



Pollinator-Friendly Solar

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**Solar Sites:
A standard practice**

**Agricultural soils covered
in turfgrass
x25 years**



Another standard practice



Agricultural soils covered
with gravel
x25 years

Photo: Janelle Patterson, *Marietta Times (Ohio)*





RICHARD BEAVEN FOR THE WALL STREET JOURNAL

Energy from more than 1,200 solar panels powers Benjamin Freund's 650-acre dairy farm and home in East Canaan, Conn.

Solar Projects Sow Tension

As panels supplant crops on more farms, states weigh limits on big renewable fields

By Joseph De Avila

The boom in solar energy is forcing states and farming communities to grapple with where large renewable-energy projects should be built.

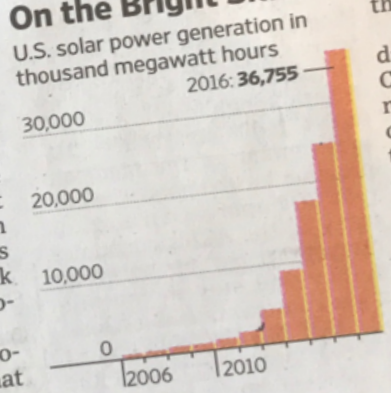
In Connecticut, a state senator has proposed a bill that would discourage the use of farmland for solar projects. Counties in North Carolina and Washington have already imposed temporary restrictions on large solar projects, citing concerns about loss of farmland and the impact on rural character. Massachusetts, meanwhile, is putting in place incentives to try to steer solar projects to rooftops and brownfields, which are con-

dition of Counties. The pressure in rural areas stems, in part, from simple economics. Some farmers are installing solar panels on a patch of their land to help offset energy costs. Other farmers are renting out entire fields to solar companies that can afford to pay premium prices for access to clear fields that don't require much work or money to prepare for a solar project.

"Of course, there can be local tension in terms of what people are used to on the farmland, what people like to see in a rural environment," said Amit Ronen, director of the George Washington University Solar Institute. "But I don't see it as a long-term constraint on continuing to expand solar fairly dramatically."

U.S. solar-power generation has grown quickly, thanks to shrinking equipment costs, federal tax credits and aggressive goals set by states to use

On the Bright Side



Source: Department of Energy
THE WALL STREET JOURNAL.

North Carolina Clean Energy Technology Center.

But large solar installations don't always sit well with local communities.

Currituck County, N.C., enacted a prohibition on new commercial solar development in February after developers came forward with several proposals for large projects.

whelming opposition," said Mr. Scanlon. The county denied the application.

Benjamin Freund, who has a dairy farm in East Canaan, Conn., in recent years installed more than 1,200 solar panels on a patch of his land and on top of his dairy barn. The generated power offsets his entire \$6,000 monthly energy bill.

He said he doesn't like competing with solar companies when he needs access to other farmland, but he also doesn't like being told what he can build on his property.

"From a property rights standpoint, this is a heavy-handed way to say that my property no longer has this development potential simply because of the fact that it's arable land," Mr. Freund said.

Robin Chesmer, managing member of a dairy farm in Lebanon, Conn., said he thinks good soil should be used only for food production.

"As a society, we have already messed up a lot of our landscape," Mr. Chesmer said. "Let's not mess up what we

Responsible steps to
ensure productive use of
agricultural soils









Dr. Karen Oberhauser

University of Minnesota

Dr. Marla Spivak

University of Minnesota



Ag Leaders Established a Vegetation Standard for Pollinator-friendly Solar



State Rep. Rod Hamilton (R)
Chair, Agriculture Finance Committee
Member, Agriculture Policy Committee



State Senator Dan Sparks (DFL)
Chair, Agriculture Policy Committee
Member, Commerce & Consumer
Protection Policy and Finance Committee

Statute 216B.1642

Subd. 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...

ALBRIGHT	●	ECKLUND	●	JOHNSON, B.	●	MELIN	●	RUNBECK	●
ALLEN	●	ERHARDT	●	JOHNSON, C.	●	METSA	●	SANDERS	●
ANDERSON, C.	●	ERICKSON	●	JOHNSON, S.	●	MILLER	●	SCHOEN	●
ANDERSON, M.		FABIAN	●	KAHN	●	MORAN	●	SCHOMACKER	●
ANDERSON, P.	●	FENTON	●	KELLY	●	MULLERY	●	SCHULTZ	●
ANDERSON, S.	●	FISCHER	●	KIEL	●	MURPHY, E.	●	SCOTT	●
ANZELC	●	FLANAGAN	●	KNOBLACH	●	MURPHY, M.	●	SELGER	●
APPLEBAUM	●	FRANSON	●	KOZNICK	●	NASH	●	SIMONSON	●
ATKINS	●	FREIBERG	●	KRESHA	●	NELSON	●	SLOCUM	●
BACKER	●	GAROFALO	●	LAINE	●	NEWBERGER	●	SMITH	●
BAKER	●	GREEN	●	LESCH	●	NEWTON	●	SUNDIN	●
BARRETT	●	GRUENHAGEN	●	LIEBLING	●	NORNES	●	SWEDZINSKI	●
BENNETT	●	GUNTHER	●	LIEN	●	NORTON	●	THEIS	●
BERNARDY	●	HACKBARTH	●	LILLIE	●	O'DRISCOLL	●	THISSEN	●
BLY	●	HALVERSON	●	LOEFFLER	●	O'NEILL	●	TORKELSON	●
CARLSON	●	HAMILTON	●	LOHMER	●	PELOWSKI	●	UGLEM	●
CHRISTENSEN	●	HANCOCK	●	LOON	●	PEPPIN	●	URDAHL	●
CLARK	●	HANSEN	●	LOONAN	●	PERSELL	●	VOGEL	●
CONSIDINE	●	HAUSMAN	●	LUCERO	●	PETERSBURG	●	WAGENIUS	●
CORNISH	●	HEINTZEMAN	●	LUECK	●	PETERSON	●	WARD	●
DANIELS	●	HERTAUS	●	MACK	●	PIERSON	●	WHELAN	●
DAVIDS	●	HILSTROM	●	MAHONEY	●	PINTO	●	WILLS	●
DAVNIE	●	HOPPE	●	MARIANI	●	POPPE	●	YARUSSO	●
DEAN, M.	●	HORNSTEIN	●	MARQUART	●	PUGH	●	YOUAKIM	●
DEHN, R.	●	HORTMAN	●	MASIN	●	QUAM	●	ZERWAS	●
DETTMER	●	HOWE	●	MCDONALD	●	RARICK	●	SPEAKER	●
DRAZKOWSKI	●	ISAACSON	●	MCNAMARA	●	ROSENTHAL	●	DAUDT	●

Unanimous support from Minnesota's Republican House of Representatives

MN Corn Growers Association



“The long term health of our pollinators is a complicated issue, but creating habitat is a proven way to increase the likelihood of success. We encourage our members to look for opportunities to add habitat on their farms.

“It makes sense for us to support SF3353 [the standard for pollinator-friendly solar] because it’s an easy and logical way to add habitat that is so critically needed...”

Dr. Adam Birr, President

Minnesota Corn Growers Association


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<https://www.revisor.mn.gov/statutes/?id=216B.1642>



Flexible Standard

- Percent wildflowers
- Percent native species
- Diversity of species
- # seasons flowering
- Nearby assets
- Signage? Mgt plan?



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

<input type="checkbox"/> 1-15 percent	10 points
<input type="checkbox"/> 16-30 percent	15 points
<input type="checkbox"/> 31-45 percent	20 points
<input type="checkbox"/> 46-60 percent	25 points
<input type="checkbox"/> 61+ percent	30 points

Total points

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

<input type="checkbox"/> At least 2% milkweed cover	5 points
<input type="checkbox"/> At least 3% native shrub cover	5 points
<input type="checkbox"/> Detailed mgmt. plan developed (see example plan)	10 points
<input type="checkbox"/> 3 or more signs legible at twenty or more feet stating pollinator friendly habitat	5 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

<input type="checkbox"/> 1-25%	5 points
<input type="checkbox"/> 26-50%	10 points
<input type="checkbox"/> 51-75%	15 points
<input type="checkbox"/> 76-100%	20 points

Total points

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

<input type="checkbox"/> 1-25%	-10 points
<input type="checkbox"/> 26-50%	-15 points
<input type="checkbox"/> 51-75%	-20 points
<input type="checkbox"/> 76-100%	-25 points
<input type="checkbox"/> On-site use	-30 points

Total points

This doesn't include herbicide being used for weed control

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

<input type="checkbox"/> 1-9 species	5 points
<input type="checkbox"/> 10-19 species	10 points
<input type="checkbox"/> 20-39 species	15 points
<input type="checkbox"/> > 40 species	20 points

Total points

Exclude invasives from species totals.

Grand Total

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

<input type="checkbox"/> Spring	10 points
<input type="checkbox"/> Summer	5 points
<input type="checkbox"/> 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)

<input type="checkbox"/> Native bunch grasses for nesting	5 points
<input type="checkbox"/> Trees and shrubs for nesting	5 points
<input type="checkbox"/> Clean, perennial water sources	5 points

Total points

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 gaminoids (grasses, sedges, rushes).

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

Pollinator-Friendly Solar

Incremental <> Meaningful

*Solar site vegetation that helps bees
and beneficial insects*

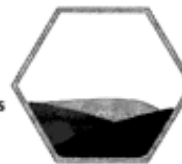
MN's largest electric co-op, Connexus Energy, has a pollinator-friendly solar site near its headquarters.

The site scores 100, so they can legally say that site is “pollinator-friendly” and “beneficial to pollinators, songbirds, and gamebirds.”



Solar Site Pollinator Habitat Assessment Form

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1. PERCENT OF SITE DOMINATED BY WILDFLOWERS

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- 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.

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- Summer 5 points
- Fall 5 points

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- Native bunch grasses for nesting 5 points
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Total points

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

Total points

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- 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



MN's largest electric co-op, Connexus Energy, has a pollinator-friendly solar site near its headquarters. The site scores 100.

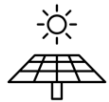
RESULTS:

Pollinator-Friendly Solar Sites Seeded in 2016



equal to...

2,330 acres



0.01 percent of farmland

**More than
1,400,000**
6'x12'
pollinator
gardens

RESULTS:

More Jobs for the Rural Economy

Before



After



RESULTS:

Improving soils & controlling stormwater



Project Highlights



Aurora Solar
 100 MW distributed
 solar array
 16 sites
 1,000 acres

Pollinator-friendly
 seed mix used on all
 sites

Sample General Composition of Seed Mix for use within Solar Panel Array

No Mow Turf with Forbs; Seeding Rate: 42 seeds per Sq. ft./ac	Height	Bloom Time	oz./acre	Seeds/oz.	Seeds/sq. ft.
<i>Cover Crop</i>					
<i>Avena sativa</i> (Oats) ¹	3'	NA	20lbs/ac	1,100	8.9
<i>Grasses</i>					
<i>Bouteloua curtipendula</i> (Side oats grama) PLS	1-2'	Jun-Nov	8.0	6000.00	1.10
<i>Bouteloua gracilis</i> (Blue grama) PLS	1'	Jul-Oct	4.0	40,000.00	3.67
<i>Buchloe dactyloides</i> (Buffalo grass--BOWIE cultivar) PLS	5"	Apr-Dec	128.0	3,600.00	10.58
<i>Carex bicknelli</i> (Copper shouldered oval sedge) PLS	1-3'	Mar-May	2.0	17000.00	0.78
<i>Koeleria macrantha</i> (Junegrass) PLS	10-20"	Apr-Jun	4.0	200,000.00	18.37
<i>Sporobolus heterolepis</i> (Prairie Dropseed) PLS	2-3'	Jun-Aug	4.0	16,000	1.47

<i>Forbs</i>					
<i>Allium canadense</i> (Wild garlic)	1-2'	May-Jul	8.0	560.00	0.10
<i>Allium stellatum</i> (Prairie onion)	8-18"	Jul-Aug	1.00	11,000.00	0.25
<i>Anemone canadensis</i> (Canada Anemone)	1-2'	May-Jun	1.00	8,000.00	0.18
<i>Anemone patens</i> (Pasqueflower)	3-18"	Apr-May	1.00	18,000.00	0.41
<i>Asclepias tuberosa</i> (Butterfly-weed)	1-2'	Jun-Aug	2.00	4,300.00	0.20
<i>Echinacea angustifolia</i> (Narrow leaved Purple Coneflower)	1-2'	Jun-Jul	2.00	7000	0.32
<i>Sisyrinchium campestre</i> (Prairie blue-eyed grass)	4-16"	May-Jun	1.00	45,000.00	1.03
<i>Solidago nemoralis</i> (Gray goldenrod)	1-2'	Aug-Oct	0.50	300,000.00	3.44





North Star Solar
 100 MW solar array
 1,000 acres
 Largest single-site
 array in the Midwest
 Pollinator-friendly seed
 mix from Minnesota
 Native Landscapes
 used throughout

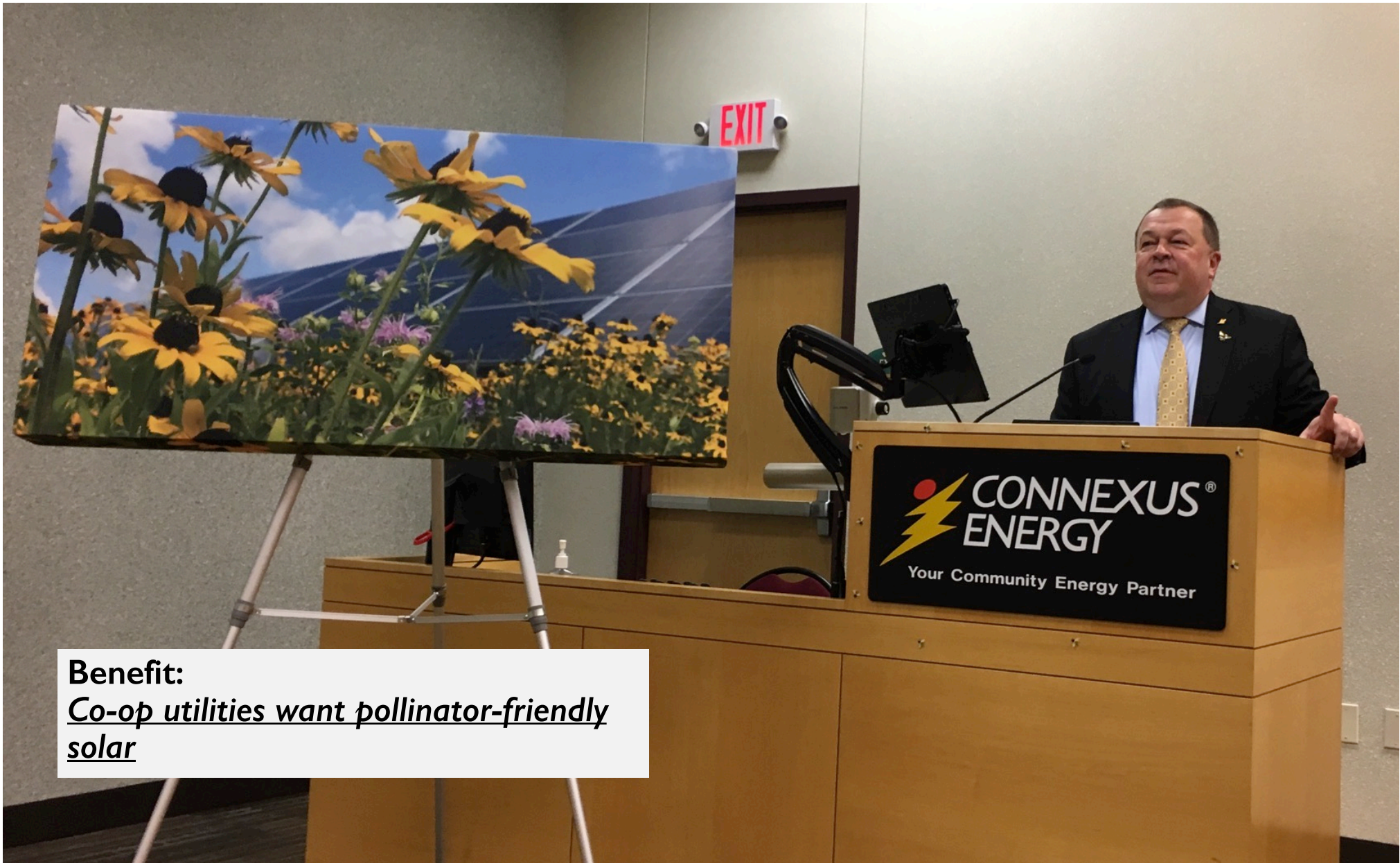
	Scientific Name	Common Name	% of Mix	PLS lbs/ac	Total PLS lbs	Seeds/ Sq Ft
Grasses:	Bouteloua curtipendula	Side-Oats Grama	35.00	2.80	2.80	10.23
	Bouteloua gracilis	Blue Grama	12.00	0.96	0.96	14.10
	Carex bicknellii	Bicknell's Sedge	1.50	0.12	0.12	0.75
	Carex radiata	Eastern Star Sedge	1.50	0.12	0.12	1.81
	Carex vulpinoidea	Fox Sedge	1.25	0.10	0.10	2.98
	Koeleria macrantha	Junegrass	1.25	0.10	0.10	7.35
	Schizachyrium scoparium	Little Bluestem	14.50	1.16	1.16	6.39
	Sporobolus cryptandrus	Sand Dropseed	4.00	0.32	0.32	23.51
	Sporobolus heterolepis	Prairie Dropseed	5.00	0.40	0.40	2.35
	Forbs:	Achillea millefolium	Yarrow	0.40	0.03	0.03
Agastache foeniculum		Fragrant Giant Hyssop	0.25	0.02	0.02	0.66
Allium stellatum		Prairie Onion	0.50	0.04	0.04	0.16
Anemone canadensis		Canada Anemone	0.25	0.02	0.02	0.06
Aquilegia canadensis		Columbine	0.25	0.02	0.02	0.28
Asclepias syriaca		Common Milkweed	0.75	0.06	0.06	0.09
Asclepias tuberosa		Butterfly Milkweed	0.75	0.06	0.06	0.09
Asclepias verticillata		Whorled Milkweed	0.25	0.02	0.02	0.08
Aster oolentangiensis		Sky-Blue Aster	1.25	0.10	0.10	2.94
Aster laevis		Smooth Blue Aster	0.75	0.06	0.06	1.21
Aster lateriflorus		Calico Aster	0.80	0.06	0.06	5.88
Astragalus canadensis		Canada Milk Vetch	0.75	0.06	0.06	0.37
Coreopsis palmata		Prairie Coreopsis	0.50	0.04	0.04	0.15
Dalea candida		White Prairie Clover	3.00	0.24	0.24	1.67
Dalea purpureum		Purple Prairie Clover	3.00	0.24	0.24	1.32
Desmodium canadense		Canada Tick Trefoil	1.00	0.08	0.08	0.16
Helianthus pauciflorus		Stiff Sunflower	0.40	0.03	0.03	0.05
Monarda fistulosa		Wild Bergamot	0.75	0.06	0.06	1.54
Liatris aspera		Rough Blazing Star	0.75	0.06	0.06	0.35
Lupinus perennis		Wild Lupine	0.25	0.02	0.02	0.01
Penstemon gracilis		Slender Beardtongue	0.40	0.03	0.03	7.05
Potentilla arguta		Prairie Cinquefoil	0.25	0.02	0.02	1.69
Pycnanthemum virginianum		Mountain Mint	0.50	0.04	0.04	3.23
Ratibida columnifera		Long-Headed Coneflower	1.00	0.08	0.08	1.23
Rudbeckia hirta		Black Eyed Susan	1.25	0.10	0.10	3.38
Solidago nemoralis		Old Field Goldenrod	0.50	0.04	0.04	4.41
Solidago rigida	Stiff Goldenrod	1.50	0.12	0.12	1.81	
Verbena stricta	Hoary Vervain	1.25	0.10	0.10	1.03	
Zizia aurea	Golden Alexanders	0.75	0.06	0.06	0.24	
Cover Crop:	Triticum aestivum	Winter Wheat		10.00	10.00	

Species subject to change based on price and availability at the time of planting

Minnesota Power & Camp Ripley

Solar Farm Short Native Mix	Species	PLS/acre	Height(in)
Short height general dry prairie native mix.	Sideoats Grama	3.00	18-30
	Little Bluestem	3.00	18-30
	Buffalograss	3.00	18-30
	Kalm's Brome	0.50	24-36
	Blue Grama	1.00	12-15
	Junegrass	0.25	6-12
	Prairie Dropseed	0.25	18-30
	Grass Total	11.00	
	Black Eyed Susan	0.20	18-24
	Purple Prairie Clover	0.20	18-24
	Partridge Pea	0.20	18-24
	Purple Coneflower	0.20	18-24
	Yarrow	0.01	12-18
	White Prairie Clover	0.10	18-24
	Large Flowered Beard Tongue	0.04	12-24
	Butterfly Milkweed	0.05	18-24
	Total PLS/Acre	1.00	
Oats	25.00		
Total PLS/Acre	37.00		





Benefit:
Co-op utilities want pollinator-friendly solar

Electric utilities
get pollinator-
friendly solar
when they ask
for it.



BRIEF

In bid to help bees, Xcel to require vegetation disclosure in solar RFPs



(Credit: [Engie Distributed Solar](#))

MN Utility Leaders, City of Minneapolis Require Pollinator-Friendly Solar Scorecard



NREL — InSPIRE Project Sites

The collage features the following elements:

- Top Left:** Oregon State University and PINEGATE RENEWABLES logos next to a photo of solar panels in a field.
- Top Center-Left:** CLIF BAR logo next to a photo of solar panels in a field.
- Top Center-Right:** enel Green Power logo next to a photo of solar panels in a field with flowers.
- Top Right:** COLETT UNIVERSITY logo next to a photo of solar panels in a field.
- Middle Left:** Oregon State University and PINEGATE RENEWABLES logos next to a photo of solar panels in a field.
- Middle Center-Left:** Colorado State University logo next to a photo of solar panels in a field.
- Middle Center-Right:** ORGANIC VALLEY logo next to a photo of solar panels in a field.
- Middle Right:** HYPERION SYSTEMS logo next to a photo of solar panels in a field.
- Middle Far Right:** Catholic Energies logo next to a photo of solar panels in a field.
- Bottom Left:** SOLI CULTURE logo next to a photo of a greenhouse.
- Bottom Center-Left:** The University of Arizona logo next to a photo of solar panels in a field.
- Bottom Center-Right:** Dryland Agriculture logo next to a photo of a field with a sign that reads "Pollination Garden Test Plot".
- Bottom Right:** A large photo of a solar farm with the text "Plans - 1.3 MW" and logos for JIMMY CARTER, KLEIN, UNIVERSITY OF GEORGIA, and SolAmerica.

ADDISON COUNTY INDEPENDENT

Vol. 28 No. 24 Middlebury, Vermont ♦ Monday, September 19, 2016 ♦ 36 Pages

Bright idea: Solar arrays & bees

Kiernan's plantings provide a magnet for pollinators

By JOHN FLOWERS

MIDDLEBURY — Mike Kiernan has for years been concerned about the perplexing plunge in the number of pollinating creatures throughout the world.

Now the accomplished Por-

ter Medical Center physician has made a commitment to “bee” part of the solution to a problem that is threatening the world’s ecosystems and food supply.

Mike Kiernan and wife, Tawnya, this past spring launched a

new venture appropriately dubbed “bee the change,” through which they are identifying under-used pieces of property — most notably solar farm locations — for the planting of specific flowers, (See Bees, Page 22)



2016: first Solar farm apiary in U.S.



Bare Honey & MN Dept of Agriculture

Highlighting Solar Grown honey as an exciting new specialty crop.



Solarama Crush

East Coast Style "Hazy" IPA made with Solar Grown honey, Kernza perennial grain, and 100% clean energy

Chef Gavin Kaysen, Coach of Team USA for Bocuse d'Or, the world's most rigorous culinary competition