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

Date of Report: December 4, 2015

Date of Next Status Update Report: January 1, 2017

Date of Work Plan Approval:

Project Completion Date: June 30, 2018

Does this submission include an amendment request? No

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:	**$0**
	Balance:	**$490,000**

Legal Citation: M.L. 2016, Chp. xx, Sec. xx, Subd. xx

Appropriation Language:

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 hours[2], 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 n 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**:**

Project Status as of July 1, 2017**:**

Project Status as of January 1, 2018**:**

Overall Project Outcomes and Results:

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: $ 10,500**
Amount Spent: $ 0
Balance: $ 10,500

Outcome	Completion Date
1. Creation of comprehensive solar site assessment at selected location.	July 15,2016
2. Generation of a site-specific solar design for site.	July 31, 2016

Activity Status as of January 1, 2017**:**
Activity Status as of July 1, 2017**:**
Project Status as of January 1, 2018**:**

Final Report Summary:

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: $ 0
Balance: $ 416,159

Outcome	Completion Date
1. Preparation of project management plan.	August 15, 2016
2. Professional engineering services for electrical, structural, and geotechnical analysis.	September 1, 2016
3. Procurement of the following permits, and utility agreements: - County building permit - Interconnection agreement from local utility	September 1, 2016
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, 2016
5. All equipment and materials will have been received and placed in inventory until construction start date.	October 1, 2016

Activity Status as of January 1, 2017**:**
Activity Status as of July 1, 2017**:**
Project Status as of January 1, 2018**:**

Final Report Summary:

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, 2016.

Summary Budget Information for Activity 3: **ENRTF Budget: $ 58,341**
Amount Spent: $ 0

Balance: $ 58,341

Outcome	Completion Date
1. Installation phase 1: footings	September 15, 2016
2. Installation phase 2: racking	September 30, 2016
3. Installation phase 3: modules and inverters	October 15, 2016
4. Installation phase 4: trenching and electrical, production meter, fencing	October 31, 2016
5. Installation phase 5: inspection and commission	November 15, 2016

Activity Status as of January 1, 2017**:**
Activity Status as of July 1, 2017**:**
Project Status as of January 1, 2018**:**

Final Report Summary:

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: $ 5,000**
Amount Spent: $ 0
Balance: $ 5,000

Outcome	Completion Date
1. Report generation.	December 2016
2. Dissemination to national energy assistance and weatherization community.	February 2017

Activity Status as of January 1, 2017**:**
Activity Status as of July 1, 2017**:**
Project Status as of January 1, 2018**:**

Final Report Summary:

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**:**
Status as of July 1, 2017**:**
Project Status as of January 1, 2018**:**

Final Report Summary:

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); 1 Technical Director 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	$70,000	Solar garden preparation activities, and coordination with collaborators.
Leech Lake Band of Ojibwe (In-kind support)	$ 20,000		General project support and implementation.
MinnCAP (In-kind support)	$ 5,000		General project support and implementation, integration with LIHEAP.
TOTAL OTHER FUNDS:	**$195,000**	**$70,000**	

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:
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: December 4, 2015

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)	$10,000	$0	$10,000	$0	$0	$0	$50,950	$0	$50,950	$5,000	$0	$5,000	$65,950	$65,950
Master Electrician Joel Lindstrom: $11,700 (70% salary, 30% benefits); 18% FTE for one year														
Roger Garton, Technical Director: $20,000 (70% salary, 30% benefits); 31% FTE for one year														
Installation Technicians: $29,250 (70% salary, 30% benefits); 54% FTE for one year for one person														
Jason Edens, Director: $3,000 (70% salary; 30% benefits); 4% FTE for one year														
Program support staff: $2,000 (70% salary; 30% benefits); 3% FTE for one year														
Professional/Technical/Service Contracts				$16,646		$16,646							$16,646	$16,646
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)														
Professional Engineering Services: Structural Review Subcontract with Meyer Borgman and Johnson ($6,000)														
Electrical Permits & Inspection ($5,646)														
Equipment/Tools/Supplies							$820	$0	$820				$820	$820
Equipment Rental (Heavy equipment handler, trailer for transport)													$0	$0
Capital Expenditures Over $5,000: Solar equipment and installation ($399,513)				$399,513		$399,513							$399,513	$399,513
Made in Minnesota PV (Photovoltaic, or solar electric) Modules, 310W, 72-cell or comparable (with shipping) ($203,811)													$0	$0
Ground-Mount Racking (with shipping) ($73,032)													$0	$0
Inverters (with shipping) ($32,080)													$0	$0
Electrical Parts - Array, Underground, and Balance of System (with shipping) ($23,527)													$0	$0
Helical Anchors or comparable footings installed ($31,820)													$0	$0
Code-required Fencing ($35,243)													$0	$0
Travel expenses in Minnesota	$500	$0	$500				$6,571	$0	$6,571				$7,071	$7,071
Travel to/from work site and related meetings with utility and partners (Mileage $4,500; Lodging $2,571)													$0	$0
COLUMN TOTAL	**$10,500**	**$0**	**$10,500**	**$416,159**	**$0**	**$416,159**	**$58,341**	**$0**	**$58,341**	**$5,000**	**$0**	**$5,000**	**$490,000**	**$490,000**

RREAL has moved to our own property! We are now located at:

3963 8th Street SW

Backus, MN 56435

Office phone: (218) 947-3779

The Project Manager for "Community Solar Garden Installation" will be BJ Allen, bj@rreal.org , cell 218-209-5584.

The project location has changed from the original proposal, and the installation will now be conducted on tribal property owned by Leech Lake Band of Ojibwe at a yet-to-be determined location. The benefits of the Community Solar array will flow to the same group of people, low income Leech Lake tribal members. This location change has resulted in some budgetary alterations specifically related to travel expenses. If for some reason the property at Leech Lake is unsuitable, the back-up system installation location is RREAL property as originally proposed. The location will be determined prior to July 1, 2016.

Activity points:

Activity 1: The budget submitted January 8, 2016 includes $500 travel expenses, and has subsequently increased from $10,000 to $10,500.

Activity 2: The budget submitted January 8, 2016 reflects a decrease in cost for the PV modules of $7,500, which will result from the ability to procure from different Minnesota manufacturers. Cost savings realized will transfer to Travel expenses of $7,500 in Activities 1 and 3 due to the change in installation location to Leech Lake tribal lands. Equipment rental has been moved to Activity 3, resulting in a total reduction of $8,320 for Activity 2, from $424,479 to $416,159.

Activity 3: The budget submitted January 8, 2016 includes equipment rental of $820 and travel costs of $7,000, resulting in a total increase of $7,820 for this activity, from $50,950 to $58,770.

Activity 4: The budget submitted January 8, 2016 has not changed for this activity.

Budget points:

The original proposal allocated $29,250 for Master Electrician. The January 8, 2016 proposal allocates $11,700 for Master Electrician, switched with the Solar Installation Labor, as the Master Electrician will not spend as much time onsite as the technicians and Technical Director.

The original proposal allocated $11,700 for Solar Installation Labor. The January 8, 2016 proposal allocates $29,250 for Solar Installation Labor, as this crew will install footings, racking, hang modules, trenching, fencing, and assist with electrical work, spending more time onsite than originally proposed.

The original proposal allocated $407,833 for Equipment/Tools/Supplies, most of which changed to Capital Expenditures per instructions from LCCMR staff with the exception of Equipment Rental. Capital Expenditures now stand at $399,513 with the ability to purchase Made-in-Minnesota PV products from a competitive market, and utilize products that are more technically common in the solar marketplace. A price reduction here is good, as additional dollars are required for travel expenses since the installation will be located a distance away from RREAL property. Capital expenditures total $399,513,

and adding Equipment Rental, comes to $400,333. The difference between the original proposal is $7,500 which has been transferred to Travel for reasons aforementioned.

The original proposal indicated N/A for travel, mileage, and lodging, as the original plan was to install the solar array on RREAL property in Backus and thus travel and mileage would have been minimal. However, completing the community shared solar array on Leech Lake tribal property will require considerable additional travel and lodging. The new budget allocates $7,500 to travel, mileage and lodging.

The Community Solar Garden installation will benefit low income Leech Lake Band of Ojibwe residents, and thus the installation location has changed to occur on tribal property, in a yet-to-be finalized location. One potential site is the Prescott community, image below. The Prescott community address is: 68th Ave NW, Cass Lake, MN 56633, 47.313777, -94.644181. RREAL's property in Backus will remain a back-up plan in case Leech Lake property is deemed unsuitable.

Map 1. Back-up Solar Installation Site – 3963 8th St SW, Backus, MN 56435, 46.775615, -94.489963.