**PROJECT TITLE: Habitat Friendly Solar Impacts: Environmental and Economic Guidance**

**I. PROJECT STATEMENT**

The objectives of this project are to 1) measure ecosystem and economic benefits of ground solar installations with pollinator habitat and 2) accelerate the adoption of ground solar installations that provide ecosystem and economic benefits by developing guidance to ease the approval and public engagement processes that are needed before a solar project is allowed to proceed.

Solar power is our fastest growing renewable energy source. Minnesota is expected to reach over 1,000 MW of solar capacity in 2019 (which would power 750,000 homes). In ten years solar power could provide four times that amount. Ground-mounted solar power is expanding across rural landscapes. Minnesota is also a national pioneer in planting pollinator habitat beneath solar installations to provide habitat for insects and birds, reduce runoff, and improve soil quality. Local and state governments must evaluate application permits for ground solar projects to determine if they meet requirements for runoff reduction, protection of nearby wetlands, and meet Habitat Friendly Standards (HFS) for insects and birds. Local and state government officials and the communities they represent have few tools or training to determine whether solar facilities meet these requirements, often leading to denial of applications or slowing the approval process for renewable energy projects. Local governments and communities often have many unanswered questions about environmental or economic benefits when they attempt to evaluate solar project applications. This project will help local and state regulators and stakeholders better evaluate potential environmental and economic benefits associated with pollinator habitat plantings at ground solar installations, to inform the approval process.

**II. PROJECT ACTIVITIES AND OUTCOMES**

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| **Activity 1: Assessing impacts of ground solar installations on runoff and wetlands**  **Description:** We will measure soil moisture and runoff and develop simple models and tools for local and state government to use in identifying impacts of ground based solar installations on runoff and wetland hydrology. This guidance will help local and state government speed the approval process for ground solar projects with pollinator habitat, in order to comply with requirements for runoff reduction and wetland protection according to the Minnesota Wetland Conservation Act (WCA).  Ground solar installations with established pollinator habitat will be monitored for runoff, soil moisture, soil health indicators, vegetation, and water table depth to identify impacts on stormwater runoff and wetlands based on type of collector (fixed tilt or sun tracking), type of ground cover (e.g. pollinator habitat, turfgrass or gravel), and site characteristics (soil and slope). Results will be used to develop a hydrologic model and simple spreadsheet tool that can account for runoff and infiltration as well as lateral flow to adjacent wetlands. This information will be used to assist state and local government in the permitting and approval process for new ground solar installations.  **ENRTF BUDGET: $244,793** |

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| **Outcome** | **Completion Date** |
| *1. Summarize impacts of pollinator habitat on runoff and nearby wetlands* | *June 30, 2022* |
| *2. Improved spreadsheet calculator for runoff from ground solar installations* | *Dec 31, 2022* |
| *3. Guidance for impacts of ground solar installations on wetland protection* | *Dec 31, 2022* |

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| **Activity 2: Assessing ground solar installations as habitat for birds**  **Description:** We will evaluate and provide guidance to local and state government on how birds use ground solar installations (e.g. are HFS being met?). Impacts on bird populations and habitat quality are considered in the permitting process, without much guidance about how ground solar installations can be managed to provide bird habitat. We will assess bird abundance, richness, and species composition at ground solar installations with pollinator habitat beneath the solar panels to help guide decisions about how solar installations can be designed and managed to make them more attractive to bird communities. Local government staff will be trained to assess whether Habitat Friendly Solar standards related to birds are being met at sites.  **ENRTF BUDGET: $225,521** |

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| **Outcome** | **Completion Date** |
| *1. Summarize impacts of ground solar installations on bird populations* | *Dec 31, 2022* |
| *2. Guidance for assessing impacts of solar installations on birds and habitat quality* | *April 30, 2023* |

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| **Activity 3: Stakeholder and government engagement and education on environmental and economic impacts of low-impact ground solar development**  **Description:**We will evaluate economic impacts of ground-mounted solar installations on local communities in Minnesota (e.g. land values, home prices, revenue streams, jobs). We will disseminate project results and train local and state government, solar developers, and the general public about how to maximize the environmental and economic benefits of ground solar installations. Government and state agency stakeholders will be engaged to provide input into the use and interpretation of results from Activity 1 and 2. Recommendations will be made to improve local ordinances and codes, and solar siting and design standards for solar pollinator projects, and speed the permit assessment and approval process. Final deliverables will include written and web-based reports and in-person dissemination to local and state government officials, decision-makers, habitat and agriculture sector stakeholders, and other interested parties.  **ENRTF BUDGET: $280,734** |

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| **Outcome** | **Completion Date** |
| *1. Assess economics of solar installations on the environment and rural communities* | *June 30, 2021* |
| *2. Engage local and state agencies, SWCD and Watershed Districts throughout project* | *June 30, 2022* |
| *3. Develop model ordinances, standards, and other recommendations for solar design* | *January 30, 2023* |
| *4.* *Disseminate results and educate stakeholders on findings for low-impact solar* | *June 30, 2023* |

**III. PROJECT PARTNERS AND COLLABORATORS:** These include the Board of Water and Soil Resources; National Renewable Energy Laboratory; and the Audubon Society.

**IV. LONG-TERM IMPLEMENTATION AND FUNDING:** This project is being conducted in coordination with the National Renewable Energy Laboratory (NREL), which has established four sites in Minnesota to evaluate the performance of pollinator-friendly seed mixtures and other low-impact solar designs on insect populations.

**V. SEE ADDITIONAL PROPOSAL COMPONENTS:**

1. **Proposal Budget Spreadsheet**
2. **Map and Visual Components**

**F. Project Manager Qualifications and Organization Description**