

Using Solar Arrays to Promote Pollinators
The Gund Institute and Energy Action Network

Summary

The **GUND Institute** and the **Energy Action Network** co-hosted a presentation and discussion on “*Using Solar Arrays to Promote Pollinators*” on Wednesday, October 12, 2016. Speakers included:

- Taylor Ricketts, Director GUND Institute, UVM
- Rob Davis, Director of Media and Innovation Lab, Fresh Energy (Minnesota)
- Mike Kiernan, Founder “Bee the Change”, Middlebury Vermont
- Chuck Ross, Secretary, Agency of Agriculture Food and Markets



Summary: A Win-Win-Win for Agriculture, Clean Energy and...Bees

- What if we could utilize the land under solar arrays to do more than generate clean energy?
- What if we could find a way to address the growing threat to native bees, which are valuable crop pollinators, by devoting significant tracts of land to pollinator friendly plants?
- What if it could be made affordable for solar developers to pursue?
- How can we understand the long-term impact of this strategy on energy and agriculture?
- Does this require any legislative action?

Large- and small-scale solar can cost-effectively provide significant agricultural and ecological benefits to communities at a scale that would be difficult to attain any other way. The solution is simple—integrate into solar projects a vegetative management plan that features a mix of low-growing and shade tolerant, pollinator friendly plants throughout the array.

In 2016, Fresh Energy and National Audubon Society incubated a campaign in Minnesota to establish the nation’s first certifiable standard for pollinator-friendly solar. The Minnesota Board of Water and Soil Resources gathered input from key stakeholders (Xerces Society, solar developers, etc) to develop this standard. In parallel, a Vermont-grown effort is underway between a Middlebury based group, *Bee the Change*, and several solar projects, supported by Green Mountain Power, Encore Renewable Energy and others.

Other innovative utilities and solar developers around the country who value this sustainable approach have joined this initiative and are already building projects to this standard:

- Minnesota: Enel Green Power’s Aurora solar project, 150 MW, ~1,000 acres, 16 sites
- Minnesota: Minnesota Power’s Camp Ripley project, 10 MW, 65 acres, 1 site
- Wisconsin: SoCore & Dairyland Electric, 15 MW, 12 sites
- Maryland: OneEnergy Renewables, 1 site, 5 MW

The discussion explored how to: i) encourage the Vermont solar industry to join in this effort; ii) generate a similar certifiable standard for pollinator-friendly solar in Vermont, identifying key native species; iii) more fully understand the long term co-benefits and costs, ranging from carbon accounting to improved crop yields to potentially increased efficiency of panels; and more.

Proposed Next Steps

1. **Develop Vermont Solar Site Pollinator Guidelines/Assessment Form** to ensure a minimum standard for claiming pollinator benefits and to provide guidelines for landscapers/environmental consultants working on vegetative management plans for the land under solar arrays
 - This assessment form could draw on Vermont experts and the work out of Minnesota (see Attachment 1 for the assessment form developed by the MN Board of Water and Soil Resources, University of Minnesota experts and other interested stakeholders).
 - The standards could be applied to screening plants, buffer zones, and areas under and between solar arrays. The goal is to develop both the standards and provide guidance on native pollinator plant types that would be the best for ensuring 3 blooming seasons, cover diversity, and height diversity (to not shade the panels).
 - **NOTE: THIS WAS COMPLETED (March 2017)**
2. **Identify projects/developers willing to pilot this effort.** At present, GMP, Encore, Green Lantern Group, Mont Vert, VSECU/Sovern, and Ben & Jerry's have indicated they are interested, but need to better understand the costs of truly pollinator friendly vegetative management plans, and which companies might be able to assist in implementing them
 - **NOTE: As of March 2017, GMP and several developers have volunteered to pilot this effort**
3. **Identify a means to test and study the impact of these efforts** on agricultural value, incremental stormwater control, carbon sequestration, other soil benefits, financial and ecosystem services (the Gund Institute has expressed interest)
4. **Explore how these standards could be incorporated into Certificate of Public Good screening/vegetative management/aesthetic requirements**
 - This may require input from ANR, PSD and Agency of Agriculture
5. **Explore whether legislation** establishing voluntary solar site management practices for pollinator friendly solar sites would be useful to enact (see Minnesota legislation in Attachment 2);



Solar Site Pollinator Habitat Assessment Form

For solar companies to claim pollinator/wildlife habitat benefits on solar sites



1. PERCENT OF SITE DOMINATED BY WILDFLOWERS

- 1-15 percent 10 points
- 16-30 percent 15 points
- 31-45 percent 20 points
- 46-60 percent 25 points
- 61+ percent 30 points

Total points

Note: Project may have "array" mixes and diverse border mixes; forb dominance should be averaged across the entire site. Forb dominance should exclude native ragweeds.

2. % OF SITE DOMINATED BY NATIVE SPECIES COVER

- 1-25% 5 points
- 26-50% 10 points
- 51-75% 15 points
- 76-100% 20 points

Total points

3. COVER DIVERSITY (# of plant species with >2% cover)

- 1-9 species 5 points
- 10-19 species 10 points
- 20-39 species 15 points
- > 40 species 20 points

Total points

Exclude invasives from species totals.

4. SEASONS WITH AT LEAST 3 BLOOMING SPECIES PRESENT (check/add all that apply)

- Spring 10 points
- Summer 5 points
- Fall 5 points

Total points

See BWSR Pollinator Toolbox for Information about bloom season

5. AVAILABLE HABITAT COMPONENTS WITHIN .25 MILES (check/add all that apply)

- Native bunch grasses for nesting 5 points
- Trees and shrubs for nesting 5 points
- Clean, perennial water sources 5 points

Total points

6. AVAILABLE HABITAT COMPONENTS ON-SITE (check/add all that apply)

- At least 2% milkweed cover 5 points
- At least 3% native shrub cover 5 points
- Detailed mgmt. plan developed (see example plan) 10 points
- 3 or more signs legible at twenty or more feet stating pollinator friendly habitat 5 points

Total points

7. INSECTICIDE RISK (% of project adjacent to insecticide use such as non-organic cropland, or on-site use)

- 1-25% -10 points
- 26-50% -15 points
- 51-75% -20 points
- 76-100% -25 points
- On-site use -30 points

Total points

This doesn't include herbicide being used for weed control

Grand Total

Provides Exceptional Habitat 85 TO 100
Meets Pollinator Standards 70-84

Developer: _____

Project Location: _____

Project Size: _____

Target Seeding Date: _____

Send completed forms to: Dan.Shaw@state.mn.us

Note: Measurements of percent "cover" should be based on "absolute cover" defined as the percent of the ground surface that is covered by a vertical projection of foliage as viewed from above. To measure cover diversity it is recommended to use plots, and/or transects in addition to meander searches for accurate measurements. Wildflowers in question 1 refer to "forb" which are flowering plants that are not woody, and are not graminoids (grasses, sedges, rushes).

Attachment 2: Minnesota Solar Legislation

A bill for an act relating to agriculture; establishing voluntary solar site management practices for solar sites; proposing coding for new law in Minnesota Statutes, chapter 216B.

BE IT ENACTED BY THE LEGISLATURE OF THE STATE OF MINNESOTA:

Section 1.

[216B.1642] SOLAR SITE MANAGEMENT.

Subdivision 1.

Site management practices.

An owner of a ground-mounted solar site with a generating capacity of more than 40 kilowatts may follow site management practices that (1) provide native perennial vegetation and foraging habitat beneficial to gamebirds, songbirds, and pollinators, and (2) reduce storm water runoff and erosion at the solar generation site. To the extent practicable, when establishing perennial vegetation and beneficial foraging habitat, a solar site owner shall use native plant species and seed mixes under Department of Natural Resources "Prairie Establishment and Maintenance Technical Guidance for Solar Projects."

Subdivision 2.

Recognition of beneficial habitat.

An owner of a solar site implementing solar site management practices under this section may claim that the site provides benefits to gamebirds, songbirds, and pollinators **only if the site adheres** to guidance set forth by the pollinator plan provided by the Board of Water and Soil Resources or any other gamebird, songbird, or pollinator foraging-friendly vegetation standard established by the Board of Water and Soil Resources. An owner making a beneficial habitat claim must make the site's vegetation management plan available to the public and provide a copy of the plan to a Minnesota nonprofit solar industry trade association.

Creating a Vermont Solar Site Pollinator Habitat Standard: Process Summary

Since our initial meeting on October 12, 2016, we have worked to create a standard for pollinator friendly solar energy development in the state of Vermont. We based our effort on the standard established in the state of Minnesota, adapting the Minnesota version for Vermont's ecological, regulatory, and policy context. A diverse group of participants has contributed to the creation of the Vermont standard, including representatives from the Energy Action Network, the University of Vermont, the National Audubon Society, Vermont state agencies, and landscape and environmental consultancies.

In revising the Minnesota standard, we discussed and addressed questions in the following areas:

- **Purpose of the standard as a planning vs. assessment document.** We discussed whether the standard should be used primarily to plan for the creation of pollinator plantings at solar sites, to assess sites after their establishment, or both. We decided to write the standard as a planning oriented document. Its adaptation or use for assessment purposes may be revisited in the future.
- **Vermont's ecological context.** We adjusted the standard to make it appropriate for the ecological context of Vermont. Adapted sections relate to the percent of the solar site to be planted with flowering plant species, the plant diversity of the site, seasons during which flowers will be in bloom, and nesting habitat for bees.
- **Flowering plant seed mix.** We added a point to the standard to highlight the importance of choosing a seed mix that includes appropriate plant species, as well as the importance of planting seeds according to best practices.
- **Native species.** We discussed the value of awarding points for the planting of native species within solar developments. We decided to include points related to native species as part of the section of the standard related to seed mix planning.
- **Pollinator nesting habitat.** We added points to the standard to incorporate the importance of pollinator nesting habitat for pollinator populations.
- **Management practices.** We created a section on the standard to suggest appropriate management practices, including mowing at specific times of year, creating pollinator nesting habitat, and creating establishment, management, and monitoring plans.
- **Pesticide risk.** We discussed how best to capture pesticide risk to pollinators as part of the standard. We decided to include a deduction of points for on-site insecticide use.

- **Vegetation buffer.** We added a section to the form related to the vegetation buffers that are often planted surrounding solar sites. This section highlights an additional opportunity to create habitat beneficial to pollinators.
- **Benefits to other wildlife.** We discussed whether to incorporate specific language into the standard related to creating habitat for birds and other wildlife. We decided to focus the standard on pollinators while designing it such that solar projects that meet the standard will be beneficial to birds and other important wildlife beyond pollinators.