

M.L. 2016 Project Abstract

For the Period Ending June 30, 2018

PROJECT TITLE: Community Solar Garden Installation

PROJECT MANAGER: BJ Allen

AFFILIATION: Rural Renewable Energy Alliance

MAILING ADDRESS: 3963 8th Street SW

CITY/STATE/ZIP: Backus, MN 56435

PHONE: 218-947-3779 ; 218-209-5584 (BJ Allen, Project Manager direct)

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FUNDING SOURCE: Environment and Natural Resources Trust Fund

LEGAL CITATION: M.L. 2016, Chp. 186, Sec. 2, Subd. 07a

APPROPRIATION AMOUNT: \$490,000

AMOUNT SPENT: \$474,254

AMOUNT REMAINING: \$15,746

Overall Project Outcome and Results

This project installed a community solar garden to provide for electrical distribution in Cass, Beltrami, Hubbard, and Itasca Counties, to assist households in the Leech Lake Band of Ojibwe low-income home energy assistance program in meeting electrical energy needs and serve as a model for low-income energy assistance elsewhere in the state. Beneficiaries are to be residents of the Leech Lake Band of Ojibwe Reservation.

Low-income households devote a significantly greater percentage of their income to home energy than the average household. Currently, energy assistance programs offer temporary relief but don't provide a long-term solution to low-income energy poverty, and depend on imported fossil fuels. Utilizing Minnesota solar energy to meet this need is innovative and desirable in preserving Minnesota's valuable natural resources.

This project responds to the growing natural resource impacts of using imported, fossil fuels to supply Minnesota's low-income energy needs. The community solar system help increase the state's annual renewable energy production, and offsetting an estimated 217 tons of carbon dioxide emissions. This project has reduced carbon emissions to help slow climate change, increasing utilization of local power generation, improve energy security and affordability, and create low-income access to renewable energy.

This project successfully installed 217.58kW of solar energy that is producing 281,420kWh annually, enough to completely power 27 Minnesota homes. The systems will serve low-income Leech Lake families for the next 30 years. This was celebrated as the first community solar installation on Tribal lands in the country, and is providing inspiration to individuals around the nation seeking to deploy solar energy for the benefit of low-income people.

Project Results Use and Dissemination

As a central feature of the Rural Renewable Energy Alliance's efforts to increase access to solar energy for low-income households as a means of permanently addressing energy poverty, the results of this project have been disseminated at the national level. Presentations specifically about this project have

been given at the following national events: National Energy Utility Affordability Conference (NEUAC), Clean Energy States Alliance webinar (CESA), American Solar Energy Society – US Department of Energy – Solar in Your Community Challenge conference. The project has further been presented at the following regional events: Connecting Low Income Communities to Efficiency and Renewable Sources meeting, Clean Energy Resource Teams Conference, RE-AMP Network Conference, Northern New England Community Action Conference, Minnesota Department of Commerce presentations, Great Plains Institute presentations, and at two Midwest Renewable Energy Fair. Reports resulting from this project have been disseminated at all the above venues, as well as being available through our website <https://www.rreal.org/cs4ca> , and Facebook page https://www.facebook.com/pg/ruralrenewableenergyalliance/photos/?tab=album&album_id=10154750786849241



Environment and Natural Resources Trust Fund (ENRTF) M.L. 2016 Work Plan Final Report

Date of Report: August 16, 2018

Final report

Date of Work Plan Approval: June 7, 2016

Project Completion Date: June 30, 2018

PROJECT TITLE: Community Solar Garden Installation

Project Manager: BJ Allen

Organization: Rural Renewable Energy Alliance

Mailing Address: 3963 8th Street SW

City/State/Zip Code: Backus, MN 56435

Telephone Number: (218) 947-3779 ; (218) 209-5584 (BJ Allen, Project Manager direct)

Email Address: info@rreal.org ; bj@rreal.org (BJ Allen, Project Manager direct)

Web Address: www.rreal.org

Location: Beltrami, Cass, Hubbard, Itasca

Total ENRTF Project Budget:

ENRTF Appropriation: \$490,000

Amount Spent: \$474,254

Balance: \$15,746

Legal Citation: M.L. 2016, Chp. 186, Sec. 2, Subd. 07a

Appropriation Language:

\$490,000 the second year is from the trust fund to the commissioner of natural resources for an agreement with Rural Renewable Energy Alliance to install a 200-kilowatt community solar garden to provide for electrical distribution in Cass, Beltrami, Hubbard, and Itasca Counties, to assist households in the Minnesota low-income housing energy assistance program in meeting electrical energy needs and serve as a model for low-income energy assistance elsewhere in the state. This appropriation is not subject to Minnesota Statutes, section 116P.10.

I. PROJECT TITLE: Community Solar Garden Installation

II. PROJECT STATEMENT:

The *Community Solar Garden Installation* project will install a 200 kilowatt community solar garden, a centrally-located solar photovoltaic system that provides electricity to participating subscribers off-site, as a new fiscally appropriate model of low-income energy assistance. The electricity generated from this community solar garden will be designated to recipients of Minnesota's Low-Income Home Energy Assistance Program (LIHEAP). The system will be installed in northern Minnesota in either Cass, Beltrami, Hubbard, or Itasca County, with the goals of serving low-income Leech Lake Band of Ojibwe band members, and demonstrating the efficacy of utilizing community solar gardens to meet the energy needs of low-income households to local, state, and national Energy Assistance and Weatherization Assistance Programs.

Low-income households devote a significantly greater percentage of their income to home energy than the average household. This fact has been exacerbated over the past 15 years with declining real household incomes, felt most sharply in the lowest quintile segment.¹ Meanwhile, fuel costs are increasing. Currently, energy assistance programs offer temporary relief but don't provide a long-term solution to low-income energy poverty and depend on imported fossil fuels. Utilizing Minnesota solar energy to meet this need is innovative and desirable in preserving Minnesota's valuable natural resources.

This project responds to the growing natural resource impacts of using imported, fossil fuels to supply Minnesota's low-income energy needs. The solar energy system will increase the state's annual renewable energy production by an estimated 285,705 kilowatt hours², thereby offsetting an estimated 217 tons of annual carbon dioxide emissions.³ Project goals include reducing carbon emissions to prevent further climate change, increasing utilization of local power generation, improving energy security and affordability, and creating low-income access to renewable energy.

In collaboration with the Leech Lake Band of Ojibwe Energy Assistance Program, the project will annually serve between 75 and 100 low-income Leech Lake families for the next 30 years. This will be the first community solar installation on Tribal lands in the country, and will provide a model to individuals around the nation seeking to deploy community solar to benefit low-income people.

¹ Doug Short, U.S. Household Incomes: A 47-Year Perspective, Advisor Perspectives

² National Renewable Energy Laboratory (NREL) PV Watts® Calculator

³ Environmental Protection Agency (EPA) Greenhouse Gas Equivalencies Calculator

III. OVERALL PROJECT STATUS UPDATES:

Project Status as of January 1, 2017: Construction of the 200 kilowatt community solar garden has begun, with one-fifth of the project complete, online, and producing power to benefit low income Leech Lake Energy Assistance recipients. Site selection and system design is in process for the remaining portion of the project. Various partners at the Leech Lake Band have been very engaged in the project, and the Band won an award from the MN Department of Commerce earlier this year for the project. The location for this system is at Prescott Community Center, 14148 68th Ave NW, about 10 miles southwest of Cass Lake, MN. The Prescott Community Center is on Leech Lake Band Reservation land. The Community Center has a playground onsite, and features a number of community programs, from Summer Food Service for kids, to voting, and much more.

This portion of the project is projected to produce 49,153kWh annually [PVWatts Calculator <http://pvwatts.nrel.gov/pvwatts.php>], and is interconnected with Beltrami Electric Cooperative's grid. The system is currently compensated at the net metering retail rate, which is \$0.1069/kWh. This first portion of the system will generate around \$5,250 annually to benefit low income Leech Lake families, totaling over \$131,250 over twenty-five years, the warranty period of the PV modules. Note that amount is not including an increase in the cost of energy which would increase the compensation rate accordingly.

Collaborating entities engaged within the Leech Lake Band include the Division of Resource Management, Leech Lake Financial Services, the Leech Lake Energy Assistance Program, Leech Lake Housing, the Leech Lake Tribal Council, the Leech Lake Tribal College, and Leech Lake Facilities Management.

Additional funds have been procured through the Initiative Foundation, a regional foundation, to support paid interns from the Leech Lake Tribal College construction trades program to participate in the project. In collaboration with Tribal College instructors, RREAL interviewed and hired three interns, assisting them with applying for and receiving their Registered Unlicensed Individual (RUI) certificates issued through the Department of Labor and Industry, required for work on solar electric installations throughout the State of MN.

Project Status as of July 1, 2017: A total of 172.98kW have been constructed to-date, with construction of the remaining portion slated to begin within the next few weeks. The current total capacity is projected to produce 214,858kWh annually [PVWatts Calculator <http://pvwatts.nrel.gov/pvwatts.php>], and is interconnected with Beltrami Electric Cooperative, MN Power, and Lake Country Power's grids. This portion of the system is projected to generate around \$20,000 of power annually to benefit low income Leech Lake families.

With the final system construction beginning soon, a ribbon-cutting ceremony is scheduled to occur at Prescott Community Center on the Leech Lake Reservation, Tuesday, August 15th from 1-3pm. LCCMR staff would be very welcome to join us in this celebration of success. Collaborating engaged entities include the Leech Lake Tribal Council, Leech Lake Tribal College, Leech Lake Division of Resource Management, Leech Lake Energy Assistance, Leech Lake Facilities Management, and Leech Lake Housing.

The Leech Lake Band won a Clean Energy Community Award from the MN Department of Commerce for their efforts in this project. RREAL, Leech Lake, and other partners are recipients of an award from the US Department of Energy to continue to demonstrate a viable model to deliver solar energy to low income households around the United States, through the ongoing *Solar in Your Community Challenge*.

Project Status as of January 22, 2018: A total of 217.58kW have been constructed to-date. The total capacity is projected to produce 281,420kWh annually [PVWatts Calculator <http://pvwatts.nrel.gov/pvwatts.php>], and is interconnected with Beltrami Electric Cooperative, MN Power, and Lake Country Power's grids. It will generate approximately \$26,000 worth of power annually to benefit low income Leech Lake families.

A ribbon-cutting ceremony was held on August 14, 2017 to celebrate and bless the project with drumming, storytelling, and many guests. It was held at Prescott Community Center, with about 60 attendees welcomed, variously representing the Leech Lake Division of Resource Management, Leech Lake Tribal Council, Leech Lake Tribal College construction trades interns who were involved in the project, Leech Lake Housing, the Initiative Foundation, and even a Commissioner from the LCCMR amongst other guests.

There remain a few construction details to be completed, along with reporting and other administrative work.

Amendment Request as of October 17, 2016:

We are requesting an amendment for two items.

Roger Garton is listed as the Technical Director for RREAL, but as of September 2016, he is no longer employed at RREAL. We would therefore like to re-allocate his salary expenses for the project to other members of the RREAL team who are conducting Project Management activities.

We further request an extension on our proposed timeline, as activities completion will require more time than originally anticipated and follow a phased approach.

Amendment Approved: [11/02/2016]

Amendment Request as of January 2, 2017:

We are requesting an amendment as detailed below.

To install a total of 200kW of community solar gardens to provide for electrical distribution in Cass, Beltrami, Hubbard, and Itasca Counties, to assist households in the Minnesota low-income housing energy assistance program in meeting electrical energy needs and serve as a model for low-income energy assistance elsewhere in the state.

Minnesota State law provides legislation for community-owned community solar arrays exclusively in Xcel Energy utility service territory. Some other electric utilities have adopted voluntary community solar programs, but are not required by law to do so, and the vast majority of these voluntary programs have been utility-owned. Since one of the common complaints from utilities about solar integration is that increased rate costs as a result of incorporating distributed renewable energy are borne by low income ratepayers, delivering solar energy directly to benefit low income ratepayers would logically address that concern.

Further, Beltrami Electric Cooperative, one of the utilities that serves the Leech Lake Band of Ojibwe, was in the midst of planning a utility-driven community solar garden, but the project was languishing as they had yet to achieve the 50% subscription target desired for construction to commence. Therefore, at the outset of this project, the team at RREAL, along with our partners at the Leech Lake Band of Ojibwe, were optimistic that for our mutual benefit, we would be able to integrate this project with a planned community solar garden at Beltrami Electric Cooperative utility. Following months of negotiation with the utility, however, the final hurdle became the ownership of the asset. In order to move forward, the utility required ownership of the asset, which was understandably unacceptable to the Tribe, LCCMR, and other stakeholders.

With integration into the planned community solar garden at Beltrami Electric Cooperative no longer an option, remaining potential options included a Power Purchase Agreement with the entity producing power for Beltrami, Minnkota, at avoided cost (at the time of initial discussion, \$0.017/kWh); a Power Purchase Agreement with Beltrami Electric for about twice that amount, at \$0.04/kWh; or aggregating scattered smaller solar gardens to 200kW that would comply with Statute 216B.164 at being less than 40kW AC and achieving net metering at the retail rate, over 4 times the avoided cost level from Minnkota. Minnesota Statute 216B.164 Cogeneration and Small Power Production, <https://www.revisor.mn.gov/statutes/?id=216B.164>, requires all electric utilities in Minnesota to interconnect with and purchase electricity at the average retail utility energy rate from cogenerators and small power producers.

A Power Purchase Agreement would require Beltrami Electric to request a waiver to their exclusivity purchase agreement with Minnkota. After negotiations stopped with the community solar ownership discussion, it is unlikely Beltrami would still agree to do this, as electric cooperatives are not required by law to interconnect systems larger than 40kW AC.

Projecting annual power production for 200kW of PV installed in northern Minnesota with NREL's PV Watts calculator, assuming 20% system losses, there will be 209,917kWh of AC power to harvest annually. The retail rate of the utilities serving the Leech Lake Band varies, but averages about \$0.094/kWh. Compensation for the system power production annually at the retail rate would equal roughly \$19,730. For the sake of comparison, compensation for system power production annually at Minnkota's avoided cost rate would equal roughly \$3,570. Over the 25-year lifespan of the modules, the difference becomes truly stark, assuming no increase in the cost of energy: \$493,250 at the retail rate, versus \$89,250.

To achieve the same goal outlined in the original application, to install a total of 200kW of community solar with benefits flowing to low income households through the Leech Lake Energy Assistance Program, the greatest

benefit will flow to those same households by installing systems that are 40kW AC or less in several sites, at least five sites. **This will still achieve the same amount of pollution reduction, and further supply the same amount of additional renewable energy to the Minnesota grid as proposed.** With systems being located in Cass, Beltrami, Hubbard, and Itasca counties, and the benefits from all of these systems flowing to low income Leech Lake Band members, the spirit of the original application is intact, while working within the constraints and realities of grid integration for distributed energy generation facilities in Minnesota. With fairness and equality a major concern on the Reservation, this further would allay any potential misconceptions regarding system benefits, as systems could be located in different utility service territories, around different Districts or areas on the Reservation.

Additional unaffected project goals include reducing carbon emissions to prevent further climate change, increasing utilization of local power generation, and improving energy security and affordability. It should be noted that installing the 200kW in scattered sites will be the best outcome for the community, with a significant difference in total benefit over the life of the system, and one which we are therefore prepared to realize.

Some background on the Low Income Home Energy Assistance Program (LIHEAP): A federally-funded program on an annual appropriations basis, LIHEAP is managed through the U.S. Department of Health and Human Services (DHHS). Funds are then sent to states, with the Department of Commerce managing the program in MN. Finally, funds get allocated to local entities. Local entities receive and evaluate applications, work with local utilities, and conduct other programming. Low income households and individuals apply for assistance to these local entities on an annual basis, and must meet the income threshold and other application requirements in order to receive assistance. Income eligibility requirements are currently 50% at or below State Median Income (SMI) <https://mn.gov/commerce/consumers/consumer-assistance/energy-assistance/>. The bulk of energy assistance goes to direct bill assistance for low income households, but funds are also allocated to emergency repairs or replacements, education and outreach, and weatherization efforts. According to the MN Department of Commerce, only about 1/3 of eligible households receive energy assistance statewide. Leech Lake Band of Ojibwe Energy Assistance accepts applications from low income households within their service territory, through their Energy Assistance program. Counties in which the Reservation is located have separate programs for non-tribal residents: in Beltrami County, Bi-CAP; Cass County, Bi-CAP; Hubbard County, Mahube-Otwa CAP; Itasca, Kootasca CA (<https://mn.gov/commerce/consumers/your-home/save-energy-money/low-income-assistance/eap/eap-service-providers.jsp>).

In summary, the requested change is to install a total of 200kW of community solar gardens in Cass, Beltrami, Hubbard, and Itasca Counties that will benefit low income Leech Lake households through the Leech Lake Energy Assistance program.

Amendment Approved: [01/26/2017]

Amendment Request as of January 22, 2018:

We are requesting an amendment to the budget. We are requesting to move some of the remaining funds from Personnel in one Activity to Personnel in two other Activities. As of the reimbursement request submitted in December 2017, there remained \$8,539.35 in Personnel, all in Activity 3: Construction, Commissioning. There is presently a negative balance in Activity 1 under Personnel, and we request for \$49 to be moved from Activity 3 Personnel to Activity 1 Personnel to eliminate that negative balance. There is further a negative balance of \$175 in Activity 4 Personnel. Activity 4 is Reporting, and we underestimated the funding this would require. There is further still quite a bit of work to be completed in this area. Therefore, we request to move \$6,000 to Activity 4: Reporting. These two changes would leave \$2,714 for Personnel under Activity 3: Construction, Commissioning, which should be sufficient for remaining required work. Finally, we request an extension to our Activity 4 timeline to go through May 2018 to accommodate the effort required.

Overall Project Outcomes and Results: A total of 217.58kW was constructed. The total capacity is projected to produce 281,420kWh annually [PVWatts Calculator <http://pvwatts.nrel.gov/pvwatts.php>], and is interconnected with Beltrami Electric Cooperative, MN Power, and Lake Country Power's grids. It will generate approximately \$26,000 worth of power annually over the next 25 years to benefit low income Leech Lake families.

IV. PROJECT ACTIVITIES AND OUTCOMES:

Activity 1: Solar Assessment, Analysis and Design at Community Solar Site

Prior to July 2016 utilizing secured funding through the McKnight Foundation, in collaboration with the Leech Lake Band of Ojibwe, RREAL will select several potential sites on tribal property, with the RREAL property located in Backus as a back-up. Approximately 2 acres will be required for the facility. After July 1, 2016, RREAL will then perform a comprehensive solar site assessment and analysis for the 200 kilowatt Community Solar Garden Photovoltaic array in the best locations within Cass, Beltrami, Hubbard, or Itasca County. The solar site suitability and system design will be conducted in collaboration with one of the four utilities that supplies power to the Leech Lake Reservation.

Summary Budget Information for Activity 1:

ENRTF Budget: **\$10,549**
Amount Spent: **\$ 10,518**
Balance: **\$ 31**

| Outcome | Completion Date |
|--|-----------------|
| 1. Creation of comprehensive solar site assessment at selected location. | July 15, 2017 |
| 2. Generation of a site-specific solar design for site. | July 31, 2017 |

Activity Status as of January 1, 2017: Solar site assessments have been completed on several sites, and system design for the first portion of the system has been completed.

Activity Status as of July 1, 2017: Solar site assessments have been completed and system design for most of the system has been completed.

Project Status as of January 12, 2018: Solar site assessments have been completed and system design has been completed.

Final Report Summary: July 1, 2018: Solar site assessments and system design were completed.

Activity 2: Community Solar Garden Materials Procurement

During this phase of the project, the project management plan will be formalized. Professional Engineering services will also be obtained for geotechnical services, and electrical and structural analysis. Based upon the project location, permits and interconnection agreements from the local utility and local authorities will be procured in collaboration with Leech Lake Band of Ojibwe. Given the system design specifications, solar equipment and ancillary materials will be purchased and received at RREAL.

Summary Budget Information for Activity 2:

ENRTF Budget: **\$416,159**
Amount Spent: **\$402,265**
Balance: **\$ 13,894**

| Outcome | Completion Date |
|---------|-----------------|
| | |

| | |
|--|-------------------|
| 1. Preparation of project management plan. | August 15, 2017 |
| 2. Professional engineering services for electrical, structural, and geotechnical analysis. | September 1, 2017 |
| 3. Procurement of the following permits, and utility agreements: - County building permit - Interconnection agreement from local utility | September 1, 2017 |
| 4. Purchase of equipment and materials to be used in the construction of the community solar garden, including approximately 488 Minnesota-made photovoltaic modules, racking, inverters, electrical parts, hardware, fencing, and additional system components. | September 1, 2017 |
| 5. All equipment and materials will have been received and placed in inventory until construction start date. | October 1, 2017 |

Activity Status as of January 1, 2017: A project management plan was created for the first portion of the project. Utility agreements and permits were procured for the first portion of the project. Equipment and materials for the first portion of the project have been ordered and received, and the project management plan and some materials for the second portion of the project have been ordered and received.

Activity Status as of July 1, 2017: Project management plans have been created for the project. Utility agreements and permits have been procured for the project. About 80% of the equipment and materials for the project have been ordered and received.

Project Status as of January 12, 2018: Project management plans have been created for the project. Utility agreements and permits have been procured for the project. Equipment and materials for the project have been ordered and received.

Final Report Summary: Plans were created for the project. Utility interconnection agreements and permits were procured for the project. Equipment and materials for the project were ordered and received.

Activity 3: Construction and Commissioning of Community Solar Garden Array

According to the Project Management plan established during Activity 2, RREAL will begin construction of the community solar garden. Following installation, the system is anticipated to be inspected and commissioned by mid-November, 2017.

Summary Budget Information for Activity 3:

ENRTF Budget: \$ 52,292
Amount Spent: \$ 50,471
Balance: \$ 1,821

| Outcome | Completion Date |
|--|--------------------|
| 1. Installation phase 1: footings | September 15, 2017 |
| 2. Installation phase 2: racking | September 30, 2017 |
| 3. Installation phase 3: modules and inverters | October 15, 2017 |
| 4. Installation phase 4: trenching and electrical, production meter, fencing | October 31, 2017 |
| 5. Installation phase 5: inspection and commission | November 15, 2017 |

Activity Status as of January 1, 2017: One-fifth of the project (43.4 kW DC) has been installed on Leech Lake Band property southwest of Cass Lake, and is producing power to benefit low-income Band members.

Activity Status as of July 1, 2017: Over four-fifths of the total project (172.98kW DC) has been installed. Three-fifths of the project has been commissioned and is producing power to benefit low-income Band members. An additional one-fifth of the project is scheduled for commissioning next week, while the final one-fifth of the project is scheduled for construction within the next few weeks.

Project Status as of January 12, 2018: The bulk of the project has been completed. All systems have been commissioned, and are producing power to benefit low-income Band members. There are just a few remaining details to be wrapped up.

Final Report Summary: The installations have been completed, with a total of 217.58kW installed.

Activity 4: Report Generation and Project Dissemination

RREAL will summarize the project results and the developed replicable model, presenting the findings and recommendations to the U.S. low-income energy assistance and weatherization communities. The report will also be disseminated through the President's National Community Solar Partnership, and to the public at-large.

Summary Budget Information for Activity 4:

ENRTF Budget: \$ 11,000

Amount Spent: \$ 11,000

Balance: \$ 0

| Outcome | Completion Date |
|--|-----------------|
| 1. Report generation. | March 2018 |
| 2. Dissemination to national energy assistance and weatherization community. | May 2018 |

Activity Status as of January 1, 2017: With the use of additional resources, RREAL has been working hard to develop a replicable model and this is a work-in-progress. Reports have not yet been disseminated.

Activity Status as of July 1, 2017: With the use of additional resources, RREAL has been working hard to develop a replicable model and this is a work-in-progress. Reports have not yet been disseminated.

Project Status as of January 12, 2018: RREAL has been working hard to develop a replicable model and this is a work-in-progress. Reports have not yet been disseminated.

Final Report Summary: In collaboration with one of our partners, RREAL has developed a case study on this model, and is actively replicating it in Vermont and Kansas, and working to replicate it elsewhere too. This project has been presented at the following national events: National Energy Utility Affordability Conference (NEUAC), Clean Energy States Alliance webinar (CESA), American Solar Energy Society – US Department of Energy – Solar in Your Community Challenge conference. The project has further been presented at the following regional events: Connecting Low Income Communities to Efficiency and Renewable Sources meeting, Clean Energy Resource Teams Conference, RE-AMP Network Conference, Northern New England Community Action Conference, Minnesota Department of Commerce presentations, Great Plains Institute presentations, and at two Midwest Renewable Energy Fair. Reports resulting from this project have been disseminated at all the above venues, as well as being available through our website, and Facebook page.

V. DISSEMINATION:

Description: RREAL will summarize the project results and the developed replicable model, presenting the findings and recommendations to the U.S. Low-Income Home Energy Assistance and Weatherization communities. The report will also be disseminated through the National Community Solar Partnership of which RREAL is a partner, and to the public at-large through RREAL's website, at <http://www.rreal.org/#!community-solar-for-community-action/c1tpi> .

Status as of January 1, 2017: With the use of additional resources, RREAL has been working hard to develop a replicable model and this is a work-in-progress. Reports have not yet been disseminated.

Status as of July 1, 2017: With the use of additional resources, RREAL has been working hard to develop a replicable model and this is a work-in-progress. Reports have not yet been disseminated.

Project Status as of January 1, 2018: RREAL has been working hard to develop a replicable model and this is a work-in-progress. Reports have not yet been disseminated.

Final Report Summary: This project has been presented at the following national events: National Energy Utility Affordability Conference (NEUAC), Clean Energy States Alliance webinar (CESA), American Solar Energy Society – US Department of Energy – Solar in Your Community Challenge conference. The project has further been presented at the following regional events: Connecting Low Income Communities to Efficiency and Renewable Sources meeting, Clean Energy Resource Teams Conference, RE-AMP Network Conference, Northern New England Community Action Conference, Minnesota Department of Commerce presentations, Great Plains Institute presentations, and at two Midwest Renewable Energy Fair. Reports resulting from this project have been disseminated at all the above venues, as well as being available through our website <https://www.rreal.org/cs4ca>, and Facebook page

https://www.facebook.com/pg/ruralrenewableenergyalliance/photos/?tab=album&album_id=10154750786849241

VI. PROJECT BUDGET SUMMARY:

A. ENRTF Budget Overview:

| Budget Category | \$ Amount | Overview Explanation |
|---|-------------------|--|
| Personnel: | \$ 65,950 | 1 Master Electrician labor at 18%FTE (\$11,700); Installation Technicians labor at 54%FTE for one person (\$29,250); Project Management at 31% FTE (\$20,000); Director at 4% FTE (\$3,000); and Program support staff at 3% FTE (\$2,000) |
| Professional/Technical/Service Contracts: | \$ 16,646 | Professional Engineering services for electrical, geotechnical and structural; and permits and inspections |
| Equipment/Tools/Supplies: | \$ 820 | Equipment rental |
| Capital Expenditures over \$5,000: | \$ 399,513 | PV modules (\$203,811); Racking (\$73,032); Inverters (\$32,080); Electrical parts (\$23,527); Footings (\$31,820); Fencing (\$35,243) |
| Travel Expenses in MN: | \$ 7,071 | Mileage (\$4,500); Lodging (\$2,571) |
| TOTAL ENRTF BUDGET: | \$ 490,000 | |

Explanation of Use of Classified Staff: The Director of RREAL, Jason Edens, is not classified staff, but will be dedicating time directly to this effort, and will specifically be coordinating between Leech Lake, Leech Lake Energy Assistance, and the utility for property use, client identification, and benefit transfer.

Explanation of Capital Expenditures Greater Than \$5,000: With a contract agreement between Leech Lake Band of Ojibwe and RREAL, equipment will be dedicated to benefit low-income tribal residents throughout its useful life, which is anticipated to be 30 years. The agreement will commit Leech Lake Band of Ojibwe to keeping the system in service for this explicit purpose throughout its service life.

Number of Full-time Equivalents (FTE) Directly Funded with this ENRTF Appropriation: 1.1FTEs

Number of Full-time Equivalents (FTE) Estimated to Be Funded through Contracts with this ENRTF Appropriation: 0.15FTEs

B. Other Funds:

| Source of Funds | \$ Amount Proposed | \$ Amount Spent | Use of Other Funds |
|-----------------|--------------------|-----------------|--------------------|
| Non-state | | | |

| | | | |
|---|------------------|------------------|---|
| McKnight Foundation (Cash support) | \$170,000 | \$170,000 | Solar garden preparation activities, and coordination with collaborators. |
| Leech Lake Band of Ojibwe (In-kind support) | \$ 20,000 | \$ 20,000 | General project support and implementation. |
| TOTAL OTHER FUNDS: | \$190,000 | \$190,000 | |

VII. PROJECT STRATEGY:

A. Project Partners:

The Rural Renewable Energy Alliance (RREAL) will be the project lead and recipient of the funding request to the Environmental and Natural Resources Trust Fund. RREAL will lead the site assessment process, design, and installation of the community solar garden. RREAL will work alongside project partners including Leech Lake Band of Ojibwe, a nonprofit organization that assists in rural cooperative utility negotiations, the local utility to ensure the project design aligns with necessary utility needs, and the Minnesota Community Action Partnership to ensure the project design aligns with energy assistance programming frameworks. These partners will contribute to the implementation of the community solar array through in-kind support.

B. Project Impact and Long-term Strategy:

RREAL will develop a planning, financing and implementation model for low-income community solar gardens. While historically RREAL has installed solar electric and solar thermal systems on the individual homes of low-income families, utilizing the community solar model will allow us to reach a greater number of beneficiaries in a more efficient manner. Community solar overcomes common barriers to residential solar deployment including inadequate site based solar resource. Working within the existing Energy Assistance program framework prevents duplication of effort since the program is already identifying low-income households, and has a relationship with their regional utilities through beneficiary designation and fund transfers.

The results of this effort will be disseminated to statewide, regional and national Energy Assistance and Weatherization Assistance service providers so that the project can be successfully replicated and scaled in other geographies, thereby expanding the impact that solar contributes to Minnesota's environment and renewable energy production. The results will also be disseminated to the National Community Solar Partnership.

C. Funding History:

| Funding Source and Use of Funds | Funding Timeframe | \$ Amount |
|---|-------------------------------|-----------|
| Environment and Natural Resources Trust Fund – M.L. 2016: Appropriation of cash funds used to reduce energy poverty through solar deployment in the project region. | July 1, 2016 – June 30, 2018 | \$490,000 |
| McKnight Foundation – community solar for community action program development | November 2014 – November 2016 | \$170,000 |

VIII. FEE TITLE ACQUISITION/CONSERVATION EASEMENT/RESTORATION REQUIREMENTS:

N/A

IX. VISUAL COMPONENT or MAP(S):

See attachments entitled "Solar Installation Site and Design Graphics."

X. RESEARCH ADDENDUM:

N/A

XI. REPORTING REQUIREMENTS:

Periodic work plan status update reports will be submitted no later than January 1, 2017, July 1, 2017, and January 1, 2018. A final report and associated products will be submitted between June 30 and August 15, 2018.

Environment and Natural Resources Trust Fund
M.L. 2016 Project Budget

Project Title: Community Solar Garden Installation

Legal Citation: Laws of Minnesota 2016, Chapter 186, Section 2, Subdivision 07a□

Project Manager: BJ Allen

Organization: Rural Renewable Energy Alliance

M.L. 2016 ENRTF Appropriation: \$ 490,000

Project Length and Completion Date: 2 Years, June 30, 2018

Date of Report: August 16, 2018



| ENVIRONMENT AND NATURAL RESOURCES TRUST FUND BUDGET | Activity 1 Budget | Amount Spent | Activity 1 Balance | Activity 2 Budget | Amount Spent | Activity 2 Balance | Activity 3 Budget | Amount Spent | Activity 3 Balance | Activity 4 Budget | Amount Spent | Activity 4 Balance | TOTAL BUDGET | TOTAL BALANCE |
|---|---|-----------------|--------------------|---|------------------|--------------------|--|-----------------|--------------------------------------|-------------------|-----------------|--------------------|------------------|-----------------|
| BUDGET ITEM | Solar Assessment, Analysis and Design at | | | Community Solar Garden Procurement | | | Construction and Commissioning of | | Report Generation and Project | | | | | |
| Personnel (Wages and Benefits) | \$10,049 | \$10,049 | \$0 | \$0 | \$0 | \$0 | \$44,901 | \$44,901 | \$0 | \$11,000 | \$11,000 | \$0 | \$65,950 | \$0 |
| Master Electrician Joel Lindstrom: \$11,700 (70% salary, 30% benefits); 18% FTE for one year | | \$1,121 | | | | | | \$7,144 | | | | | | |
| Project Managers \$20,000 (70% salary, 30% benefits); 31% FTE for one year | | \$5,927 | | | | | | \$2,864 | | | \$2,153 | | | |
| Installation Technicians: \$29,250 (70% salary, 30% benefits); 54% FTE for one year for one person | | | | | | | | \$34,893 | | | | | | |
| Jason Edens, Director: \$3,000 (70% salary; 30% benefits); 4% FTE for one year | | \$3,000 | | | | | | | | | | | | |
| Program support staff: \$2,000 (70% salary; 30% benefits); 3% FTE for one year | | | | | | | | | | | \$8,847 | | | |
| Professional/Technical/Service Contracts | | | | \$16,646 | \$11,146 | \$5,500 | | | | | | | \$16,646 | \$5,500 |
| Professional Engineering Services: Electrical Engineering subcontract with Gausman and Moore (\$3,500) | | | | | | | | | | | | | | |
| Professional Engineering Services: Geotechnical Report Subcontract with Meyer Borgman and Johnson (\$1,500) | | | | | \$6,400 | | | | | | | | | |
| Professional Engineering Services: Structural Review Subcontract with Meyer Borgman and Johnson (\$6,000) | | | | | \$1,000 | | | | | | | | | |
| Electrical Permits & Inspection (\$5,646) | | | | | \$3,746 | | | | | | | | | |
| Equipment/Tools/Supplies | | | | | | | \$820 | \$0 | \$820 | | | | \$820 | \$820 |
| Equipment Rental (Heavy equipment handler, trailer for transport) | | | | | | | | | | | | | | |
| Capital Expenditures Over \$5,000: Solar equipment and installation (\$399,513) | | | | \$399,513 | \$391,119 | \$8,394 | | | | | | | \$399,513 | \$8,394 |
| Made in Minnesota PV (Photovoltaic, or solar electric) Modules, 310W, 72-cell or comparable (with shipping) (\$203,811) | | | | | \$207,948 | | | | | | | | | |
| Ground-Mount Racking (with shipping) (\$73,032) | | | | | \$47,287 | | | | | | | | | |
| Inverters (with shipping) (\$32,080) | | | | | \$55,489 | | | | | | | | | |
| Electrical Parts - Array, Underground, and Balance of System (with shipping) (\$23,527) | | | | | \$33,253 | | | | | | | | | |
| Helical Anchors or comparable footings installed (\$31,820) | | | | | \$8,704 | | | | | | | | | |
| Code-required Fencing (\$35,243) | | | | | \$38,438 | | | | | | | | | |
| Travel expenses in Minnesota | \$500 | \$470 | \$31 | | | | \$6,571 | \$5,570 | \$1,001 | | | | \$7,071 | \$1,031 |
| Travel to/from work site and related meetings with utility and partners (Mileage \$4,500; Lodging \$2,571) | | \$470 | | | | | | \$5,570 | | | | | | |
| COLUMN TOTAL | \$10,549 | \$21,037 | \$31 | \$416,159 | \$402,265 | \$13,894 | \$52,292 | \$50,471 | \$1,821 | \$11,000 | \$11,000 | \$0 | \$490,000 | \$15,746 |