



PROJECT TITLE: Creating a Statewide Solar Resource Inventory and Map

I. PROJECT STATEMENT

The **goal** of this project is to enable local and state planners to understand and manage the opportunities and risk associated with developing Minnesota’s solar energy resources. This project will remove barriers that limit local governments and solar developers from using Minnesota’s valuable statewide LiDAR data set to assess solar development opportunities. This project will remove barriers that limit local governments and solar developers from using Minnesota’s valuable statewide LiDAR data set to assess solar development opportunities. The **target audience** is local government staff responsible for managing local resources and regulating development. The **outcomes** will be: 1) A statewide solar resource data set that can be mapped at that local level; 2) local planners who have been trained in employing LiDAR-based local energy data and solar development best practices; and, 3) a solar development website informing consumers, assisting installers, enabling development planning.

Background/Justification: Minnesota’s portfolio of strategies to reduce greenhouse gas emissions by 30% by 2025 includes substantial use of our solar energy resources. Minnesota will increase solar generation by 3000% (from 13 MW to over 450 MW) over the next seven years. Although virtually all of this development will be regulated by local governments, few cities or counties know how to identify, prioritize or manage local energy resources, nor do they understand the potential development conflicts between solar resource and other natural resources or development priorities.

Minnesota’s statewide light detection and ranging (LiDAR) sensing data provides an invaluable solar assessment tool for local and regional governments; the raw data can be processed to identify heights (and shading patterns) of trees and buildings, and thus the viability of the solar resource at a fairly high level of resolution. The state’s LiDAR data is not, however, currently processed to show such “first return” data. Local government staff face substantial barriers to using this valuable data set. Moreover, once the data is processed, most staff are not familiar with protocols for using the data for solar resource assessment and mapping.

Precision, efficacy and cost efficiency of solar resource management will be greatly increased by use of these data and assessment protocols. Examples include mapping the local resource on a parcel by parcel basis, more effective siting and installation of community-based solar infrastructure, prediction of conflicts between solar development and forest, agriculture, and historic/cultural resources, better protection of solar access rights and many more. Moreover, integrating LiDAR data with Minnesota’s other rich set of data layers will create a tool that greatly facilitates efficient and effective local solar development.

1. Overall GOALS of the project

- Goal: Minimize local barriers to solar development. Outcome: Solar becomes easier to install, making costs drop thus installations increase and Greenhouse Gas Emissions drop.
- Goal: Improve Minnesota’s ability to calculate potential solar installation sizes and outputs. Outcome: State, local, and utility planners can assess realistic potential of Minnesota’s solar energy resources.
- Goal: Create well informed solar consumers and developers. Outcome: Public access to solar resource information so as to facilitate easily accessible information affecting solar development opportunities (Area Network Grids, Historic Preservation districts, specific rooftop solar potential).

Method: Create an easy to use, interactive, layered map integrated into a website with multiple solar resources allowing access for homeowners, business owners, local government officials, solar installers and out of state developers to the information needed to make informed decisions regarding solar development in Minnesota.

II. DESCRIPTION OF PROJECT ACTIVITIES



Environment and Natural Resources Trust Fund (ENRTF)
2014 Main Proposal
Project Title: *Creating a Statewide Solar Resource Inventory and Map*

Budget: \$132,000

Activity 1: *Establish protocol for data set and GIS solar assessment*

The Center for Urban and Regional Affairs (CURA) at the University of Minnesota will develop and apply a consistent protocol for translating State-wide LiDAR data based on local landscape information. CURA (or working with other GIS contractor) will create statewide 3-D elevation data for use in solar resource assessment and add additional data layers to create a uniform statewide solar assessment GIS data set and protocol.

Outcome	Completion Date
1. <i>LiDAR data protocol prepared to make solar rooftop resource assessment possible</i>	<i>January 2015</i>

Activity 2: *Technical Assistance provided to customize map*

Budget: \$66,000

Outreach to local governments on how to use and promote the resource information, assess specific projects and build sustainable communities. Develop outreach and technical assistance standards that help integrate solar resources information into local planning and development regulation.

Outcome	Completion Date
1. <i>40 cities and counties customize, then utilize the map to assess local solar resource and promote to their citizens.</i>	<i>July 2016</i>

Activity 3: *Publish a one-stop web-based solar inventory map*

Budget: \$89,000

Using successful examples like the Renew Boston Solar resource tool and the NYC Solar Map (<http://nycsolarmap.com>), the interactive maps developed will be easily integrated with existing resources as a one-stop shop for solar questions from consumers, local governmental jurisdictions and solar industry professionals. This website will host the solar resource map for the State and up-to-date information on incentives, rebates, laws regarding solar policies, solar permitting, zoning and planning best practices, frequently asked questions, and state progress toward renewable energy goals.

Outcome	Completion Date
1. <i>Thousands of people access the map/website to research solar opportunities every year</i>	<i>January 2016</i>

III. PROJECT STRATEGY

A. Project Team/Partners

The Minnesota Renewable Energy Society (MRES) will serve as the grant manager and administrator. MRES will work with the installer/developer industry to integrate the resource mapping information into site assessment and market development and do outreach. A professional GIS Firm will develop and apply a protocol for translating State-wide LiDAR data into a data set that can be used for solar resource assessment. **The Clean Energy Resource Teams (CERTs)** will conduct outreach to local governments on how to use the resource information and assist in generating resource maps or other tools for communities they work with.

B. Timeline Requirements

Processing the LiDAR data and developing protocols will take six months. Recruiting local participants and mapping information to local conditions will take 24 months. Developing the interactive web-based solar assessment tool will be an interactive multi-stage process taking 18 months. Total project time – 36 months.

C. Long-Term Strategy and Future Funding Needs

Once the website and mapping protocol is established, the ongoing work will be to maintain the website, provide up to date resources and data entry, and direct local governments and utilities in adapting the assessment tool to specific local or utility planning needs. MRES will hire an intern to conduct the website updates with their own funding and resources. CERTs will integrate the solar assessment tool into existing assistance programs, project grant processes, and GreenStep Cities best practices.

2014 Detailed Project Budget

Project Title: *Creating a Statewide Solar Resource Inventory and Map*

IV. TOTAL ENRTF REQUEST BUDGET: 3 Years

<u>BUDGET ITEM</u>	<u>AMOUNT</u>
Personnel:	
1 MRES staff, grant management, billing, reporting, invoicing, recruitment of local governments, 15% time, 3 years, fringe 20%	<u>\$32,500</u>
1CERTs staff, recruitment of local governments, assistance in website creation, 35%, 2 years, fringe 20%	<u>\$102,500</u>
Contracts:	
GIS professional firm or the University of MN, establish LiDAR protocol for solar assessment, 25% 1 year, fringe 25%	<u>\$112,000</u>
Planning Consultant, provide solar planning technical assistance to local governments, help create the protocol to address local planning data, resources and issues, 10% 2 years, fringe 20%	<u>\$40,000</u>
Equipment/Tools/Supplies:	\$0
Acquisition (Fee Title or Permanent Easements):	\$ -
Travel:	\$ -
Additional Budget Items:	\$ -
TOTAL ENVIRONMENT AND NATURAL RESOURCES TRUST FUND \$ REQUEST =	\$287,000

V. OTHER FUNDS

<u>SOURCE OF FUNDS</u>	<u>AMOUNT</u>	<u>Status</u>
Other Non-State \$ Being Applied to Project During Project Period:	\$ -	<i>Indicate: Secured or Pending</i>
Other State \$ Being Applied to Project During Project Period:	\$ -	<i>Indicate: Secured or Pending</i>
In-kind Services During Project Period:	\$ -	<i>Indicate: Secured or Pending</i>
Remaining \$ from Current ENRTF Appropriation (if applicable):	\$ -	<i>Indicate: Unspent? Not Legally Obligated? Other?</i>
Funding History:	\$ -	

Creating a Statewide Solar Resource Inventory and Map

Increasing Solar Projects in Minnesota, Reducing Greenhouse Gas Emissions



1 Process and prepare LiDAR data for the state of Minnesota and create publicly-accessible, online map

1

2 Help 40 cities and counties utilize the online map to assess local solar resource potential and engage their communities

2

3 Promote online map to thousands of people who will research opportunities to plan and implement solar projects across Minnesota

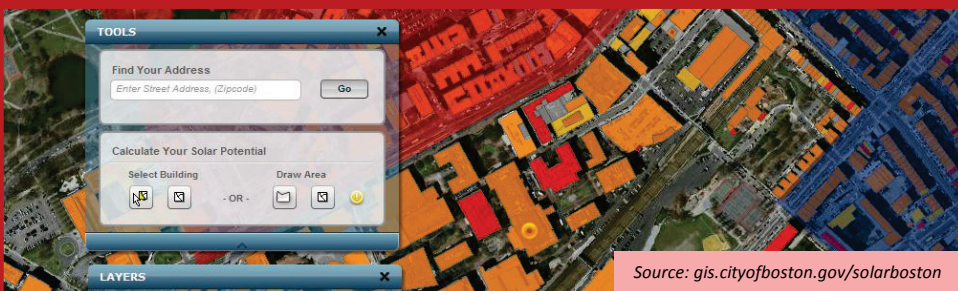
3



Source: Rochester

1 **PREPARING DATA:** City of Rochester began city-wide solar resource assessment. This map shows that some of the best insolation areas have important natural systems that are incompatible with solar development (urban forest, wetlands, parks). Our project's goal of incorporating LiDAR data would allow cities to more accurately identify solar resources and potential land use, natural resource, and development conflicts.

3 **PROMOTING SOLAR MAP:** This screenshot is from the Renew Boston Solar Resource Map that presents four layers of information: (1) Yellow dots are current solar installations; (2) Different colored roofs shows each building's solar potential; (3) Red sections are areas where integrating solar is difficult for utilities; (4) Blue sections are historic districts with special considerations for development. The "Find your address" box enables users to find the solar potential at any location. *This map is similar to what we are proposing as an end product for use by all Minnesotans.*



Source: gis.cityofboston.gov/solarboston

2 **HELPING COMMUNITIES:** City of Stillwater completed a rooftop solar resource assessment that incorporated LiDAR data, a process that took the city 57 hours. The resulting assessment allowed for detailed identification of the city's entire rooftop solar resource, locations of optimal sites for solar development, and conflicts with urban forest, future development plans, and priorities for solar access protection. *Our project would enable communities across Minnesota to access similarly rich data more efficiently.*



Source: David Brandt, Stillwater, publication pending

The Minnesota Renewable Energy Society (MRES) is a member-run, 501(c)(3) non-profit organization founded in Minneapolis in 1978 and incorporated in Minnesota in 1979 to promote the use of, and to engage in advocacy for, renewable energies in Minnesota through education and through the demonstration of practical applications. MRES is involved in education, awareness, and advocacy efforts for all forms of renewable energy, with a particular emphasis on solar technologies. MRES is the Minnesota chapter of the American Solar Energy Society (www.ases.org).

Laura Cina, Managing Director of the Minnesota Renewable Energy Society managed the MN Solar Challenge which conducted technical assistance to twenty local governments updating planning, zoning and permitting processes to create solar friendly communities. Laura received her Bachelor Degree in Political Science and Sustainable Studies from the University of Minnesota. She is currently attending the Humphrey Institute at the University of Minnesota for her Masters in Public Affairs.

The Clean Energy Resource Teams (CERTs) partnership, launched in 2003, connects Minnesota communities with the resources they need to identify and implement community scale energy efficiency and clean energy projects. CERTs are a nonpartisan, non-advocacy group that works with individuals and institutions across the state to strengthen their communities by supporting money saving energy efficiency projects and building entrepreneurship around Minnesota's growing renewable energy industries. CERTs works with the GreenStep Cities, focused on outreach to and recruitment of cities around the State. CERTs regional staff, located in each CERT region, connect directly to City staff and elected officials about GreenStep Cities and its best practices, give presentations to City Councils and host regional forums for local units of government. They conducted the outreach to the local governments regarding the MN Solar Challenge technical assistance as well. In addition to this direct work with local government, CERTs also has specific experience working on building interactive websites including the Clean Energy Project Builder, www.theCleanEnergyBuilder.com which lists all of the renewable energy businesses in the State as well as map that lists many of the solar installations in the State, www.cleanenergyresourceteams.org/mn-solar-projects-map.

Melissa Pawlisch is the Clean Energy Resource Teams (CERTs) Director for the University of Minnesota's Regional Sustainable Development Partnerships program and Extension. Melissa has spent over 15 years working on energy-related issues. In 2002 she began work with community organizations looking for alternatives to centralized power production. Melissa has staffed five of the greater Minnesota CERTs regions and worked to stimulate clean energy project development by connecting team members with the resources and technical assistance they need to implement community energy projects. She has a Masters degree in Science, Technology and Environmental Policy.

Dan Thiede is the CERTs Communications Coordinator with the University of Minnesota's Regional Sustainable Development Partnerships program and Extension. In this role, Dan is responsible for everything from goal-setting and big-picture strategy to the daily management of websites, social media, outreach and marketing, public relations and publicity, design and publications and communications interns. Dan has undergraduate degrees from the University of St. Thomas in geography and English writing, as well as a minor in environmental studies. Dan is also currently earning a Masters degree in Strategic Communications from the University of Minnesota.