill system would serve the MRF, EMS, and Winter Transportation building; the Airport would have its own meter and then there are three other meters at that site. There is room for a 200kW but you do not need that much, even in a microgrid scenario. L. Bean said what he sees evolving is that we may want a net meter arrangement in some places and a microgrid in others and not a microgrid in every place. CVAE said that simplifies it.
B. Henry said we do not have a good definition of emergency. If we are talking about an emergency where the grid itself, coming from the mainland is down, there is no power under the lake coming to this island – what would be the reason for that? A local issue south of Bayfield or a nuclear bomb? Will there be a period of time that we have to plan for no power coming to the island for 1 or 5 days? Have we been without power for a week or two weeks? L. Bean said microgrids have been designed for 3 days of no power. CVAE said in an area like this you might want to shoot for 4 days since the Lake Superior area is in a heavier snow zone and there is fog. Historically being without power is not an issue on the Island. CVAE said this was a security issue that came up in California when someone shot out a transformer station.
Question of how much propane is on hand. L. Bean said the committee has focused on electric use and options to replace propane have not been examined.

To be noted is that the EMS building will have a new roof so we need to look into an installation on the new roof.

Question about passive hot water heating for the future as there is a whole network of tubing in the EMS and WTC floors that could be hot water heated.

Power Management: Efficiency First, Focus on Energy lighting, waste water pumps.
CVAE contacted Dr. Mowry who thinks a microgrid project on this island is a great opportunity to show how a microgrid would have value in an emergency scenario especially on an island that has to deal with ice on/ice off conditions. CVAE told Dr. Mowry we were looking for an intern to work on this project through him. Dr. Mowry did give CVAE a letter stating the points he saw that were most important to pursue. One of them was load management – most microgrids are in third world countries at a school where people come to charge their smart phones or computers but who do not have washers, dryers, etc. The School gets power during peak time and then the power is available to the people so there are things such as load management which lowers the cost. This involves some sacrifice in order to get the cost under control as you do not run certain things at certain times in order to make sure everything gets done.

L. Bean said he made a presentation to TB last week. The first recommendation was to increase the awareness and behavior of employees to increase energy efficiency. He then talked to Pete Clark, TA and a board member and emphasized that employees need to hear it from them that this is important. The Committee made recommendations in regards to lighting changes that would include a budgeted amount to change all light bulbs to energy efficient bulbs, as well as the 6 poles on the ferry dock and the heads and bulbs at the Museum parking lot.

Cathy of CVAE put together a Focus on Energy lighting rebate. To be noted is that you cannot just change a bulb; you have to change the fixture. L. Bean said the museum parking lot has 2 poles with four lights each. The poles are fine; need to change the bulbs and the heads. The Ferry dock needs the poles, everything replaced. L. Bean thought the Town Foreman put $20,000 in his budget for the two lighting projects and $2,000 for general fixtures and bulbs throughout the town. Question if the savings for lighting will have an impact on the sizing for solar installations? L. Bean said sizing and cost. CVAE said a utility looks at a 2 year average so you do not want to go over 120% of the last 2 years of use or 100kW. Question if the 100w LEDS that would replace the 400w high pressure sodium means that it would use a ¼ the amt of energy? CVAE said yes. L. Bean said our calculations to the Town Board were based on ½ so we would do much better than that. CVAE said the difference between incandescent and LED is 9x the amt of energy. Florescent to LED is 50%.
Discussion of the electric use on the dock. Power is used to charge the ferry boats, Arnie's boats, and the lights are on all the time. CVAE said there is an E-gauge that monitors all systems that could be connected to the cables. This adds an additional cost but you would know where the electric use is going. G. Carlson said his interest is to make sure we are properly sizing our loads. CVAE said in our Scope of Work we need to plan for future use. G. Carlson said future growth may be from a lower base than where we are right now. L. Bean said a key question is how much of that load is for lighting. The committee also recommended to the Town Board to invest in a control system - photocells, wireless controls, as well as the new fixtures.

Waste Water pumps and Mike Tiry, exemption application.
Zach, Madeline Sanitary District, has the District's electric bills for CVAE and also the electrical use of various pumps in the buildings.

CVAE said from an emergency situation you want the toilets to slush at the height of tourist season. Zach said most everyone has a private well so if there is no power there is no water.
Zach presents all the electrical use of various pumps buildings.
CVAE said the solar for the airport could be submitted with MSD – could be grid tied, a net metering option.
Discussion of the pumps that are around 40 years old.

Finance:
CVAE talked to two different law firms who have experience in solar and alternative energy finance structures. One firm is not interested; the other firm deals with small community programs.
Thinking of investing some money with them because it will help us down the road but we would like them to give us some ideas about the La Pointe project once we have figures together. They deal with power purchase agreements and are familiar with leases, municipal finances.

Michael Tiry, Tiry Engineering.
Michael has worked 25 yrs with the US Dept of Agriculture in agriculture waste management. He started his own business and went into anaerobic digestion of agricultural waste. He has worked with waste on two of the largest dairy farms in WI that consisted of 3,000 head of cattle which generated 600kW. If this is combined with substrates you could generate over a megawatt of electricity. He has worked with a couple of universities and now has received a $200,000 grant to work with farms of 200 cows or less. He is running a digester on an Organic Family farm which is about the size of the digester you would look at. Substrates are needed as well as energy crops such as reed canary grass which you could grow. You cannot use human waste because of pathogen issues. Animal waste works well and cooking grease is excellent. The digester can also use food and fish waste.
The way a digester works is bacteria are developed under temperature in a large tank and feed on the substrates. The bacteria then produce methane which is used for energy. You get about a cubic foot of methane from every 7lbs of volatile solids that you destroy by anaerobic composition. You would probably have a 30,000 gallon digester on island; an energy crop of 160 acres could supply a 30,000 gallon digester which would produce anywhere from 50-90kW of electricity. 2/3 recovered as heat; 1/3 recovered as electricity.

The by-products would be a fiber product that can be used for animal bedding, mulch, soil compost; the liquid portion has plant nutrients which can be used as a fertilizer and could go back on the energy crop.
The recording now ends 2.5 hours later, at about 12:30 pm
(Meeting continues but there is no recording) at approximately 12:30pm

Minutes taken from recorder and respectfully submitted by Kathy Erickson, Clerical Assistant

Minutes approved as presented March 6, 2015

Introductions
Contract Review
Updates
    Exemption Application
    St. Thomas professor Dr. Greg Mowry
    PSC Corey Singletary – policy changes at utility level

Solar: Predesign sizing calculator and estimated production by site
Microgrids
Power Management: Efficiency First, Focus on Energy lighting, waste water pumps
Grants& Finance
Next Steps
Links:
https://sam.nrel.gov/
National Renewable Energy Laboratory: The System Advisor Model (SAM) is a performance and financial model designed to facilitate decision making for people involved in the renewable energy industry.
http://www.grants.gov/web/grants/search-grants.html
    PD-13-7564: Communications, Circuits and Sensing Systems
    607: Energy Power and Adaptive Systems
    PD-14-7644:Fundamental solar for Sustainability
    EDAP 2014: Economic Development Assistance Program 2014
    EPA-62015-P3-Q2: National student design competition for sustainability
www.rurdev.**usda**.gov/had-cf_**grants**.html
    Community Facility grant
http://www.rurdev.usda.gov/UEP_HomePage.html

    USDA Rural Utilities Electric Program