Pollinator-Friendly Solar

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Fresh Energy
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Solar array, Ohio

Photo: Janelle Patterson, *Marietta Times*

A standard practice


x25 years

Solar Site Vegetation & Performance

- Performance profile for solar site vegetation:
  - Resilient to droughts
  - Resilient to intense downpours
  - Insulation / reduce risk of frost heave
  - Minimal maintenance
  - Low-growing
  - Full-sun & shade tolerant
  - Beneficial to the pollinators needed for agriculture

the WHITE HOUSE PRESIDENT BARACK OBAMA

Announcing New Steps to Promote Pollinator Health

MAY 19, 2015

Summary: Pollinators are critical to the Nation's economy, food security, and environmental health.


Dr. Karen Oberhauser
University of Minnesota
Dr. Marla Spivak
University of Minnesota

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

Fresh Energy

Audubon
MINNESOTA

MinnesotaCorn
GROWERS ASSOCIATION

Minnesota
Farmers
Union

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…

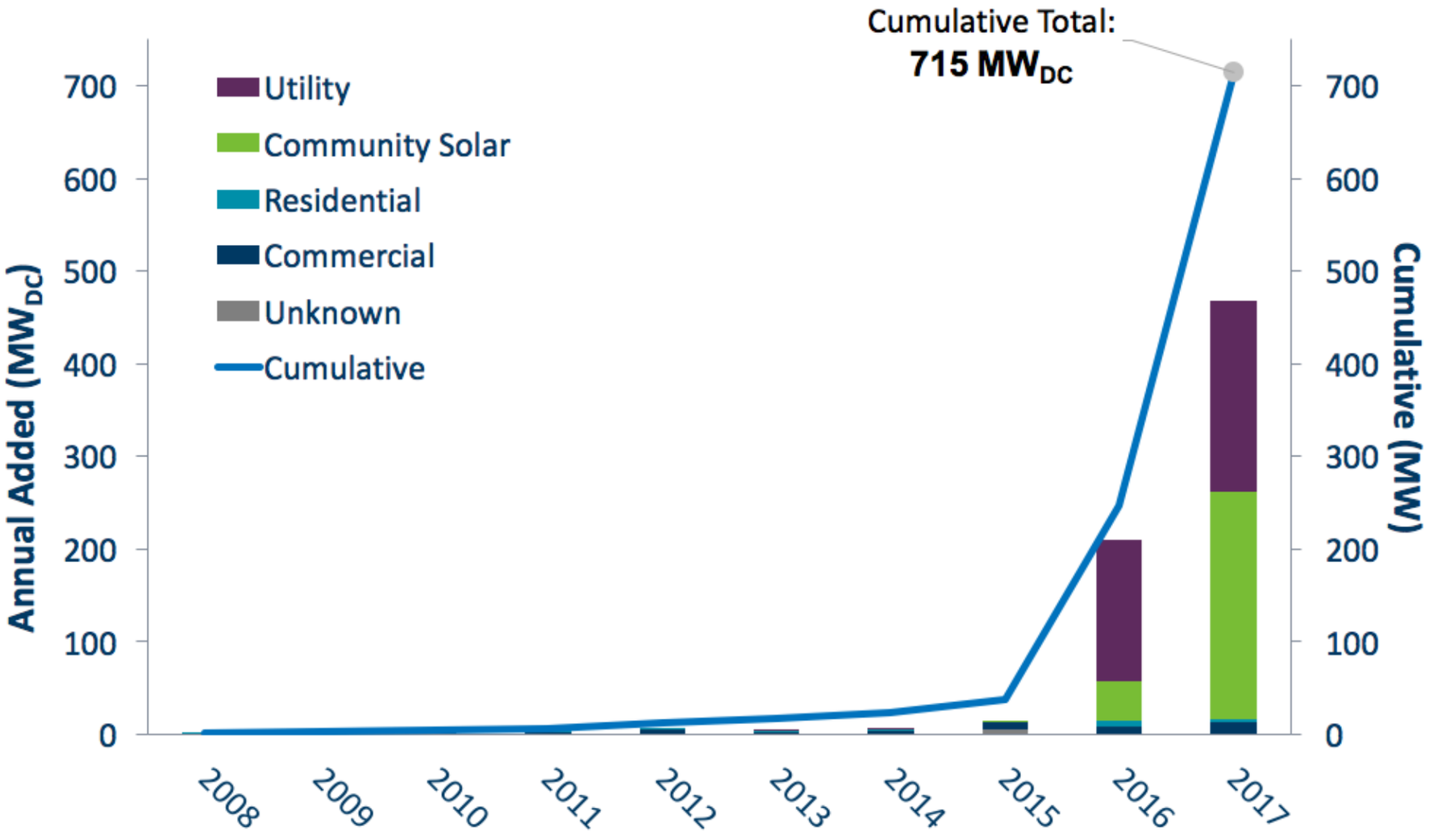
https://www.revisor.mn.gov/statutes/?id=216B.1642

Solar in Minnesota (Dec. 2017)

~5,000 acres solar

~6,600 acres of dry edible peas (2012)

~8,000,000 acres corn (2012)



Source: MN Department of Commerce

Pollinator-Friendly Solar Seeded in 2016

2,400 acres

0.01 percent of farmland

equal to…

>1,400,000

6’x12’

pollinator

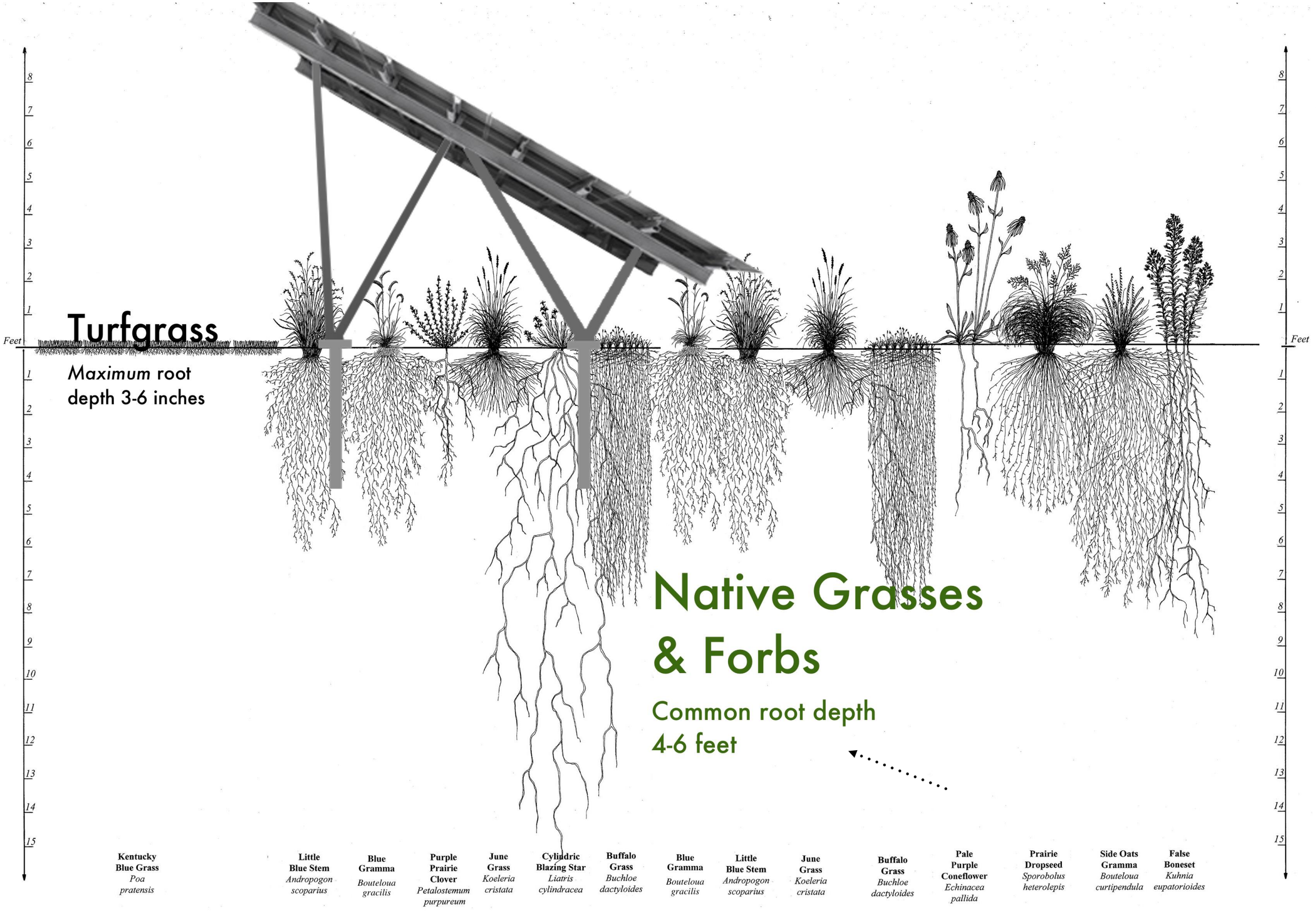
gardens

+long-term vegetation management

Jobs for the Rural Economy

Before

After


Feet
1
2
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11
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13
14
15
Turfgrass
Maximum root depth 3-6 inches
Native Grasses & Forbs
Common root depth 4-6 feet
Kentucky Blue Grass Poa pratensis
Little Blue Stem Andropogon scoparius
Blue Gramma Bouteloua gracilis
Purple Prairie Clover Petalostemum purpureum
June Grass Koeleria cristata
Cylindric Blazing Star Liatris cylindracea
Buffalo Grass Buchloe dactyloides
Blue Gramma Bouteloua gracilis
Little Blue Stem Andropogon scoparius
June Grass Koeleria cristata
Buffalo Grass Buchloe dactyloides
Pale Purple Coneflower Echinacea pallida
Prairie Dropseed Sporobolus heterolepis
Side Oats Gramma Bouteloua curtipendula
False Boneset Kuhnia eupatorioides

Sample Projects

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.
Cover Crop					
Avena sativa (Oats)[1]	3'	NA	20lbs/ac	1,100	8.9
Grasses					
Bouteloua curtipendula (Side oats grama) PLS	1-2'	Jun-Nov	8.0	6000.00	1.10
Bouteloua gracilis (Blue grama) PLS	1'	Jul-Oct	4.0	40,000.00	3.67
Buchloe dactyloides (Buffalo grass--BOWIE cultivar) PLS	5"	Apr-Dec	128.0	3,600.00	10.58
Carex bicknelli (Copper shouldered oval sedge) PLS	1-3'	Mar-May	2.0	17000.00	0.78
Koeleria macrantha (Junegrass) PLS	10-20"	Apr-Jun	4.0	200,000.00	18.37
Sporobolus heterolepis (Prairie Dropseed) PLS	2-3'	Jun-Aug	4.0	16,000	1.47
Forbs					
Allium canadense (Wild garlic)	1-2'	May-Jul	8.0	560.00	0.10
Allium stellatum (Prairie onion)	8-18"	Jul-Aug	1.00	11,000.00	0.25
Anemone canadensis (Canada Anemone)	1-2'	May-Jun	1.00	8,000.00	0.18
Anemone patens (Pasqueflower)	3-18"	Apr-May	1.00	18,000.00	0.41
Asclepias tuberosa (Butterfly-weed)	1-2'	Jun-Aug	2.00	4,300.00	0.20
Echinacaea angustifolia (Narow leaved Purple Coneflower)	1-2'	Jun-Jul	2.00	7000	0.32
Sisyrinchium campestre (Prairie blue-eyed grass)	4-16"	May-Jun	1.00	45,000.00	1.03
Solidago nemoralis (Gray goldenrod)	1-2'	Aug-Oct	0.50	300,000.00	3.44

COMMUNITY ENERGY SOLAR

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	2.06
	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**	

Connexus Energy
Performance Characteristics:
1. Visual appeal
2. Maintenance free for existing grounds crew
3. No loss of solar performance
4. Ecological services highlighted in company marketing materials

Vegetation seeded and maintained by Prairie Restorations, Inc
Seeded in Oct. 2014. Pictured in July, 2016.

Newsletter

Connexions

A member update.

CONNEXUS® ENERGY

September 2016

Pollinator haven at Connexus solar garden

For honey bees and butterflies, it doesn't get much better than the pollinator-friendly habitat found in Connexus Energy's community solar garden. Recently, Fresh Energy, with the help of Prairie Restoration, assessed our site, and we received a perfect 100 score on the Solar Site Pollinator Habitat Assessment. That means our solar garden not only provides solar energy for our members, but it also provides exceptional habitat to help struggling pollinators.

What is pollinator-friendly habitat?

Pollinators, such as honey bees, butterflies, hummingbirds, and bats, assist plants in reproduction by transferring pollen. This allows the plant to produce berries, nuts, and other foods important to the survival

Kearney Nebraska

Solar array seeded with >5 million native plants including:

- Purple Prairieclover
- Indian Blanket
- Four Point Evening Primrose
- Scarlet Globemallow
- Heath Aster
- Aromatic Aster
- Dwarf Goldenrod

May 2017
www.solarpowerworldonline.com

Solar Power World

Technology • Develo

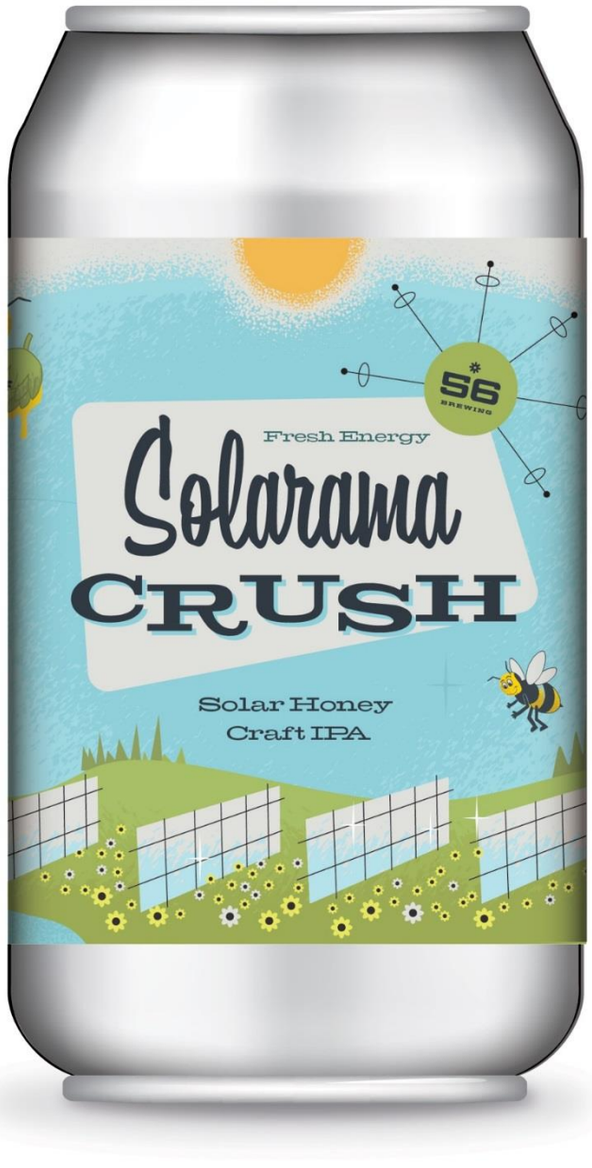
THE BUZZ around pollinator-friendly solar plants

ALSO INSIDE: 15 TRENDS KEEPING THE U.S. ON TOP OF ITS SOLAR GAME


SOLARHONEY
CERTIFIED
BEEKEEPING • POLLINATOR FRIENDLY


RAW HONEY US GRADE A FANCY
HONEY
BOLTON BEES
NET WT 13.5 oz (382.5 G)
SOLARW
THIS HONEY IS PART OF A BIGGER CIRCLE THAT CONNEXUS ENERGY
A MEMBER-OWNED ELECTRIC COOPERATIVE, HAS CREATED.
BY BUILDING ONE OF THE LARGEST COMMUNITY SOLAR GARDENS
MINNESOTA, CONNEXUS ENERGY OVERTURNED THE TYPICAL IDEA
THAT SOLAR FIELDS ARE LOCATED IN BARREN SURROUNDINGS.
THEY PLANTED A PICTURESQUE GARDEN WITH AN ABUNDANCE
POLLINATOR-FRIENDLY FLOWERS.
THE SOLARWISE SOLAR GARDEN IS NOT ONLY BEAUTIFUL TO
IS A PERFECT ENVIRONMENT FOR BEES TO FLOURISH. SUCH
AS THE BEES ARE MAKING THEIR HONEY, THE SOLAR PANELS
GENERATING RENEWABLE ELECTRICITY.


BREWED & PACKAGED IN NORTHEAST MINNEAPOLIS BY
56 BREWING
Please RECYCLE
6 15867 91542 0
The First
Solar Honey
Craft IPA
In true Garden to Growler™ fashion, Solarama Crush™ is the first of its kind, a Solar Honey India Pale Ale. It is a refreshing, crushable hazy American IPA that is heavily dry hopped with Citra, Loral and Enigma hops. In addition, it is sourced with local Minnesota ingredients. This collaboration has been crafted with Solar Honey™, Kernza®, Turkey Red Heritage Wheat, malted 2-row barley from Vertical Malting and Zeus hops from Mighty Axe Hops.


56 BREWING
Fresh Energy
Solarama
CRUSH
Solar Honey
Craft IPA


GOVERNMENT WARNING: (1) ACCORDING TO THE SURGEON GENERAL, WOMEN SHOULD NOT DRINK ALCOHOLIC BEVERAGES DURING PREGNANCY BECAUSE OF THE RISK OF BIRTH DEFECTS. (2) CONSUMPTION OF ALCOHOLIC BEVERAGES IMPAIRS YOUR ABILITY TO DRIVE A CAR OR OPERATE MACHINERY, AND MAY CAUSE HEALTH PROBLEMS.
Made in
Alc/vol
6.1%
750
ml of beer