



Warner Board of Selectmen

Meeting Minutes Wednesday, February 3, 2016 APPROVED

In attendance: Selectman Allan N. Brown, Selectman Clyde Carson, Selectman David Hartman, Town Administrator Jim Bingham, Ray Martin Water Precinct Administrative Assistant, Peter Newman Water Precinct Commissioner, Dan Lavoie Water District Commissioner, George Hart Representative from Harmony Energy Works, Kimberley Edelmann, Barbara Annis, Rick Davies, Ed Mical, Martha Mical, John Leavitt, Jonathan Lord, Jim McLaughlin, Peter Anderson, Lois Lord other members of the public.

- A.** Selectman Carson opened the meeting by saying the town used 151,000 kilowatts of electricity and was billed \$31,000 in a 12 month time period, the Library is the largest consumer of electricity of all of the town buildings, he showed the various meters that are read throughout the town and stated the hope is to offset this cost with the solar array. The cost of a 100 Kilowatt Array is \$345,870.

The legislature may be raising the cap for net metering but the town's application for that was submitted in December and approval has been received.

Eversource has told us they need to do upgrades on the poles going into the transfer station which could potentially cost \$30,000 which we are going to negotiate with them so it may be lower but for now are including that number in the project.

We are going to hire a Clerk of the Works to make sure the project is done properly and to certify that it works as advertised when it's completed; that cost is built into the project.

Site preparation will be done by the highway department who will clear the site, we may be able to sell some of the lumbar and they will do the stumping; that cost is \$13,000.

The total project cost is just under \$400,000. By staying under 100,000 kilowatts we qualify for state funding of \$75,000. Rural Development and the Community Develop Finance Authority are teaming together, are able to help the Water Precinct more than the town, part of that will be a grant and a loan at 3.4% interest. We will be financing about \$282,000 at a monthly payment of \$1,621 for the life of the project which is considered to be 20 years.

When we talked about the project early on we decided we wanted to make sure we could do it cost effectively and would do the project if it was cash positive. Harmony Energy has given us a conservative number of what we can expect to get out of the Solar Array which is 140,000-145,000 kilowatt hours of power a year. Based on the power fed back into the grid, the town will get a monthly or quarterly check from Eversource, the current rate for that is around .07 per kilowatt hour.

There are also energy credits. Every 1,000 watts produced is a credit which can be sold on the open market, there are different rates for those depending on the state. The current rate is .04-.055 per kilowatt hour.

Using the most conservative figures for those and the cost of \$31,000 for the towns energy for a 12 month period, yearly cost of the loan payments of \$19,500, yearly insurance on the array of \$300 and the savings of what is sold back to the grid of \$16500-\$17100 and the renewable energy credits of \$5600-\$8000, for the first year of the project we would save 8%-17% in our electric costs.

Selectman Carson turned the meeting over to Ray Martin to talk about the Precincts Solar Array.

- B.** Ray Martin said the Precincts Solar Array is very similar to the Towns; they would have three more panels so the cost is a bit more at \$347,000. The overall budget is \$360,000, they will get \$75,000 in state funding and will get a better deal and choice of grants one being a Community Development Block Grant for a possible \$69,000 which reduces the cost to what needs to be financed to \$216,000.

Most likely it will be financed through Rural Development and we are looking at a couple of others sources, the rate will be around 2.75%-2.8%. The Precinct gets a lower rate than the town because it's a water and sewer project and the also qualifies as a low-moderate income area.

The array will be placed at the water treatment plant so the electricity will go directly into the plant before it goes out into the grid. We pay \$2100-\$2200 monthly in electricity and \$1500 of that goes to the plant, the other is for the well site that pumps the water to fill the tanks and the pump station at McDonalds. We have 5 meters that would be in the net metering.

The Precinct will get a little higher credit because they will use it before sending it out whereas the town won't be using as much of it directly at the transfer station and highway garage.

The yearly electric costs for the Precinct are \$27,000, loan payment comes in at \$14,000, insurance is the same, net metering is \$17,400 and renewable energy credits are the same as the town. Our net cost of electricity average is \$17,000 for approximately \$9,770 savings expected the first year.

We don't have the \$30,000 cost of upgrading which the town will have to pay because we already upgraded our electrical because of the large usage we have at the plant and for the clarifier project that was done.

Ray turned the meeting over to George Hart from Harmony Electrical.

- C. George gave background on his company, in business since 2008, have done a lot of projects including Main Street Bookends in Warner, Brochu Nursery in Concord, Swampscott Beverage in Newfields and have a lot of experience with commercial projects. They are proposing a system that is very similar to others they have done.

A picture of the transfer station was shown with the location of the proposed solar array with three rows each with an inverter and one step down utility. George showed a picture of the water treatment plant with the location of their array of five rows that are tied directly to the facility.

The modules they use are made in America, minus zero or plus five for value, have a 25 year warranty for power production, and have an anti-reflective panel making them slightly less than the reflectivity of dirt.

In a traditional situation if a cloud passes over and reduces the power on one panel, you can get a reduction of 10% off of the entire string. Harmony uses an optimizer on every module so that if there is cloud cover that causes a degradation in power on one you still get 100% on the other modules in the string. Because of that, you typically have a 5-15% greater energy harvest.

Environmentally, an MIT study indicates that simply inadvertent poundage of CO2 we're talking over 5 million pounds of carbon dioxide over the 25 year period, in addition to nitrous oxide and well over 23,000 lbs, of Sulphur dioxide. In terms of making a significant environmental impact, with both of the arrays it is the equivalent of planting over 1400 acres of trees.

With our proposal to the town we wanted to insure there were no further expenses down the road. The solar panels and optimizers have a 25 year warranty, the inverters come with a standard 12 year warranty which we upgrade and pay for an increase to 25 years.

There is online monitoring and you can look at every single module and optimizer and how it performs. On a larger chart, you can compare performance with projections for a year.

- D. Selectman Carson opened the meeting up to questions from the public. (answers were provided by George Hart unless otherwise noted)

Is there a certain amount guaranteed on the grant? Rural Development has money available and has indicated \$25,000 is guaranteed. It was confirmed the rebate is guaranteed as well.

Have you taken into account rainy and snowy days? The projects made are based on the National Renewable Laboratory who has weather stations throughout the country and the closest one in Concord was used. It's a 25 year capture and average. We regularly see 10%-15% above what the projections are.

Ed Mical: How many panels for the town? George replied 361 per array. Ed: Each panel will be producing DC voltage going through a string. How high is the voltage? From the solar panel to the optimizer you're producing 38 volts. The output of the optimizer is around 400 volts. Ed: Are you using 1,000 watt wire? 1,000 or 2,000 which is becoming the standard. Ed: The setup is a safety hazard for fire personnel until you get to the inverter.

George: Part of the 2015 National Electric Code has something called rapid shutdown and solar inverters meet that code. As soon as you turn the switch, within 10 seconds the voltage must drop below 30 volts out of each optimizer and the whole string goes down to 30 volts.

Ed: What is the net metering based on? Selectman Carson answered, we got the numbers from the CDFA who is familiar with the market. It was clarified those are carbon credits. The net metering credit is the reimbursement from Eversource.

George: Each location will have an educational kiosk with a large screen monitor as well as handouts. Smartphones will be able to bring up the days production for the town.

Bob: Do you have a guarantee of the loan rate? Selectman Carson: We've applied for the loan which probably won't be approved until after town meeting but the rate they are talking is 3.4%.

Bill: How will global warming affect the array over the 25 year life period? I don't know and it depends on whether we're taking clearer skies or skies with more moisture.

Have you seen any patterns over the past 10-15 years? As the temperature rises we do know that solar is less efficient, on a cold day in March or April even with fewer days of sunlight they are more efficient. Dec/Jan /Feb have 2.2 hours of strong sunlight versus August with 6.5 hours.

John Leavitt: The extra 10 years of warranty on the inverter is not from the manufacturer right? It's a manufacturer's warranty and costs us, depending on the inverter, the ones at the transfer station about \$750 each; the other ones are about \$1100. I get shipped a new inverter, I replace and get paid by the manufacturer. How long has the inverter manufacturer been in business? About 12 years. How much do inverters cost? From \$2500 to \$3300.

Kimberley Edelman: If your company goes out of business, what is the position for Warner for support, warranties and service? The state requires us to give you a five year workmanship warranty. Beyond that we also give you a manual with schematics. The warranties are manufacturer warranties so it doesn't matter who installed them. Other solar companies could service them.

Rick Davies had a question on his home solar array which led to a discussion regarding inverter size and their dc value, overloading the converter, and the optimal angle of arrays.

Ed Mical asked Neil Nevins if the solar array they have installed at Bookends has met what it was designed for and Neil replied it has overproduced and they no longer have an electric bill.

Barbara: I'm not taking technical but aesthetics and have no idea how large the arrays are. A slide was shown of an array and George described each panel as 3x5, they are stacked 3 high. The distance is 70ft from the front to the rear and 210 ft. wide for the arrays at the transfer station. Those at the Water Precinct measure 140 ft. deep and 128 ft. wide. Barbara asked about the problem of snow accumulation on the panels and was told the angle at 37 degrees is high enough that the snow won't accumulate easily and can be removed with a traditional snow rake with a plastic blade or brush if necessary. The leading edge of the array is 4 feet off of the ground and in most years snow does not pile up that high.

Is there going to be a lot of tree clearing to get the efficiency, specifically at the water treatment plant? Ray Martin showed the areas that would need to be cleared. What are the efficiencies of that site? Ray replied both companies that submitted proposals walked the site and said the arrays can be aligned to 180 degrees and would be very efficient. George said they use something called a solar path finder that allows them to see shade for an entire year so can determine exactly which trees need to be removed.

John Leavitt asked how the array at the water treatment plant would affect the snowmobile trail. Ray replied that is being worked on, they may go around or in between them.

The Town Administrator asked George if he had a sense of whether they're looking at upgrades for existing arrays versus them becoming obsolete, for example with the inverters that can be swapped out. George replied the only ones he knows that produce something like that are Selectria out of Massachusetts and they are already at 98% efficiency. Five years ago the low end was around 96.5% so in the last three years they've only gained 2%. The largest change has come through optimizers with 8-15 percentage points in difference.

Linda Hartman: Do you have any plans to protect them against vandalism? Selectman Carson said they have

talked about that, the ones in the precinct will be within a fence. At the Transfer Station, they didn't do anything up front as they want it to be accessible. If there is a problem they can gate it down below.

George said they use something called "prison hardware" and you have to have a special driver to take it off to remove any modules. He did research and couldn't find one instance of solar panels being stolen in New Hampshire. He has heard of it happening in California but hasn't heard of anyone vandalizing them by shooting at them or trying to break them. They are durable and are tested with 1.5 inch ice balls fired at 40 miles an hour to simulate severe hail storms.

Selectman Carson noted they had allocated an hour for this meeting and were now at an hour and 15 minutes. He said if anyone has more questions they will be around after this meeting and there is another public information scheduled for March 3rd.

- E.** Chairman Hartman closed the Solar Array Public Hearing at 8:12 p.m. The Water District Solar Array Public Hearing was closed at 8:12 as well.

Board of Selectmen
David E. Hartman
Clyde Carson
Allan N. Brown

Recorder of the minutes: Lois Lord