EPRI

Pollinator-Friendly Solar Scorecards

Comprehensive Analysis of Scorecard Attributes

2021 TECHNICAL REPORT

Pollinator-Friendly Solar Scorecards

Comprehensive Analysis of Scorecard Attributes

3002022121

Final Report, October 2021

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NOTE

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ABSTRACT

The push toward carbon-free and renewable energy sources has precipitated a nationwide (United States) trend to increase solar generation via ground-mounted photovoltaic (PV) arrays. Beyond carbon benefits, one possible way to provide additional ecological value of solar PV projects is to co-locate pollinator habitat when site conditions permit.

Around 2015, the concept of a "scorecard" emerged that could assess the value of a solar project to pollinator species. The development and application of these scorecards, to date, has not been controlled by any central organization. Scorecards are being developed on a state-by-state basis using various processes, by a variety of subject matter experts, and using a range of oversight and review approaches. As such, there is variation between different state scorecard programs and divergent opinions regarding the scorecards themselves. Given that developing state and local laws and incentive programs are linked to the pollinator-friendly solar scorecards, it is important to consider the basis of the scorecards themselves. With interest in co-location of solar with pollinator habitat, this comprehensive study of existing pollinator solar scorecards considers the level of consistency across the scorecards, analyzes the specific scorable elements and their relative weighting, and investigates the factors that influenced scorecard development.

Specifically, EPRI conducted a desktop study to analyze scorecard attributes, including the level of consistency, associated programs (including state laws, if present), and factors that influenced scorecard development. A total of 15 state scorecards and one nonspecific scorecard available as of April 2021 were reviewed to identify common and differentiating features. A categorization system for individual scoring elements was created to facilitate numeric assessment across the available scorecards. Further, in order to understand the unique motivations and processes that influenced the design of the scorecards, interviews were conducted with 34 experts involved in scorecard design, policy development, and use, including university professors, state agency staff, and solar project developers, owners, and operators.

Research uncovered a general lack of rigor, consistency, and oversight for scorecard design methodology, version control, and use. However, if the scorecards can be predictive of ecological outcomes – healthy pollinator habitat – then they may still be meeting their primary purpose. Field-based research is necessary to determine if there is a correlation between the points received on a pollinator-friendly scorecard and the actual solar PV site habitat conditions.

Keywords

Pollinators
Habitat
Solar photovoltaic (PV)
Renewables
Solar scorecards

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PRIMARY AUDIENCE: Utilities with solar installations, environmental policymakers

SECONDARY AUDIENCE: Solar photovoltaic (PV) project developers, legislators

KEY RESEARCH QUESTION

One possible way to increase the ecological value of PV arrays is to include pollinator-beneficial vegetation on-site. In late 2015, some stakeholders – including state agencies, universities, conservation consultants, and solar developers – created the concept of a "scorecard" to assess the level to which a solar PV site is supporting is "pollinator-friendly." The first state-specific scorecard was released in 2016 in Minnesota, followed by an additional 13 state-specific scorecards between 2018 and 2020. The purpose of this report is to provide a neutral analysis of existing state-level scorecards and associated programs and laws, with a numerical analysis of scoring elements and passing criteria for each scorecard.

RESEARCH OVERVIEW

As an initial step to understand pollinator-friendly solar scorecards, EPRI conducted a desktop research study to analyze the scorecard attributes, including level of consistency, associated programs (including laws, if present), and factors that influenced scorecard development. A total of 15 state scorecards and one nonspecific scorecard available as of April 2021 were reviewed to identify common and differentiating features. Dashboards were created for each scorecard to capture key elements such as project documentation and methods, project elements covered by the scorecard, recertification and designation maintenance details, and laws, if applicable. When narrative information was present, the level of narrative detail associated with each scorecard category was assigned a qualitative rating (i.e., ranging from "very detailed" to "not addressed"). Scorecard-specific numerical assessments for achieving a passing score were summarized to facilitate comparisons. Applicable policies were reviewed for the eight states that have a state law. Further, in order to understand the unique motivations and processes that influenced scorecard design, EPRI conducted interviews with 34 stakeholders involved in scorecard design, policy development, and use. Experts included university professors, state agency staff, and solar project developers, owners, and operators. Interviews explored the history of scorecard design, current usage, and future needs of scorecard programs.

KEY FINDINGS

The research revealed several observations with the current scorecards:

- In general, there is a lack of rigor, consistency, and oversight for scorecard design methodology and version control.
- The process for scorecard development varied widely, which could potentially lead to concerns about the scorecards being used as the basis for laws.

- Citation of the scorecards in local and state laws, as well as the use of language such as “standards”, may lead to assumptions about the rigor of the scorecards themselves.
- Although solar site design scale varies widely, scorecard applicability on community-scale vs. utility-scale is not addressed in either the scorecards or the laws.
- None of the scorecards provided guidance on when *not* to establish pollinator habitat on a particular property due to ecological risk and/or unintentional creation of habitat sinks.
- The initial scorecards assess the plans for the site, not the implementation of those plans. Further, most scorecards are self-assessed with no oversight or third-party review. The result is that scores can reflects intentions, verses outcomes, and are self-assessed based on interpretation of the scoring elements and questions.
- The scorecards imply, via numerical scores, which factors are more important than others. It is unclear if the scorecard designers were conscientiously adjusting the weighting of elements, or if there was simply an addition of scoring elements that increased the maximum points possible and inadvertently changed the relative weighting of specific elements (relative to early scorecards).
- Based on average (mean) values, if a solar site were to achieve the full score for all Plant Diversity elements and no other points, it would receive 60%, which would be sufficient to meet the average minimum passing score of 56%.
- It is potentially problematic that the purpose of the scorecard is unclear making it difficult to assess if they are effective at meeting their purpose.
- Field verification is needed to confirm if there is any correlation between scorecard results and on-site habitat conditions.
- Another generation of scorecards that address some of the issues identified in this research would be useful for resolving the mismatch between the scorecards themselves, the presumed rigor of cited law, and the larger societal objective to advance a sustainable and equitable energy future.

WHY THIS MATTERS

Developers face inherent challenges in creating a simple tool, such as a single-page scorecard, to quickly assess complex ecological conditions. The task requires condensation to the most influential habitat features that some experts spend their entire careers studying. The condensation process will always come with trade-offs – generally aimed at balancing ecological relevance, level of effort for measurement, and achievability. Still, the value and interest in a tool for assessing the benefit of establishing plants that promote pollinator habitat on a solar PV site is clear, as growth in ground-mounted solar is expected to increase dramatically over the next 20 years. Given the continuing solar industry interest in co-location of solar with pollinator habitat, this comprehensive study of existing pollinator solar scorecards considers the level of consistency across the scorecards, analyzes the specific scorable elements and their relative weighting, and investigates the factors that influenced scorecard development.

HOW TO APPLY RESULTS

Solar developers, operators, and owners, and power companies who procure solar, may have interest in this report to understand the application of solar scorecards in their projects. Further, states and local agencies, conservation practitioners, and researchers may find this analysis useful in supporting further development of pollinator-labeling programs and the next generation of similar efforts.

LEARNING AND ENGAGEMENT OPPORTUNITIES

- *Overview of Pollinator-Friendly Solar Energy*. EPRI, Palo Alto, CA: 2019. 3002014869.
- *2020 Solar Technology Status, Cost, and Performance*. EPRI, Palo Alto, CA: 2020. 3002018729.
- *Power*-in-Pollinators Initiative
- *www*.epri.com/pollinators

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PROGRAM: P192A Environmental Aspects of Renewables and Power-in-Pollinators Initiative

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BACKGROUND AND PURPOSE

The push toward carbon-free and renewable energy sources has precipitated a nationwide (United States) trend to increase solar generation via ground-mounted photovoltaic (PV) arrays. Global cumulatively installed solar capacity is anticipated to exceed 900 GW in 2021 and triple over the next decade.[1] As a renewable energy source, solar is generally considered to have lower adverse environmental impacts relative to traditional fossil fuels and has potential to be paired with ecologically supporting land management practices.

One possible way to increase the ecological value of PV arrays is to include pollinator-beneficial vegetation on-site. In late 2015, some stakeholders – including state agencies, universities, conservation consultants, and solar developers – created the concept of a "scorecard" to assess the level to which a solar PV site is supporting pollinators, or is "pollinator-friendly."

The design and application of these scorecards is, to date, not controlled by any central organization and is, instead, being developed on a state-by-state basis, using various processes, by a variety of subject matter experts, and with a range of oversight and review approaches. As such, there is variation between different state scorecard programs, divergent opinions regarding the scorecards themselves, and lack of clarification on conditions under which they apply.

The purpose of this report is to provide a neutral analysis of existing state-level scorecards and associated programs (including laws, if present), with a numerical analysis of scoring elements and passing criteria for each scorecard. Further, in order to achieve a comprehensive assessment of existing scorecard programs and to ensure all information has been captured, published or otherwise, interviews were conducted with a range of informed stakeholders regarding the history, current usage, and future needs of the scorecard programs. Additional reports will extrapolate further on input provided during interviews; this report focuses on specific aspects of interview content related to the analytic consideration of the scorecards themselves.

[1] BloombergNEF. *New Energy Outlook 2020*. BloombergNEF, 2020.

2
METHODS

Collection of Scorecards

Scorecards and any supporting information, such as guides and laws, were obtained initially via internet searches. Interviews with more than 34 experts and stakeholders were also conducted to fill in missing information and to confirm EPRI's analysis of the scorecards. Interviewees were asked to provide contact information for individuals cognizant of scorecard programs.

Scorecard Design

The scorecards range in design but are typically comprised of a one- or two-page questionnaires with approximately 10 questions. The scorecards sometimes have a companion guide that provides additional information and instruction for the various elements covered in the scorecards.

Within the scorecards, there are two general types of questions: 1) those pertaining to the planning and initial establishment of pollinator habitat such as site management plans, seed mixes, and soil treatment, and 2) those pertaining to the ongoing maintenance of the habitat such as the number of established plant species, mowing intervals, and spot management of invasive species.

In some cases, only a single scorecard is used, which addresses planning / initial establishment questions only. However, in the majority of other cases, the single scorecard blends planning / initial establishment questions with ongoing maintenance questions. In these cases where only a single scorecard is published, the scorecard is typically labeled or otherwise contextualized as being the "initial" scorecard. The presence of maintenance-related questions on these single scorecards is minor compared to the focus on planning / initial establishment questions, even though this occurs on the majority of the single scorecards.

In other cases, these two types of questions are differentiated through the use of an "initial scorecard" to be used at the onset of the project and a separate "maintenance scorecard" or "established-site scorecard" to be used at intervals such as every year, every five years, or similar. In these cases, two separate scorecards are published (with the exception of South Carolina, which has an unscored initial application and a separate, numerically-scored maintenance scorecard).

Therefore, within this report, two categories of scorecards are defined: "initial" and "maintenance." The initial scorecards are used during site planning (despite the aforementioned minority of questions which appear to be phrased inconsistently) and reflect intentions and plans for the establishment of vegetation and other site features which could support pollinator habitat. The maintenance scorecards reflect conditions post-installation, which may cover plans for

ongoing management of the pollinator-supporting plants/features, or observed condition of plants/features, or both.

Assessment of Scorecards

A two-page "dashboard" was created to summarize key details for each scorecard, as presented in Section 3.

Figure 2-1 shows the template for the dashboards with a number identifying each section, as follows:

1 – Summary

The narrative summary covers the state's scorecard, scorecard program, associated laws, guidance, and any unique features thereof.

2 – Program Documentation Elements and Methods

This section pertains to the roles and responsibilities for reviewing and approving the scorecards themselves, the certifications, and monitoring / maintenance of the certifications.

3 – Scorecard Revision Dates

Date refers to when the scorecard was first published and the date of the most recent published revision. In this context, the term "published" is used loosely to indicate that the scorecard was posted on a public website; "published" does not suggest any level of oversight or review.

4 – Guide

This section identifies whether the scorecard program has a companion guide. (Yes/No)

5 – Initial Scorecard

Each question in each scorecard was analyzed. Points were assigned to one of the categories listed in Table 2-1 (for example, Site Planning and Management and Site Preparation). See Categorization subsection for details. Only positive points were considered in determining the maximum possible score (see Section 5 for further discussion about scoring). Those points were then summed to obtain a total possible score, from which the percentages were derived. Percentages were used to compare the relative contribution of each category to the overall score to normalize variability in both total score and minimum passing scores across the scorecards.

Percentage = total points possible in category / total maximum possible points for scorecard

6 – Maintenance Scorecard

The same method was used for both the initial and maintenance scorecards. See also the Categorization subsection.

7 – Narrative Information

The scorecards *plus* any other components such as companion guides were considered for the narrative information they provide. States with no companion guide had limited narrative content and were therefore not assessed for narrative information.

The narrative content was assessed in a qualitative manner using a five-level scale with associated color coding. If no color-coding is shown on the dashboard, that state did not provide separate guides or details to scorecard users.

Not Addressed	The topic was not discussed in the guide or scorecard.
Limited Detail	Either the scorecard or guide (or both) provide one or two statements on the topic, but no in-depth discussion or graded approach is provided.
Some Detail	More detailed than the "limited detail" level information is provided, but it is somewhat less than would be expected for "good detail."
Good Detail	Either the scorecard or guide (or both) provide in-depth discussions or a graded approach for the topic.
Very Detailed	This represents a high level of detail or guidance. For example, some programs provide listings of specific plant species or seed mixes.

8 – Notes

The notes are not intended to comprehensively summarize scorecard features but, rather, are used primarily to highlight features that are uncommon among other scorecards. The notes are used in this manner for scorecards both *with* and *without* companion guides, but the amount of detail recorded in the notes tends to be higher for scorecards *with* companion guides, reflecting the increased level of information in the guides. In these cases (scorecards *with* companion guides), the notes are also used to describe the amount of narrative information in the guide in greater detail than the five-level scale used in 7 – Narrative Information. When no notes are included ("-"), the information in the scorecard and guide are considered to be unremarkable (meaning, no notably unique features were observed associated with the given scoring category).

9 – Recertification and Maintaining the Designation

This section characterizes any requirements related to the long-term maintenance of the pollinator habitat such as inspections, periodic logs, or approvals as well as the frequency of such activities.

10 – Laws

This section identifies whether a state-level law exists, for example, any public policy, bill, act, regulation, statute, or other type of final legislation (not pending or draft). Local or county level ordinances are not considered.

State X

1

Website:

Program Documentation Elements:	Method:
Planning (or Initial) Scorecard	
Maintenance Scorecard	2
Original Certification	
Renewal Certification	
On-Site Monitoring and Verification	

Scorecard Established: 3 Latest Revision: Guide: 4

	Topic	Contribution to Initial Score †	Contribution to Maintenance Score †	Narrative Information †	Notes
Site	Site Planning and Management	5	6	7	8
	Site Preparation				
	Invasive Preparation				
	Site Size (Acreage)				
	Runoff and Erosion				
	Vegetation Buffer				
Plant Diversity – including flowering plant species, flower density, native species, forbs species, and number of blooming seasons					
Invasive Species Management					
Insect Health	Available Pollinator Habitat				
	Insecticide Risk				
	Insecticide Use				
Herbicide Use					
Wildlife Habitat					
Signage and Public Engagement					
Maximum Possible Score					
Passing Score		x (x%)			

† For the numeric contribution to initial a maintenance scores, only the scorecards themselves were considered. The scorecards *plus* any other components such as companion guides or the law were considered for the narrative information they provide.

Recertification / Maintaining the Designation:

Frequency	9	
Inspections		

Laws:

10	Status:	
	Effective Date:	
	Summary:	
	Key Text:	

Figure 2-1
Template for Dashboard Assessment of Scorecards

Categorization

The categories listed on the dashboards do not match the contents of the scorecards one-for-one. Due to the variability among scorecard designs and terms, a categorization system was used to normalize the different scorecards to enable comparison and analysis. Table 2-1 provides a description of each category.

Table 2-1
Characterization of Scoring Elements

Site Planning and Management	Scoring elements pertaining to the existence of an overall plan for installing and/or maintaining pollinator habitat.
Site Preparation	Scoring elements pertaining to site grading, removal of existing vegetation, control of existing seed bank in the soil, proactively mitigating invasive species, and the control of erosion during initial establishment.
Invasive Preparation	Scoring elements associated with *lack of* measures taken to control weeds during site preparation. While this overlaps with Site Preparation, this category pertains specifically to the failure to plan any actions related to managing invasive species. In all scorecards reviewed within the scope of this report, scores in this category are penalties (negative points).
Site Size	Size considerations for the use of the scorecard. For example, some scorecards and "pollinator-friendly" designations only apply to sites above a certain minimum site size. Note that typical land use for photovoltaic installations ranges from 3.5–6.2 acres per megawatt (AC). All conversions from *acres to generation capacity* were calculated using EPRI report 3002018729.[2]
Runoff and Erosion	While there is overlap with the "Site Preparation" category, this category is reserved for any element related to runoff and erosion control beyond the initial site establishment period (separate from the Site Preparation category). No scorecards allocated any points to the Runoff and Erosion category.
Vegetation Buffer (size)	Scoring elements pertaining to the existence and ***size*** of a buffer zone around the outside of the panel array, but still within the property managed as part of the solar project. This does NOT include scoring elements associated with plant diversity specifically in the buffer – those scoring elements are included in the Plant Diversity category.
Plant Diversity	Scoring elements related to the abundance and diversity of plant species, such as • Number of forb species • Number of native grass species • Percent cover of forbs • Percent cover of native grasses • Number of blooming seasons • Seed sourcing / quality • Flower density • Flowering plant species

[2] *2020 Solar Technology Status, Cost, and Performance*. EPRI, Palo Alto, CA: 2020. 3002018729.

Table 2-1 (continued)
Characterization of Scoring Elements

Invasive Species Management	Scoring elements pertaining to a plan for the control of invasive species beyond the initial establishment period (separate from Site Preparation and Invasive Preparation categories). All scores in this category are positive points.
Available Pollinator Habitat	Scoring elements pertaining to pollinator habitat features, excluding availability of flowering plant species. For example: • Nesting features (whether naturally occurring or introduced) • Clean water sources Available Pollinator Habitat is typically specified to be available within 0.25 mi (~0.40 km) of the site and is assumed to include features located either on the site or within 0.25 mi (~0.40 km) from the edge of the site.
Insecticide Risk	Scoring elements pertain to actions taken toward reducing the risk associated with the use of insecticides *on neighboring sites* (for example, communication with local chemical applicators to reduce the potential for chemical drift onto the solar site).
Insecticide Use	Scoring elements associated with the application of insecticides *on the site*. See additional notes below this table.
Herbicide Use	Scoring elements pertaining to actions taken toward reducing the risk associated with the direct application of herbicides *on the site*.
Wildlife Habitat	Scoring elements associated with features or measures intended to promote wildlife other than pollinators, such as birds, including available nesting features and passages in fencing.
Signage/Public Engagement	Scoring elements associated with signage posted, public engagement, or hosting of educational events and research collaborations on the site.

The specific assignment of points into one of the above categories is included in Appendix A for each individual scorecard.

Numerical and Statistical Analysis

The points in the scorecards were used as a basis for numerical and statistical analyses. Similar to the need to apply to standardize categories for the various scorecard elements, it was necessary to use methods to allow for comparison of the point values between scorecards. The points were mapped to the standardize categories, and the associated points were summed for each category. The total of possible points by category were then compared to the total maximum possible points in the scorecard, resulting in a percentage. This percentage-based analysis facilitated the following objectives:

- Examination of relative weighting of each category to the overall scorecard
- Direct comparison between scorecards
- Calculation of a normalized variability (coefficient of variation) across all scorecards in
  - Total score
  - Minimum passing score

Statistical analyses were generated using Microsoft Excel built-in equations and charts. The results of the numerical and statistical analyses are included in the data tables in Section 4

(Table 4-3, Table 4-4, and Table 4-5), in situ with the data itself. Each parameter is described as follows in Table 2-2:

NOTE: The Massachusetts scorecards are not numerically-based and therefore not included in the statistical analysis. The South Carolina initial assessment is also not numerically-based and therefore not included in the statistical analysis (but the South Carolina maintenance scorecard is numerically-based and therefore included).

Table 2-2
Explanation of Scorecard Questions

Parameters	Explanation
Number of questions	Each numbered question was counted. Questions with multiple sub-parts were counted as one (for example, 1a, 1b, and 1c were counted as one question).
Maximum possible score	Summed value of the maximum points in all categories on a given scorecard
Minimum passing score	Taken directly from the scorecard
Minimum passing score (%)	Calculated value: (*Minimum passing score* / *Maximum possible score) x 100*
Scoring in Table 4-4 (percentage values) for each category	Calculated as: *Total score possible (summation) for that specific category (see Appendix A)* / *Maximum possible score*
Scoring in Table 4-5 (point values) for each category	Total score possible (summation) for that specific category (see Appendix A)
Minimum	Minimum value in the data set, obtained using the Microsoft Excel *MIN()* function
Maximum	Maximum value in the data set, obtained using the Microsoft Excel *MAX()* function
Mean	Calculated using the Microsoft Excel *AVERAGE()* function
Standard deviation	Calculated using the Microsoft Excel *STDEV.P()* function. This parameter measures the dispersion of the data set relative to its mean. In some cases, this is not a statistically significant value, as the data sets in this report are small (n = 19) and, in some cases, not normally distributed.
Coefficient of variation	Calculated as: *Standard deviation* / *Mean* While the standard deviation is also a representation of variation in the data set, the standard deviation must be considered in the context of that data set's mean value. The coefficient of variation is useful because it is normalized against the mean which makes it a dimensionless value supporting comparison across different data sets. In this report, the coefficient of variation is used to assess the level of variability across different scoring categories. In some cases, this is not a statistically significant value, as the data sets in this report are small (n = 19) and, in some cases, not normally distributed.

Additional notes on the reporting of specific scoring elements:

- Many states use penalties (negative points) for on-site insecticide use, on-site herbicide use, or a lack of soil preparation. These elements were all included in the dashboards as well as the numerical comparison in Section 4. The Missouri maintenance scorecard is unique in that it includes additional penalties (-2 points) as part of Question 1 of the Site Planning and Management category. These penalties (two separate penalties, each with a value of -1 point) include: a) mowing occurs on more than one-third of the site each year and b) mowing is conducted frequently and/or during the summer (not during dormancy). These penalty points on the Missouri scorecard were excluded from the reported numbers in the EPRI dashboard for the following reasons: a) inclusion of penalty points for mowing is unique to Missouri, b) the penalties represent a minor impact to the score, and c) summing these penalty points together with the positive scores that can also be achieved from other criteria within Question 1 would skew the results. Specifically, while it is possible on Question 1 of the Missouri maintenance scorecard to earn 18 points but lose 2 points resulting in a net of 16 points, only those 18 possible positive points were considered in the EPRI dashboard for Missouri and in the numerical comparison in Section 4.
- Some scorecards include a question about the size of buffer zones. If, for example, 5 points are available for a 30-ft (~9-m) wide buffer zone and 5 points are also available for a 50-ft (~15-m) wide buffer zone, this was counted as if only 5 total points are available (that is, the scorecard user cannot obtain points for both a 30-ft zone *and* a 50-ft zone – these points are assumed to be mutually exclusive).

Interviews

Potential interviewees were contacted based on information provided in the scorecards themselves, associated web sites, or through direct referrals. The scope of interviews was initially limited to individuals involved in the design of scorecards and the associated laws (university researchers or state agency representatives); ultimately, the scope was expanded to include solar developers, owners, and operators to add additional perspectives. Interviews were conducted virtually (web conference). All interviews were scheduled for 30 minutes, but in nearly all cases lasted for 45–60 minutes. Interviews were conducted with 34 experts and stakeholders involved in scorecard design, policy development, and use. Interviews explored the history of scorecard design, current usage, and future needs of scorecard programs using a set of approximately 10 structured questions and facilitated discussions. This report summarizes a portion of the interview input; however, a companion publication is anticipated to discuss the varied perspectives from solar developers, scientists, and conservation practitioners regarding appropriate use of scorecards, limitations, and areas for improvement.

Reminder: The analysis and conclusions of this report are EPRI's alone and not necessarily those of the experts interviewed.

The following individuals in Table 2-3 participated in the interviews:

Table 2-3
EPRI Interview Subjects and Companies

Individual	State Scorecard
Rachel Mallinger Assistant Professor, University of Florida Department of Entomology and Nematology	Florida
Adam Dolezal Assistant Professor – Entomology, Univ of Illinois at Urbana-Champaign (UIUC)	Illinois
Sam Droege Wildlife Biologist, United States Geological Survey (USGS)	Maryland
Ginny Rogers Manager with Power Plant Research Program, Department of Natural Resources (DNR)	Maryland
Jennifer Selfridge Biologist with the Natural Heritage Program at DNR	Maryland
Zara Dowling Research Fellow, UMass CEE	Massachusetts
Rufus Isaacs Professor of Entomology, Michigan State University	Michigan
Greg Ridderbusch CEO, Connexus Energy	Minnesota
Dan Shaw Senior Ecologist, Minnesota Board of Water and Soil Resources (BWSR)	Minnesota
Robert A. Pierce, II Associate Extension Professor and Wildlife Specialist – Missouri University Extension	Missouri
Scott McArt Assistant Professor, Cornell University Department of Entomology	New York
Gabriela Garrison Eastern Piedmont Habitat Conservation Coordinator, NC Wildlife Resources Commission	North Carolina
Elizzabeth Kaufman Plant Ecologist, Pollinator Partnership	Northern California / Oregon
Kelly Rourke Executive Director, Pollinator Partnership	Northern California / Oregon
Jeremy King Director of Sustainability Denison University	Ohio
Michael Retterer Coordinator for Ohio Pollinator Habitat Initiative (OPHI) and National ROW and Energy Coordinator for Pheasants Forever	Ohio
Mike Kiernan Bee the Change	Vermont

Table 2-3 (continued)
EPRI Interview Subjects and Companies

Individual	State Scorecard
Caitlin Cyrus Environmental Specialist, VHB	Virginia
Doug DeBerry Senior Environmental Scientist (VHB) and Research Assistant Professor of Environmental Science and Policy (William & Mary)	Virginia
Claudio Gratton Professor of Entomology, University of Wisconsin - Madison	Wisconsin
Iris Caldwell Program Manager – Sustainable Landscapes for the University of Illinois Chicago Energy Resources Center	Not state-specific
Rob Davis Director, Center for Pollinators in Energy, Fresh Energy	Not state-specific
Sarah Foltz Jordan Senior Pollinator Conservation Specialist, Xerces Society	Not state-specific
Brian Kortum Director, Environmental Permitting, NiSource	Not state-specific
Marcus Krembs Director of Sustainability, Enel North America	Not state-specific
Eric Lee-Mäder Pollinator Program Co-Director, Xerces Society	Not state-specific
Beth Markhart Senior Restoration Ecologist, Western EcoSystems Technology, Inc.	Not state-specific
Bill Pascoe Power Procurement Manager, MCE (aka Marin Clean Energy)	Not state-specific
Anonymous Senior Environmental Manager- Siting, Licensing, and Permitting NextEra Energy Resources	Not state-specific
Anonymous Senior Environmental Project Manager- Wildlife and Natural Resources NextEra Energy Resources	Not state-specific
Anonymous Senior Environmental Specialist- Siting, Licensing and Permitting NextEra Energy Resources	Not state-specific
Anonymous *Solar Operator/Owner*	Not state-specific
Anonymous *Solar Operator/Owner*	Not state-specific
Anonymous *Solar Operator/Owner*	Not state-specific

States Not Included

A few scorecards in development were not included in this analysis, as described below.

New York: New York passed Senate Bill S6339A in 2018 that commits to developing a program encouraging pollinator-friendly solar (https://www.nysenate.gov/legislation/bills/2017/s6339 (accessed on November 7, 2021)). Although this senate bill does not specifically mention the use of a scorecard, Cornell University did some work (with Fresh Energy) toward developing a New York scorecard. At the time of this research, that scorecard was in early draft form. Based on interview input, no progress has been made on this scorecard since approximately 2018.

Pennsylvania: Pennsylvania State University has done some work toward a scorecard for the state (https://ento.psu.edu/research/centers/pollinators/resources-and-outreach/pollinator-friendly-solar) but has not published anything at this time. Pennsylvania does not have any state laws or incentive programs related to establishing pollinator habitat at solar facilities.

Southern California: A scorecard applicable to Southern California has very recently come into existence but was introduced after the primary research was conducted for this report and is, therefore, not included. Two versions of this scorecard were posted at the time of writing, one on the MCE website and a different version on the Fresh Energy website.

Assumptions and Limitations

- The scorecards were collected between approximately September 2020 and April 2021 and analyzed from approximately November 2020 through September 2021. Many of the scorecards have been updated since the original design, and some were updated during the period of research. In some cases, different versions of a given scorecard were available on different web sites. To ensure traceability, the version of each scorecard used to conduct this assessment is included in Attachment 1, and versions of the laws studied are included in Attachment 2.
- The numerical summary and associated statistical analysis include both initial scorecards and maintenance scorecards. Although this is somewhat imbalanced because some states have two separate (initial and maintenance) scorecards whereas others only have one, this was considered to be the most meaningful representation of the data.
- The term “published” is used loosely to indicate that a scorecard is available in a finalized form and has been made publicly available, generally on a website. “Published” does not suggest any level of review.
- It is assumed that the points assigned correspond to the relative importance of scoring elements.
- Use of “law” in this report is used generally to mean any public policy, act, regulation, statute, or any stage of legislation. Only state-level laws were comprehensively summarized. No national laws are known at the time of writing, and local laws were not reviewed.

3
SCORECARD DASHBOARDS

Two-page summary level dashboards are provided for each of the 15 scorecards listed below alphabetically. See Section 2 for a description of the dashboard contents.

- Florida
- Illinois
- Indiana
- Maryland
- Massachusetts
- Michigan
- Minnesota
- Missouri
- North Carolina
- Northern California / Oregon
- Ohio
- South Carolina
- Vermont
- Virginia
- Wisconsin

In addition to the above scorecards associated with a specific state, a dashboard is also included for the following non-state-specific scorecard:

- Fresh Energy

Florida

Florida has a one-page scorecard. A separate maintenance scorecard is not available. The Florida scorecard does not have an accompanying companion guide, but rather refers to separate documents for some details about site preparation and recommended plant species.

Florida has no state law or incentive program.

Website: http://www.rachelmallinger.com/extension.html

Program Documentation Elements:	Method:
Planning (or Initial) Scorecard	Self-calculated
Maintenance Scorecard	N/A
Original Certification	N/A
Renewal Certification	N/A
On-Site Monitoring and Verification	Self-monitored

Scorecard Established: 2019 Latest Revision: - Guide: No

	Topic	Contribution to Initial Score	Contribution to Maintenance Score	Narrative Information	Notes
Site	Site Planning and Management	15%	-	-	Points awarded for a monitoring plan are included in this category.
	Site Preparation	7%	-	-	The scorecard references to ENY168, one of a series of publications of the Department of Entomology and Nematology, UF/IFAS Extension. ENY168 provides a significant level of detail on site preparation for weed minimization.
	Invasive Preparation	-7%	-	-	-
	Site Size (Acreage)	-	-	-	-
	Runoff and Erosion	-	-	-	-
	Vegetation Buffer	-	-	-	-
Plant Diversity – including flowering plant species, flower density, native species, forbs species, and number of blooming seasons		59%	-	-	-
Invasive Species Management		-	-	-	-
Insect Health	Available Pollinator Habitat	-	-	-	Although available habitat features are not covered, insecticide risk is covered well, including a penalty for use of pretreated seeds or plants with insecticides.
	Insecticide Risk	7%	-		
	Insecticide Use	-30%	-		
Herbicide Use		-	-	-	-
Wildlife Habitat		4%	-	-	-
Signage and Public Engagement		7%	-	-	-
Maximum Possible Score		135	-		
Passing Score		80 (59%)	-		

Recertification / Maintaining the Designation:

Frequency	N/A	-
Inspections	N/A	-

Laws:

None	Status:	-
	Effective Date:	-
	Summary:	-
	Key Text:	-

Illinois

Illinois has a one-page scorecard, developed with the University of Illinois. A separate maintenance scorecard is also available, as well as a short (three-page) guide. Illinois has a "voluntary designation" state law.

Website: https://www2.illinois.gov/dnr/conservation/PollinatorScoreCard/Pages/default.aspx

Program Documentation Elements:	Method:
Planning (or Initial) Scorecard	Self-calculated (must be submitted on the Illinois Department of Natural Resources [IDNR] website)
Maintenance Scorecard	Self-calculated (must be submitted on the IDNR website)
Original Certification	Self-approved
Renewal Certification	Self-approved
On-Site Monitoring and Verification	Self-monitored

Scorecard Established: December 2019 Latest Revision: January 2021 Guide: Yes

	Topic	Contribution to Initial Score	Contribution to Maintenance Score	Narrative Information	Notes
Site	Site Planning and Management	6%	7%	Some Detail	Points are awarded for a "detailed establishment and management plan," and the companion guide contains some details.
Site	Site Preparation	12%	-	Some Detail	Points are awarded for soil preparation and weed control. The companion guide provides some notes but is not extensive. Seed rates are specified depending on the slope (< or > 5%). An oat cover crop is recommended to reduce erosion for slopes >5%.
Site	Invasive Preparation	-6%	-	Some Detail	The companion guide addresses weed control during site preparation, including specific mention of specific difficult species, but is otherwise limited in detail.
Site	Site Size (Acreage)	-	-	Not Addressed	While not addressed in the scorecard itself, 525 ILCS 55 applies to sites larger than 40 kW.
Site	Runoff and Erosion	-	-	Not Addressed	-
Site	Vegetation Buffer	9%	11%	Good Detail	Points are awarded on a graded basis depending on specific widths. However, the guide does not provide any further detail.
Plant Diversity – including flowering plant species, flower density, native species, forbs species, and blooming seasons		60%	56%	Very Detailed	Takes into account some exemplary considerations, such as generic origin of seed within 150 mi (~241 km) of the site and higher seeding rates for sloped plots.
Invasive Species Management		-	11%	Good Detail	Points are awarded in both initial and maintenance scorecards (falls under site preparation for the initial scorecard), and the guide provides additional details.
Insect Health	Available Pollinator Habitat	5%	6%	Good Detail	Available habitat within 0.25 mi (~0.40) is specified, including points awarded for creation of nesting features on-site. Insecticide risk is also addressed in the scorecard.
Insect Health	Insecticide Risk	3%	4%		
Insect Health	Insecticide Use	-24%	-29%		
Herbicide Use		-	-	Not Addressed	Herbicide treatment is recommended as an option for weed control without discussion of potential risks.
Wildlife Habitat		3%	4%	Not Addressed	-
Signage and Public Engagement		2%	2%	Limited Detail	Signage is encouraged, but additional public engagement such as research and education are not specified.
Maximum Possible Score		164	139		
Passing Score		85 (52%)	70 (50%)		

Recertification / Maintaining the Designation:

Frequency	3 years (1st), 5 years (thereafter)	A passing score must be obtained on the maintenance scorecard after the first three years and then every five years thereafter.
Inspections	-	Inspections are not required.

Laws:

Illinois Pollinator-Friendly Solar Site Act (525 ILCS 55/) https://www.ilga.gov/legislation/ilcs/ilcs3.asp?ActID=3900&ChapterID=44 Accessed on Sept 1, 2021	Status:	Enacted
	Effective Date:	August 21, 2018
	Summary:	Allows owner / manager to claim that a site is "pollinator-friendly"
	Key Text:	*An owner or manager of a solar site with a generating capacity of more than 40 kilowatts…may claim that the site is "pollinator-friendly" or provides benefits to game birds, songbirds, and pollinators only if the site adheres to guidance set forth by the pollinator-friendly scorecard published by the Department in consultation with the University of Illinois, Department of Entomology.*

Indiana

Indiana has a one-page scorecard developed by Purdue University. The companion technical guide provides a significant level of detail beyond the scorecard. A separate maintenance scorecard is absent. The scorecard has a strong emphasis on differentiation between the array zone and buffer zone (points can be obtained for pollinator-friendly vegetation separately in these areas).

There is no state law or incentive program, but some counties have adopted some form of pollinator-friendly ordinances.

Website: http://macog.com/solar_energy.html

Program Documentation Elements:	Method:
Planning (or Initial) Scorecard	Self-established
Maintenance Scorecard	None
Original Certification	None
Renewal Certification	None
On-Site Monitoring and Verification	None

Scorecard Established: 2020 Latest Revision: - Guide: Yes

	Topic	Contribution to Initial Score	Contribution to Maintenance Score	Narrative Information	Notes
Site	Site Planning and Management	8%	-	Very Detailed	The companion guide provides a good amount of detail, though the scorecard itself does not necessarily reflect the amount of detail in the guide.
Site	Site Preparation	15%	-	Very Detailed	The companion guide provides a good amount of detail, though the scorecard itself does not necessarily reflect the amount of detail in the guide.
Site	Invasive Preparation	-5%	-	Some Detail	The companion guide addresses weed control during site preparation at a cursory level. It includes a reference to a more comprehensive site preparation guide from the Xerces Society, which improves the scorecard's overall level of detail: https://xerces.org/publications/guidelines/organic-site-preparation-for-wildflower-establishment. The guide briefly mentions the use of mulch or erosion control blankets on step banks.
Site	Site Size (Acreage)	-	-	Not Addressed	-
Site	Runoff and Erosion	-	-	Not Addressed	-
Site	Vegetation Buffer	3%	-	Very Detailed	Good discussion is provided in the guide including specific measurements.
Plant Diversity – including flowering plant species, flower density, native species, forbs species, and number of blooming seasons		62%	-	Very Detailed	Consideration of some exemplary considerations is included, such as generic origin of seed within 200 mi (~322 km) of the site. The guide includes example seed mixes.
Invasive Species Management		-	-	Very Detailed	-
Insect Health	Available Pollinator Habitat	-	-	Some Detail	There is an inconsistency in that pollinator habitat is not addressed in the current version of the scorecard, but it is present in the example scorecard presented in Appendix D of the guide. Insecticide risk is addressed thoroughly.
Insect Health	Insecticide Risk	3%	-		
Insect Health	Insecticide Use	-20%	-		
Herbicide Use		-	-	Not Addressed	Herbicide treatment is recommended as an option for weed control without discussion of potential risks. Herbicide treatment is also recommended for maintenance, although spot treatment is encouraged (instead of general application).
Wildlife Habitat		-	-	Limited Detail	The guide recommends timing mowing to minimize impact to wildlife.
Signage and Public Engagement		10%	-	Very Detailed	Scorecard awards points for signage, public engagement, and research involvement. Public resources and links are discussed in the guide.
Maximum Possible Score		199	-		
Passing Score		100 (50%)	-		

Recertification / Maintaining the Designation:

Frequency	None	-
Inspections	None	-

Laws:

None	Status:	-
	Effective Date:	-
	Summary:	-
	Key Text:	-

Maryland

Maryland has a one-page scorecard. A separate maintenance scorecard is not available. Maryland has not published a unique companion guide, but rather refers to the United States Department of Agriculture (USDA) Conservation Cover – 327, "Herbaceous Plantings for Pollinator Habitat," which provides a significant level of detail particularly in site preparation and maintenance.

There is a "voluntary designation" type state law.

Website: https://dnr.maryland.gov/pprp/Pages/pollinator.aspx

Program Documentation Elements:	Method:
Planning (or Initial) Scorecard	Self-calculated
Maintenance Scorecard	None
Original Certification	Reviewed by third-party (non-government)
Renewal Certification	Reviewed by third-party (non-government)
On-Site Monitoring and Verification	Third-party (non-government)

Scorecard Established:	2020 (March)	Latest Revision:	-	Guide:	No (ref. to Conservation Cover – 327)

	Topic	Contribution to Initial Score	Contribution to Maintenance Score	Narrative Information	Notes
Site	Site Planning and Management	17%	-	Good Detail	Very few details are included in the scorecard itself, and Maryland does not have a companion guide. However, the scorecard does refer to Conservation Cover – 327, which provides a good level of detail.
Site	Site Preparation	7%	-	Good Detail	Good detail is provided (again not in the scorecard itself but by reference to Conservation Cover – 327).
Site	Invasive Preparation	-	-	Some Details	Good detail is provided (again not in the scorecard itself but by reference to Conservation Cover – 327).
Site	Site Size (Acreage)	-	-	Not Addressed	While not addressed in the scorecard itself, the pollinator certification regulation specifies a site size of at least 1 acre.
Site	Runoff and Erosion	-	-	Not Addressed	-
Site	Vegetation Buffer	-	-	Limited Detail	The scorecard covers only the percentage of native and flowering plants in the buffer zone, not the size of the zone. Conservation Cover – 327 does not address a buffer zone.
Plant Diversity – including flowering plant species, flower density, native species, forbs species, and number of blooming seasons.		52%	-	Very Detailed	The Maryland scorecard covers plant diversity thoroughly. The DNR web page links to seed mix sources. Conservation Cover – 327 provides additional useful details.
Invasive Species Management		7%	-	Very Detailed	The scorecard questions address invasive species management, and Conservation Cover – 327 provides narrative details.
Insect Health	Available Pollinator Habitat	11%	-	Good Detail	Scorecard question #4 addresses the potential for pesticide contents in the seed mix.
Insect Health	Insecticide Risk	-	-		
Insect Health	Insecticide Use	-17%	-		
Herbicide Use		-	-	Good Detail	Although Conservation Cover – 327 promotes the use of herbicide for weed control, it also emphasizes the risks associated with using herbicide where wildflowers are planted.
Wildlife Habitat		-	-	Limited Detail	Wildlife considerations associated with mowing activities are discussed (such as timing and mowing pattern).
Signage and Public Engagement		7%	-	Good Detail	The scorecard encourages signage, public education, and pollinator research.
Maximum Possible Score		230	-		
Passing Score		160 (70%)	-		

Recertification / Maintaining the Designation:

Frequency	Every 2 years	Every two years, including inspection by an approved site inspector.
Inspections	Every 2 years	Required for certification and renewal. List of approved inspectors includes third-party individuals from nongovernment agencies.

Laws:

COMAR 08.13.02 https://dnr.maryland.gov/pprp/Documents/Proposed_PollinatorFriendlyDesignation-01172020.pdf Accessed on Sept 1, 2021	Status:	House Bill was signed into law in May 2017. Pollinator Certification Regulation (COMAR 08.13.02) was finalized in March 2020.
	Effective Date:	March 2020
	Summary:	Allows owner to claim that a site is "pollinator-friendly."
	Key Text:	*"1) To apply for a pollinator-friendly designation, the owner of the solar generation facility shall submit: a) A completed application on a form provided by the Department; and b) A pollinator habitat plan.… A designation is valid for 2 years after the date of issuance."*

Massachusetts

The Massachusetts pollinator-friendly solar program does not use the typical "scorecard," but instead includes checklists with the certification criteria. A basic certification level is available, plus increasingly rigorous "silver," "gold," and "platinum" levels. The Massachusetts program relies on independent review by the University of Massachusetts Clean Energy Extension (CEE). The checklists and companion guidance include a significant level of detail. Maintenance and recertification are also more rigorous compared to scorecards in other states, including frequent recertification schedule and inspections. The cost for program participants ranges from $2,000-$15,000 depending on the site size, plus $5,000 every three years.

The state law in Massachusetts is unique – it is the only known law to include a financial incentive in the form of a $0.0025/kWh rate adder (applicable only for site "units" equal to or less than 5 MW_{AC}).

Website: https://ag.umass.edu/clean-energy/services/pollinator-friendly-solar-pv-for-massachusetts

Program Documentation Elements:	Method:
Planning (or Initial) Scorecard	Approved by UMass CEE
Maintenance Scorecard	Approved by UMass CEE
Original Certification	Approved by UMass CEE
Renewal Certification	Approved by UMass CEE
On-Site Monitoring and Verification	Inspection performed by UMass CEE

Scorecard Established: 2019 Latest Revision: 2021 Guide: Yes

Topic		Initial Score	Maintenance Score	Narrative Information	Notes
Site	Site Planning and Management			Very Detailed	Site planning and management is addressed in the companion guide. As compared with other programs, the Massachusetts guide specifies contents of the plan.
	Site Preparation			Very Detailed	Site Preparation is addressed in the companion guide.
	Invasive Preparation			Good Detail	The companion guide addresses weed control during site preparation with some details beyond other states, such as consideration of separation of infested areas. It includes a reference to several more comprehensive site preparation resources from the Xerces Society (https://www.xerces.org), which improves the scorecard's overall level of detail.
	Site Size (Acreage)			Not addressed	Not directly addressed. Note that the "platinum" certification level is awarded only for facilities sited on land that was previously developed (i.e., not sited on land that was formally in agricultural production or open, undeveloped land, such as a grassland, shrubland, or forest).
	Runoff and Erosion			Limited Detail	The companion guide does mention the use of straw or erosion fabric as well as potential stormwater runoff considerations, but with very limited detail.
	Vegetation Buffer			Very Detailed	Although a specific width of the buffer zone (referred to as the "trim zone") is not provided like other scorecards, substantial detail about the buffer/trim zone is provided.
Plant Diversity – including flowering plant species, flower density, native species, forbs species, and number of blooming seasons				Very Detailed	A significant level of detail is included about Plant Diversity. The guide links to resources such as a Massachusetts native species list and seed sources.
Invasive Species Management				Very Detailed	A significant level of detail is included about Invasive Species Management in the certification criteria checklist and guide.
Insect Health	Available Pollinator Habitat			Very Detailed	A significant level of detail is included about Insect Health in the certification criteria checklist and guide.
	Insecticide Risk				
	Insecticide Use				
Herbicide Use				Good detail	Herbicide treatment is acknowledged as an option for the control of invasive or unwanted species and is generally discouraged in the Massachusetts program. Widespread herbicide use is limited. CEE would not approve a plan that involves widespread herbicide use after initial establishment.
Wildlife Habitat				Very Detailed	Checklists include some details such as wildlife passage through/under fencing. The guide provides a significant level of detail.
Signage and Public Engagement				Limited Detail	Signage is encouraged, but additional public engagement such as research and education are not specified.
Maximum Possible Score					
Passing Score					

The Massachusetts program does not have scored scorecards, but checklists that are used by UMass CEE to approve (or deny) the pollinator-friendly designation.

Recertification / Maintaining the Designation:

Frequency	Every 3 years	Reviewed by third-party (UMass CEE) An annual maintenance log is also required.
Inspections	Every 3 years	Inspection by third-party (UMass CEE)

Laws:

225 CMR 20.07(4)e https://www.mass.gov/doc/225-cmr-2000-final-071020-clean/download Accessed on Sept 1, 2021 *(SMART Solar Incentive Program)*	Status:	State Regulation
	Effective Date:	November 2018
	Summary:	Rate adder - $0.0025/kWh
	Key Text:	*(e) Pollinator Adder. A Solar Tariff Generation Unit that obtains and maintains at least a silver certification from the University of Massachusetts Clean Energy Extension Pollinator-Friendly Certification Program, or other equivalent certification as determined by the Department, shall be eligible to receive an additional $0.0025/kWh Compensation Rate Adder.*

Michigan

The Michigan scorecard is a one-page format covering the core considerations (planning, site preparation, plant diversity, and insect health), but with limited detail in other areas. No guide, landing page, or source of readily accessible information on such areas as planning and management is available.

The state incentive program (the Farmland Preservation Program) is unique, allowing the use of otherwise protected farmlands for solar power production provided that the site receives a score of 76 or higher on the scorecard.

Maintenance is a soft requirement specified in the Farmland Preservation Program but is not covered in the scorecard. A separate maintenance scorecard is not available.

Website: (None)

Program Documentation Elements:	Method:
Planning (or Initial) Scorecard	Self-calculated
Maintenance Scorecard	None
Original Certification	None
Renewal Certification	None
On-Site Monitoring and Verification	None

Scorecard Established: June 2018 Latest Revision: - Guide: No

	Topic	Contribution to Initial Score	Contribution to Maintenance Score	Narrative Information	Notes
Site	Site Planning and Management	13%	-	-	The scorecard includes points for both vegetation management plans and site plans, but no details are provided.
Site	Site Preparation	9%	-	-	-
Site	Invasive Preparation	-18%	-	-	-
Site	Site Size (Acreage)	-	-	-	-
Site	Runoff and Erosion	-	-	-	-
Site	Vegetation Buffer	-	-	-	-
Plant Diversity – including flowering plant species, flower density, native species, forbs species, and number of blooming seasons		54%	-	-	A portion of the plant diversity points can be obtained for grass only (2 points), clover/grass mix (5 points), or low-growing wildflower mix (10 points). Seeding rate is specified (at least 40 seeds per square foot), irrespective of seed species or types. Seed sourcing is specified – within 150 mi (~241 km) of the site.
Invasive Species Management		-	-	-	-
Insect Health	Available Pollinator Habitat	4%	-	-	-
Insect Health	Insecticide Risk	18%	-		
Insect Health	Insecticide Use	-36%	-		
Herbicide Use		-	-	-	-
Wildlife Habitat		-	-	-	-
Signage and Public Engagement		3%	-	-	Points are awarded for signage, but additional public engagement such as research and education are not specified.
Maximum Possible Score		112	-		
Passing Score		76 (68%)	-		

Recertification / Maintaining the Designation:

Frequency	None	-
Inspections	None	-

Laws:

Farmland Preservation Program (formerly, and commonly referred to as PA 116) https://www.michigan.gov/mdard/0,4610,7-125-1599_2558---,00.html https://www.michigan.gov/documents/mdard/MDARD_Policy_on_Solar_Panel_and_PA116_Land_656927_7.pdf Accessed on Sept 1, 2021	Status:	Policy clarification (modifies the existing Farmland Preservation Program)
	Effective Date:	June 2019
	Summary:	Allows the use of protected farmland for solar development (w/ pollinator-friendly designation).
	Key Text:	*"To allow solar energy facilities to be placed on lands enrolled in the Farmland Development Rights Program."* *"The site should be designed and planted to achieve a score of at least 76 on the Michigan Pollinator Habitat Planning Scorecard for Solar Sites"*

Minnesota

The Minnesota scorecard is a one-page format. A separate maintenance scorecard is also available. The two available guides – one from the Department of Natural Resources (DNR) and one from the Minnesota Board of Water and Soil Resources (BWSR) – cover a significant amount of detail. Minnesota has a "voluntary designation" type state law.

Website: http://bwsr.state.mn.us/minnesota-habitat-friendly-solar-program

Program Documentation Elements:	Method:
Planning (or Initial) Scorecard	Reviewed by local and state agency (BWSR)
Maintenance Scorecard	Reviewed by local and state agency (BWSR)
Original Certification	Reviewed by local and state agency (BWSR)
Renewal Certification	Reviewed by local and state agency (BWSR)
On-Site Monitoring and Verification	Self-monitored (or local agency in some localities)

Scorecard Established: 2016 Latest Revision: April 2020 Guide: Yes

	Topic	Contribution to Initial Score	Contribution to Maintenance Score	Narrative Information	Notes
Site	Site Planning and Management	11%	10%	Very Detailed	Companion guides provide a good amount of detail and examples, though the scorecard itself does not necessarily reflect the amount of detail in the guides.
Site	Site Preparation	-	-	Very Detailed	Companion guides provide a good amount of detail and examples, though the scorecard itself does not necessarily reflect the amount of detail in the guides. An oat cover crop and erosion blankets are recommended to temporarily reduce erosion during establishment.
Site	Invasive Preparation	-	-	Limited Detail	The information in the BWSR guide is limited to the use of herbicides. The information in the DNR guide is limited to the use of cover crops to reduce competition from weeds.
Site	Site Size (Acreage)	-	-	Not addressed	-
Site	Runoff and Erosion	-	-	Limited Detail	Native vegetation itself is noted for its erosion control benefits.
Site	Vegetation Buffer	-	-	Good Detail	Good discussion is provided in the guide(s), and specific measurements are recommended to prevent chemical (pesticide) drift. However, the scorecards do not distinguish between the buffer and array areas.
Plant Diversity – including flowering plant species, flower density, native species, forbs species, and number of blooming seasons		67%	71%	Very Detailed	Plant Diversity includes consideration of some exemplary considerations, such as generic origin of seed within 175 mi (~282 km) of the site. The DNR guide includes example seed mixes and a seed collection/deployment map to promote regionally native species.
Invasive Species Management		-	-	Good Detail	The DNR guide contains fairly detailed discussion about prevention and control of invasive species.
Insect Health	Available Pollinator Habitat	11%	10%	Good Detail	Insecticide risk is addressed both in the scorecards and the DNR guide.
Insect Health	Insecticide Risk	8%	6%		
Insect Health	Insecticide Use	-30%	-16%		
Herbicide Use		-	-	Not Addressed	Herbicide treatment is recommended as an option for both site preparation and spot control without discussion of potential risks.
Wildlife Habitat		-	-	Not Addressed	-
Signage and Public Engagement		4%	3%	Limited Detail	Points are awarded for signage, but additional public engagement such as research and education are not specified.
Maximum Possible Score		132	155		
Passing Score		70 (53%)	70 (45%)		

Recertification / Maintaining the Designation:

Frequency	Every 3 years	Long-term plan requirements are specified but not scored.
Inspections	Yearly	It is not clear whether the yearly inspections are required or suggested: "In addition to the full assessment being conducted every three years, yearly site inspections will be important to identify issues with weeds, erosion or other problems that need to be addressed."

Laws:

Minn. Stats. 216B.1642 https://www.revisor.mn.gov/statutes/cite/216B.1642 Accessed on Sept 1, 2021	Status:	Enacted
	Effective Date:	May 2016 (updated wording in 2019)
	Summary:	Allows owner to claim that a site provides benefits to pollinators.
	Key Text:	*"An owner of a solar site implementing solar site management practices 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"*

Missouri

The Missouri scorecard covers the core considerations (Site Planning and Management, Site Preparation, Plant Diversity, and Insect Health). No website, guide, or source of readily accessible information on such areas as planning and management is available.

Missouri has a "voluntary designation" type state law.

Maintenance is not covered in the state law or the scorecard.

Website: (None)

Program Documentation Elements:	Method:
Planning (or Initial) Scorecard	Self-calculated
Maintenance scorecard	None
Original Certification	Self-approved
Renewal Certification	None
On-Site Monitoring and Verification	None

Scorecard Established: 2019 Latest Revision: - Guide: No

	Topic	Contribution to Initial Score	Contribution to Maintenance Score	Narrative Information	Notes
Site	Site Planning and Management	16%	-	-	The scorecard includes points for both vegetation management plans and site plans, including some details specifically on mowing. The scorecard also specifies that the site plan should be "developed in consultation with natural resources professionals" (worth 3 points).
Site	Site Preparation	12%	-	-	Points associated with site preparation include soil testing and amendment.
Site	Invasive Preparation	-18%	-	-	-
Site	Site Size (Acreage)	-	-	-	-
Site	Runoff and Erosion	-	-	-	-
Site	Vegetation Buffer	-	-	-	-
Plant Diversity – including flowering plant species, flower density, native species, forbs species, and number of blooming seasons		49%	-	-	A portion of the plant diversity points can be obtained for grass monoculture (1 point), clover/grass mix (5 points), or native wildflowers (10 points).
Invasive Species Management		-	-	-	-
Insect Health	Available Pollinator Habitat	4%	-	-	Habitat component considerations include availability of water throughout the year.
Insect Health	Insecticide Risk	18%	-		
Insect Health	Insecticide Use	-35%	-		
Herbicide Use		-	-	-	-
Wildlife Habitat		-	-	-	-
Signage and Public Engagement		3%	-	-	Points are awarded for signage, but additional public engagement such as research and education are not specified.
Maximum Possible Score		113	-		
Passing Score		76 (67%)	-		

Recertification / Maintaining the Designation:

Frequency	-	No maintenance interval is specified.
Inspections	-	Inspections are not required.

Laws:

RSMo Section 261.500 https://revisor.mo.gov/main/OneSection.aspx?section=261.500 Accessed on Sept 1, 2021	Status:	Enacted
	Effective Date:	August 2019
	Summary:	Allows owner / manager to state that a site is "pollinator-friendly."
	Key Text:	*"An owner of a solar site implementing site management practices under this section may claim that the site is pollinator-friendly or provides benefits to pollinators only if the site and the site's vegetation management plan adhere to the criteria set forth in the University of Missouri extension service's scorecard…."*

North Carolina

The North Carolina scorecard is a one-page format. There is no state law or incentive program in North Carolina. Consequently, relatively few details are provided about maintenance practices, mostly limited to the guide (not present in the scorecard).

Website: http://ncpollinatoralliance.org/energy/

Program Documentation Elements:	Method:
Planning (or Initial) Scorecard	Self-calculated
Maintenance Scorecard	None
Original Certification	Self-approved
Renewal Certification	None
On-Site Monitoring and Verification	None

Scorecard Established: October 2018 Latest Revision: November 2019 Guide: Yes

	Topic	Contribution to Initial Score	Contribution to Maintenance Score	Narrative Information	Notes
Site	Site Planning and Management	9%	-	Good	Companion guides provide a good amount of detail and examples, though the scorecard itself does not necessarily reflect the amount of detail in the guide. Maintenance is not required (there is no state law). The guide does mention a few factors related to maintenance. The scorecard mentions mowing outside of the growing season.
Site	Site Preparation	6%	-	Good Detail	The companion guide provides a good amount of detail and examples, though the scorecard itself does not necessarily reflect the amount of detail in the guide. No-till planting is mentioned as a way to reduce erosion during establishment.
Site	Invasive Preparation	-6%	-	Some Detail	The companion guide addresses weed control during site preparation, including reference to a list of regional invasive species, but is otherwise limited in detail.
Site	Site Size (Acreage)	-	-	Not Addressed	While not directly related to site size, the guide does discuss the benefits of siting on degraded land as opposed to siting over existing habitat.
Site	Runoff and Erosion	-	-	Limited Detail	Native vegetation itself is noted for its erosion control benefits.
Site	Vegetation Buffer	6%	-	Very Detailed	Good discussion is provided in both the scorecard and guide.
Plant Diversity – including flowering plant species, flower density, native species, forbs species, and number of blooming seasons		51%	-	Good Detail	Good details are included in both the scorecard and guide.
Invasive Species Management		-	-	Some Detail	The guide briefly mentions that mowing and spot herbicide treatment may be required to manage invasive species.
Insect Health	Available Pollinator Habitat	5%	-	Very Detailed	Available habitat within 0.25 mi (~0.40 km) is specified, including points awarded for creation of nesting features on-site. Insecticide risk is also addressed both in the scorecard and guide, including consideration of communication with local chemical applicators.
Insect Health	Insecticide Risk	3%	-		
Insect Health	Insecticide Use	-25%	-		
Herbicide Use		-	-	Not Addressed	-
Wildlife Habitat		16%	-	Very Detailed	A strong focus is present on other ecological factors, notably discussion on the importance of riparian areas.
Signage and Public Engagement		3%	-	Limited Detail	Points are awarded for signage, but additional public engagement such as research and education are not specified.
Maximum Possible Score		158	-		
Passing Score		70 (44%)	-		

Recertification / Maintaining the Designation:

Frequency	-	No maintenance interval is specified.
Inspections	-	Inspections are not required.

Laws:

None	Status:	-
	Effective Date:	-
	Summary:	-
	Key Text:	-

Northern California and Oregon

A one-page scorecard developed in a collaboration between Pollinator Partnership and Fresh Energy covers Northern California and Oregon. There is no companion guide. The only known use of this scorecard is MCE (aka Marin Clean Energy), a public electricity provider serving four counties in the San Francisco area.

There is no state law or incentive program in either California or Oregon.

Website: https://fresh-energy.org/beeslovesolar/pollinator-friendly-solar-scorecards

Program Documentation Elements:	Method:
Planning (or Initial) Scorecard	Self-calculated
Maintenance Scorecard	None
Original Certification	Self-approved
Renewal Certification	None
On-Site Monitoring and Verification	None

Scorecard Established: 2020 Latest Revision: - Guide: No

	Topic	Contribution to Initial Score	Contribution to Maintenance Score	Narrative Information	Notes
Site	Site Planning and Management	12%	-	-	Like other scorecards, this one awards points for the creation of an establishment and management plan. However, unlike other scorecards, this one also specifies that a funding contract must be in place to receive the points.
	Site Preparation	-	-	-	While it is possible that site preparation may be part of a site plan, no points are awarded for site preparation specifically.
	Invasive Preparation	-	-	-	(Same as Site Preparation.)
	Site Size (Acreage)	-	-	-	-
	Runoff and Erosion	-	-	-	-
	Vegetation Buffer	-	-	-	-
Plant Diversity – including flowering plant species, flower density, native species, forbs species, and number of blooming seasons		65%	-	-	This scorecard includes some elements not frequently seen in other scorecards, such as a specified rate of pure live seed (PLS) application and inclusion of native milkweed for specific regions (5 mi [~8 km] or further from the coastline).
Invasive Species Management		-	-	-	-
Insect Health	Available Pollinator Habitat	6%	-	-	Includes consideration of several habitat features including ground types and clean water.
	Insecticide Risk	8%	-		Insecticide risk is addressed in detail with some considerations not common to other scorecards, such as perpetual bare ground due to herbicide use under solar panels and chemical drift from adjacent properties.
	Insecticide Use	-31%	-		
Herbicide Use		-31%	-	-	Planned on-site herbicide use as well as the use of plant materials pretreated with insecticides are addressed.
Wildlife Habitat		-	-	-	-
Signage and Public Engagement		8%	-	-	In addition to signage, points are awarded for participation in a research study.
Maximum Possible Score		128	-		
Passing Score		70 (55%)	-		

Recertification / Maintaining the Designation:

Frequency	None	-
Inspections	None	-

Laws:

None	Status:	-
	Effective Date:	-
	Summary:	-
	Key Text:	-

Ohio

The Ohio scorecard is a one-page format. A short companion guide is also available, providing additional details on many of the scorecard topics. A separate maintenance scorecard is not available.

There is no state law or incentive program in Ohio.

Website: http://www.ophi.info/resources.html

Program Documentation Elements:	Method:
Planning (or Initial) Scorecard	Self-calculated
Maintenance Scorecard	None
Original Certification	Self-approved
Renewal Certification	None
On-Site Monitoring and Verification	Self-monitored

Scorecard Established: March 2018 Latest Revision: - Guide: Yes

	Topic	Contribution to Initial Score	Contribution to Maintenance Score	Narrative Information	Notes
Site	Site Planning and Management	15%	-	Good Detail	-
	Site Preparation	8%	-	Good Detail	-
	Invasive Preparation	-5%	-	Some Detail	The companion guide addresses weed control during site preparation, including some discussion of timing.
	Site Size (Acreage)	-	-	Not Addressed	The guide notes that smaller (<1 acre) projects are more conducive to more "intense" establishment methods.
	Runoff and Erosion	-	-	Limited Detail	The scorecard awards points for "appropriate measures," but no further details are provided.
	Vegetation Buffer	8%	-	Good Detail	-
Plant Diversity – including flowering plant species, flower density, native species, forbs species, and number of blooming seasons		59%	-	Good Detail	-
Invasive Species Management		-	-	Some Detail	-
Insect Health	Available Pollinator Habitat	5%	-	Good Detail	-
	Insecticide Risk	-10%	-		
	Insecticide Use	-21%	-		
Herbicide Use		-	-	Not Addressed	Potential risks associated with herbicide treatment are not addressed.
Wildlife Habitat		3%	-	Not Addressed	Other (non-insect) wildlife or ecological considerations are not addressed.
Signage and Public Engagement		3%	-	Some Detail	Points are awarded for signage, but additional public engagement such as research and education are not specified.
Maximum Possible Score		195	-		
Passing Score		70 (36%)	-		

Recertification / Maintaining the Designation:

Frequency	None	-
Inspections	3 times during growing season	This is not a true “inspection” process, but rather a recommended monitoring frequency.

Laws:

None	Status:	-
	Effective date:	-
	Summary:	-
	Key text:	-

South Carolina

The South Carolina scorecard program was designed in coordination with Clemson University. South Carolina's solar-pollinator designation program does not follow the typical scorecard format, but instead it takes the form of a detailed application for initial site development. This approach allows for more qualitative consideration compared with other scorecards. The applicant must attend a mandatory "training and field day." Following the initial "in-progress" designation, inspections and recertifications apply. There is a points-based scorecard for use at two-year monitoring intervals. Additionally, a detailed companion guide is available from the South Carolina Department of Natural Resources (DNR).

South Carolina has a "voluntary designation" type state law.

Website: https://www.clemson.edu/public/regulatory/fert-seed/solar/index.html

https://www.dnr.sc.gov/solar/

Program Documentation Elements:	Method:
Planning (or Initial) Scorecard	Reviewed by Clemson's Department of Fertilizer and Certification Services (application, not scorecard)
Maintenance scorecard	Reviewed by Clemson
Original Certification	Reviewed/approved by Clemson
Renewal Certification	Reviewed/approved by Clemson
On-Site Monitoring and Verification	On-Site inspection performed by Clemson

Scorecard Established: June 2020 Latest Revision: - Guide: Yes

	Topic	Contribution to Initial Score	Contribution to Maintenance Score	Narrative Information	Notes
Site	Site Planning and Management	-	8%	Very Detailed	The application, scorecard, and DNR guide have a good amount of detail and examples. A template is also available: https://www.clemson.edu/public/regulatory/fert-seed/solar/template.pdf
Site	Site Preparation	-	-	Very Detailed	The application and DNR guide have a good amount of detail and examples.
Site	Invasive Preparation	-	-	Limited Detail	The companion guide addresses weed control during site preparation, including some discussion of timing, but with limited detail.
Site	Site Size (Acreage)	-	-	Not Addressed	-
Site	Runoff and Erosion	-	-	Very Detailed	-
Site	Vegetation Buffer	-	12%	Very Detailed	-
Plant Diversity – including flowering plant species, flower density, native species, forbs species, and number of blooming seasons		-	60%	Very Detailed	Thorough details are provided on plant diversity. The DNR guide includes suggested species.
Invasive Species Management		-	12%	Very Detailed	The guide includes substantial discussion on mowing frequency, site preparation and seed selection to prevent invasive species, and selective herbicide use.
Insect Health	Available Pollinator Habitat	-	6%	Very Detailed	Insecticide risk is thoroughly addressed via the Clemson University Department of Pesticide Regulation's toxicity group classifications, including graded penalties for different toxicity levels (from -5 up to -40 points).
Insect Health	Insecticide Risk	-	-		
Insect Health	Insecticide Use	-	-32%		
Herbicide Use		-	-	Not Addressed	Herbicide use is not directly addressed.
Wildlife Habitat		-	-	Very Detailed	The DNR guide includes many details on ecological considerations.
Signage and Public Engagement		-	2%	Good Detail	Points are awarded for signage. Applicants to the program must have a representative attend the Certified Solar Habitat training program (led by Clemson). This training focuses mainly on how to establish pollinator plant species and manage them within a solar farm.
Maximum Possible Score		-	126		
Passing Score		-	70 (56%)		

Recertification / Maintaining the Designation:

Frequency	Every 5 years (after the initial 5-year period)	Initial certification is issued after two growing seasons (inspection is performed). Additional inspection is required after the fourth year. Recertification after the fifth year (presumably this includes an inspection, but it is not clear). Fees apply.
Inspections		

Laws:

South Carolina Solar Habitat Act (§50-4-10) https://www.scstatehouse.gov/code/t50c004.php Accessed on Sept 1, 2021	Status:	Enacted
	Effective Date:	June 2018
	Summary:	Allows owner to claim that a site provides benefits to pollinators.
	Key Text:	*"An owner of a ground-mounted commercial solar energy generation site is encouraged to follow voluntary site management practices that:* *(1) provide native perennial vegetation and foraging habitats beneficial to gamebirds, songbirds, and pollinators; and* *(2) reduce storm water runoff and erosion at the solar generation site."*

Vermont

The Vermont scorecard is a one-page format. A companion guide is not available. The landing page provides a few useful links and resources but does not replace a comprehensive guide. A separate maintenance scorecard is not available.

Vermont has a "voluntary designation" type state law.

Website: https://www.uvm.edu/extension/agriculture/pollinator-friendly-solar

Program Documentation Elements:	Method:
Planning (or Initial) Scorecard	Self-calculated
Maintenance Scorecard	Self-calculated (Initial scorecard is used)
Original Certification	Self-approved
Renewal Certification	Self-approved
On-Site Monitoring and Verification	Self-monitored

Scorecard Established: 2016 Latest Revision: September 2018 Guide: No

	Topic	Contribution to Initial Score	Contribution to Maintenance Score	Narrative Information	Notes
Site	Site Planning and Management	18%	-	-	-
	Site Preparation	-	-	-	The site preparation category is subsumed with the points for a management plan.
	Invasive Preparation	-	-	-	-
	Site Size (Acreage)	-	-	-	-
	Runoff and Erosion	-	-	-	-
	Vegetation buffer	7%	-	-	The scorecard awards points for various aspects of a vegetation buffer.
Plant Diversity – including flowering plant species, flower density, native species, forbs species, and number of blooming seasons		70%	-	-	-
Invasive Species Management		-	-	-	-
Insect Health	Available Pollinator Habitat	4% *	-	-	-
	Insecticide Risk	-	-		
	Insecticide Use	-29%	-		
Herbicide Use		-	-	-	
Wildlife Habitat		-	-	-	The scorecard awards points for a "plant and wildlife monitoring plan." This was counted in the "Site Planning and Management" score contribution.
Signage and Public Engagement		-	-	-	-
Maximum Possible Score		136	-		
Passing Score		70 (51%)	-		

** Note: Vermont question 5d awards 0.2 points per created nesting feature. Although this question is very similar to Virginia question 10d, this question on the Vermont scorecard is not clear a) whether it pertains to pollinator of bird nesting features and b) how many total points are possible. As such, it is not possible to confidently make assumptions about the possible scores for Vermont 5d.*

Recertification / Maintaining the Designation:

Frequency	3 years	A passing score must be obtained on the scorecard every three years.
Inspections	-	Inspections are not required.

Laws:

6 V.S.A. chapter 217 § 5102 https://legislature.vermont.gov/statutes/section/06/217/05102 Accessed on Sept 1, 2021	Status:	Enacted
	Effective Date:	July 2018
	Summary:	Allows owner / manager to state that a site is "pollinator-friendly."
	Key Text:	*"... (b) In order for the solar site to meet the beneficial habitat standard and for the owner of a solar site to claim that the solar site is beneficial to those species or is pollinator-friendly, all the following shall apply:* *(1) The owner adheres to guidance set forth by the Pollinator-Friendly Scorecard (Scorecard) published by the University of Vermont (UVM) Extension. ..."*

Virginia

The Virginia program has both an "initial" and a separate maintenance scorecard. Participation in the "Pollinator-Smart" program is quite a bit more rigorous than the scorecards themselves indicate at first glance, as several detailed attachments and worksheets are required. The amount of information contained in the Virginia Pollinator-Smart program is substantial, including a 127-page guide. There is no state law or incentive program in Virginia.

Website: https://www.dcr.virginia.gov/natural-heritage/pollinator-smart#scorecards

Program Documentation Elements:	Method:
Planning (or Initial) Scorecard	Reviewed by VA Department of Conservation and Recreation (DCR) (VA Pollinator-Smart program)
Maintenance Scorecard	Reviewed by VA DCR (VA Pollinator-Smart program)
Original Certification	Reviewed by VA DCR (VA Pollinator-Smart program)
Renewal Certification	Reviewed by VA DCR (VA Pollinator-Smart program)
On-Site Monitoring and Verification	Self-monitored

Scorecard Established: December 2019 Latest Revision: - Guide: Yes

	Topic	Contribution to Initial Score	Contribution to Maintenance Score	Narrative Information	Notes
Site	Site Planning and Management	14%	14%	Very Detailed	-
	Site Preparation	-	-	Very Detailed	Site preparation is not addressed in the scorecard directly, but the guide provides details.
	Invasive Preparation	-14%	-14%	Good Detail	The companion guide includes more detail than most states, including analysis of local vegetation for potential persistence (seed spread) and integrated vegetation management (IVM) practices.
	Site Size (Acreage)	-	-	Some Detail	It is not clear if there is an absolute minimum project size (in acres), but Pollinator-Smart practices must be applied to at least 10% of the total project area to be eligible for the Pollinator-Smart program (see Worksheet 2 in the guide).
	Runoff and Erosion	-	-	Some Detail	Native vegetation itself is noted for its erosion control benefits. Native species appropriate for erosion control are listed (in lieu of other potentially invasive species).
	Vegetation Buffer	-	-	Good Detail	The vegetation buffer is referred to as the "screening zone." The scorecard itself only contains one question on the screening zone, but the guide and worksheet provide additional details.
Plant Diversity – including flowering plant species, flower density, native species, forbs species, and number of blooming seasons		54%	54%	Very Detailed	The Virginia scorecard and guide cover plant diversity thoroughly, including a listing of recommended species.
Invasive Species Management		4%	4%	Very Detailed	The guide focuses on prevention of invasive species and addresses advanced concepts such as invasion ecology.
Insect Health	Available Pollinator Habitat	14% *	21% *	Very Detailed	Available habitat within 0.25 mi (~0.40 km) is specified, including points awarded for preservation of wetlands.
	Insecticide Risk	-	-		
	Insecticide Use	-29%	-29%		
Herbicide Use		-	-	Some Detail	While the program does not directly address potentially adverse ecological impacts of herbicide use in a focused manner, the guide does encourage herbicide use during maintenance on a limited (spot use) basis. The guide also refers to various state-level herbicide control programs as a means of ensuring proper herbicide use.
Wildlife Habitat		7%	-	Very Detailed	Environmental features such as bird boxes are specified. The program is actually a combined pollinator/bird habitat program.
Signage and Public Engagement		7%	7%	Very Detailed	Research collaboration is encouraged (in addition to signage).
Maximum Possible Score		140	140		
Passing Score		80 (57%)	80 (57%)		

** Note: Virginia awards 0.2 points per created nesting feature. A maximum of 10 possible points was assumed.*

Recertification / Maintaining the Designation:

Frequency	2 years	Use of the maintenance scorecard is required every two years, including submission to and review by the VA Pollinator-Smart Solar Program, up through the 10th year (after which time a long-term plan is required, but monitoring requirements are released).
Inspections	Yearly	Inspections are recommended but not strictly required. It is also recommended that a "qualified professional" perform the inspections, but it is not clear whether this should be a third party.

Laws:

None	Status:	-
	Effective Date:	-
	Summary:	-
	Key Text:	-

Wisconsin

The Wisconsin Pollinator-Friendly Solar Certification Program uses a two-page "establishment plan" and a one-page "seasonal assessment" (for use three times per year). Some additional guidance is provided, including a concise "job sheet," but this does not include the level of detail of a more comprehensive guide. Yearly submittal of the seasonal assessments is required to maintain certification.

There is no state law or incentive program in Wisconsin.

Website: https://pollinators.wisc.edu/solar/

Program Documentation Elements:	Method:
Planning (or Initial) Scorecard	Reviewed by University of Wisconsin
Maintenance Scorecard	Reviewed by University of Wisconsin
Original Certification	Approved by University of Wisconsin
Renewal Certification	Approved by University of Wisconsin
On-Site Monitoring and Verification	Self-monitored

Scorecard Established: 2018 Latest Revision: - Guide: Yes

	Topic	Contribution to Initial Score [1]	Contribution to Maintenance Score [2]	Narrative Information	Notes
Site	Site Planning and Management	20%	-	Very Detailed	-
	Site Preparation	-	-	Very Detailed	It is noted that herbicide application in lieu of tilling can help to reduce erosion risk.
	Invasive Preparation	-	-	Limited Detail	Basic information is noted on the job sheet, but no other details are provided.
	Site Size (Acreage)	-	-	Not Addressed	-
	Runoff and Erosion	-	-	Not Addressed	-
	Vegetation Buffer	10%	10%	Very Detailed	-
Plant Diversity – including flowering plant species, flower density, native species, forbs species, and number of blooming seasons		65%	75%	Very Detailed	The Wisconsin scorecard(s) cover(s) plant diversity thoroughly.
Invasive Species Management		-	-	Limited Detail	Basic information about weed management is included in the job sheet.
Insect Health	Available Pollinator Habitat	-	-	Some Detail	Insecticide risk is addressed, but pollinator nesting habitat features are not covered.
	Insecticide Risk	5%	5%		
	Insecticide Use	-40%	-40%		
Herbicide Use		-	-	Some Detail	The Establishment Plan asks several key questions about planned herbicide use (and history of use on the site). Though this is not "scored" and detailed guidance is not provided, the plan indicates an opportunity for the approving party to assess herbicide use.
Wildlife Habitat		-	-	Not Addressed	-
Signage and Public Engagement		-	-	Limited Detail	Scorecard mentions signage in the back-page notes only, but additional public engagement opportunities such as research and education are not specified.
Maximum Possible Score		100	100		
Passing Score		65 (65%) [3]	65 (65%) [3]		

1 For Wisconsin, the initial score is obtained using the "Establishment Plan."

2 For Wisconsin, the maintenance score is obtained using the "Seasonal Assessment." In the Seasonal Assessment, 10 additional points are awarded for including a photo.

3 For Wisconsin, the "bronze" level is considered to be "passing."

Recertification / Maintaining the Designation:

Frequency	Yearly	Staff at the University of Wisconsin perform evaluations.
Inspections	Seasonal (3/yr)	Seasonal assessments using the provided seasonal scorecard are required for each of the three growing seasons.

Laws:

None	Status:	-
	Effective Date:	-
	Summary:	-
	Key Text:	-

Fresh Energy

The Fresh Energy scorecard is a one-page format and is intended to be used for states without an established scorecard program. Neither a separate maintenance scorecard nor a companion guide is provided.

Website: https://fresh-energy.org/beeslovesolar/pollinator-friendly-solar-scorecards/

Program Documentation Elements:	Method:
Planning (or Initial) Scorecard	Self-calculated
Maintenance Scorecard	None (the initial/planning scorecard could be used)
Original Certification	Not applicable
Renewal Certification	Not applicable
On-Site Monitoring and Verification	None

Scorecard Established: January 2020 | Latest Revision: 2020 (later in the year) | Guide: No

	Topic	Contribution to Initial Score	Contribution to Maintenance Score	Narrative Information	Notes
Site	Site Planning and Management	12%	-	-	Points are awarded for a management plan but without further detail.
	Site Preparation	-	-	-	Site Preparation is subsumed with the points for a management plan.
	Invasive Preparation	-	-	-	-
	Site Size (Acreage)	-	-	-	-
	Runoff and Erosion	-	-	-	-
	Vegetation Buffer	-	-	-	-
Plant Diversity – including flowering plant species, flower density, native species, forbs species, and number of blooming seasons		66%	-	-	-
Invasive Species Management		-	-	-	-
Insect Health	Available Pollinator Habitat	6%	-	-	Insecticide risk is addressed in detail with some considerations not common to other scorecards, such as consideration of perpetual bare ground due to herbicide use under solar panels and chemical drift from adjacent properties.
	Insecticide Risk	8%	-		
	Insecticide Use	-31%	-		
Herbicide Use		-31%	-	-	Herbicide use under panels and chemical drift from adjacent properties is addressed.
Wildlife Habitat		-	-	-	-
Signage and Public Engagement		8%	-	-	Beyond signage, points are awarded for participation in a study with a college, university, or research lab.
Maximum Possible Score		128	-		
Passing Score		70 (55%)	-		

Recertification / Maintaining the Designation:

Frequency	None	-
Inspections	None	-

Laws:

None	Status:	-
	Effective Date:	-
	Summary:	-
	Key Text:	-

Although the Fresh Energy scorecard is national (not state-specific) in scope, the design and intended use is similar enough to the other state-level scorecards to warrant direct comparison and inclusion of this scorecard in the numerical analysis in Section 4.

4
RESULTS

Overall Trends

The first scorecard was released in Minnesota in 2016, followed by Vermont in the same year. An additional 13 state-specific scorecards were released from 2018–2020. Table 4-1 shows the year in which each scorecard was originally released, and Figure 4-1 shows the number of scorecards published in each year from 2016–2020. Table 4-2 quantifies attributes among the 15 state-level scorecard programs, including the number (and associated percentage) of programs affiliated with a state law, programs that include a maintenance scorecard, and programs with detailed narrative guidance and/or companion guides.

Table 4-1
Date of Release for All Scorecards*

*in approximate order of release

Number*	Scorecard	Year Released
1	Minnesota	2016
2	Vermont	2016
3	Wisconsin	2018
4	Ohio	2018 (March)
5	Michigan	2018 (June)
6	North Carolina	2018 (October)
7	Massachusetts	2019
8	Florida	2019
9	Missouri	2019
10	Virginia	2019 (December)
11	Illinois	2019 (December)
12	Maryland	2020 (March)
13	South Carolina	2020 (June)
14	Northern California/Oregon	2020
15	Indiana	2020
16	National: Fresh Energy	2020

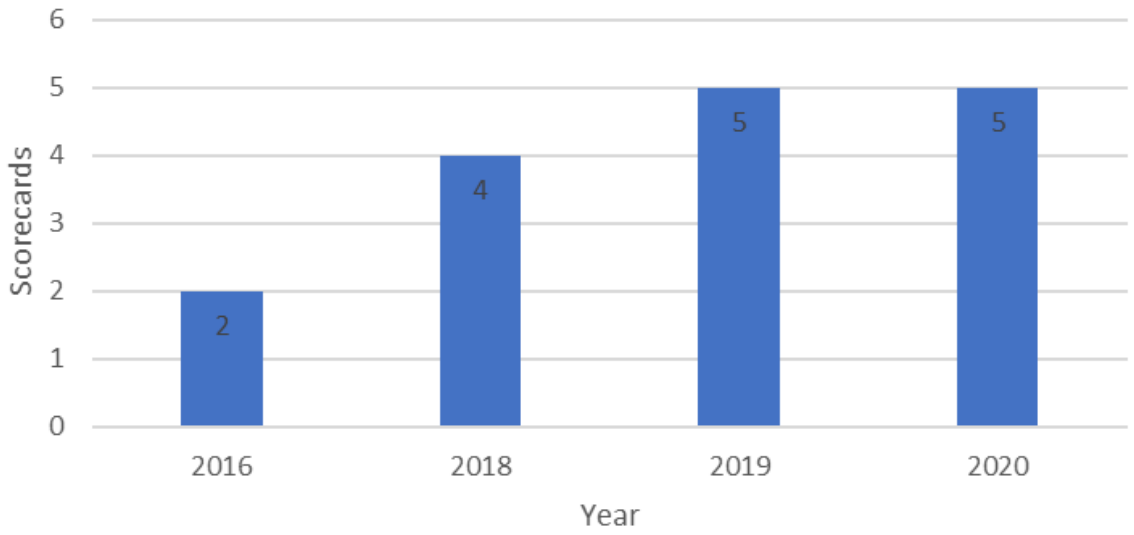

Figure 4-1
Scorecards Released per Year, 2016–2020

Table 4-2
Aspect Highlights of State-Level Programs

Aspect of State-Level Program	Number of Programs	Notes
Scorecards assessed	15	*Excludes Fresh Energy scorecard, which is not state-specific*
Programs with a state law	8 (53%)	*Illinois, Maryland, Massachusetts, Michigan, Minnesota, Missouri, South Carolina, Vermont*
Programs with a separate maintenance scorecard	6 (40%)	*Illinois, Massachusetts, Minnesota, South Carolina, Virginia, Wisconsin. Note: Massachusetts does not use numerically scored scorecards, but does have a separate form and set of criteria for site maintenance.*
Programs with detailed narrative guidance and/or companion guides	10 (67%)	*Illinois, Indiana, Maryland, Massachusetts, Minnesota, North Carolina, Ohio, South Carolina, Virginia, Wisconsin*

Minimum Passing and Maximum Possible

When analyzing the scorecards (either individually or in comparison to each other), two categories are important to consider[3]:

- **Minimum Passing**: This is the minimum number of points needed to be considered "pollinator-friendly." While several scorecards had tiered levels, this study used the minimum passing number of points in the numerical analysis.
- **Maximum Possible**: This is the total possible points that can be achieved if all possible positive points are acquired. The maximum possible points are used as the denominator in the analysis of this paper.

Minimum Passing Score % = (Minimum Passing / Maximum Possible) x 100

Table 4-3 shows values by state for these two categories and the resulting percentage of points needed to achieve a passing score.

Table 4-3
Summary of Scoring – All Numerical Scorecards

Scorecard	Number of Questions	Maximum Possible Score	Minimum Passing Score	Minimum Passing Score (%)
Initial				
Northern California / Oregon	9	128	70	55%
Florida	9	135	80	59%
Illinois	11	164	85	52%
Indiana	13	199	100	50%
Maryland	13	230	160	70%
Michigan	9	112	76	68%
Minnesota	8	132	70	53%
Missouri	9	113	76	67%
North Carolina	11	158	70	44%
Ohio	10	195	70	36%
Vermont	8	136	70	51%
Virginia	10	140	80	57%
Wisconsin	9	100	65	65%
Fresh Energy *(National)*	9	128	70	55%

[3] Recall, Massachusetts and South Carolina are not numerical scorecards and are not included in the numerical analysis.

Table 4-3 (continued)
Summary of Scoring – All Numerical Scorecards

Scorecard	Number of Questions	Maximum Possible Score	Minimum Passing Score	Minimum Passing Score (%)
Maintenance				
Illinois	10	139	70	50%
Minnesota	7	155	70	45%
South Carolina	10	126	70	56%
Virginia	10	140	80	57%
Wisconsin	10	100	65	65%
Minimum	7	100	65	36%
Maximum	13	230	160	70%
Mean	9.7	144	78.8	56%
Standard Deviation	1.5	33.1	20.7	9%
Coefficient of Variation	15%	23%	26%	15%

Minimum Passing Score

The threshold for a "passing" score is defined on a scorecard-specific (state-specific) basis. Although the thresholds are normally specified in "points," they are presented here as percentages of the total possible points in order to facilitate comparison. Table 4-3 demonstrates that there are a wide range of values for minimum passing score (from 36–70%) among the various scorecards. However, despite the wide range, the low coefficient of variation suggests that most scorecards use a minimum passing score close to the mean value of 56%, as shown on the histogram in Figure 4-2. The Ohio scorecard is the lowest at 36%. Fresh Energy and Maryland scorecards are the highest at 70%, but Missouri and Michigan are fairly close (at 67% and 68%, respectively).

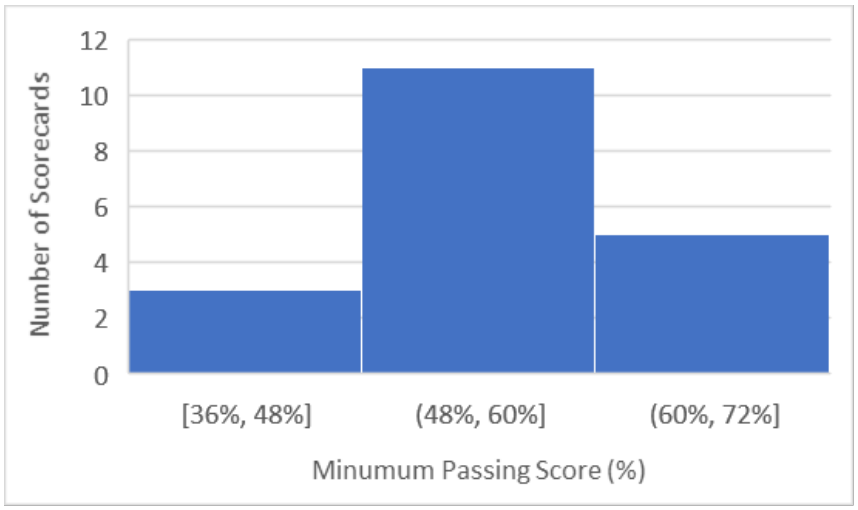

Figure 4-2
Histogram – Minimum Passing Scores

Maximum Possible Score

There are a wide range of values for maximum possible score (100–230) among the various scorecards (Table 4-3). However, despite the wide range, the low coefficient of variation suggests that most scorecards use a minimum passing score very close to the mean value of 144, as shown on the histogram in Figure 4-3.

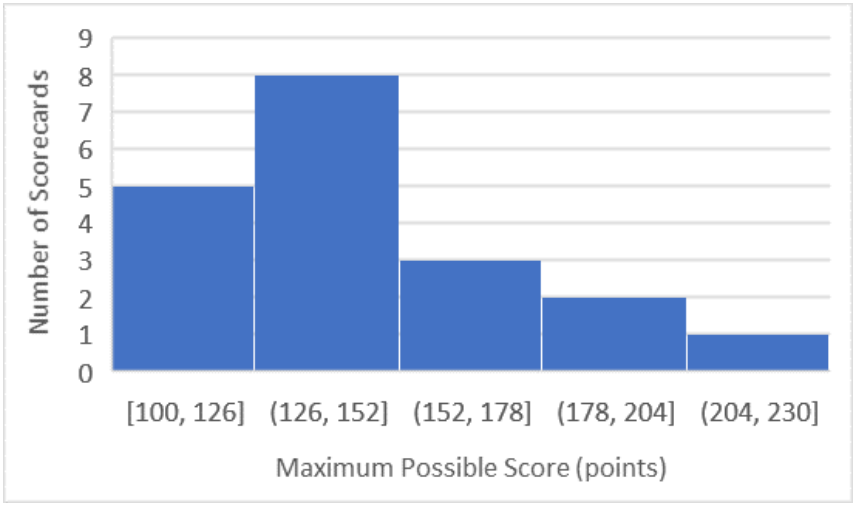

Figure 4-3
Histogram – Maximum Possible Scores

The most notable outlier – Maryland with a possible maximum of 230 points – has added points for some categories beyond the early scorecards (for example, 25 points for availabity of water and nesting features, 15 points for public outreach, and 10 points for spot control of invasive species). While these additional considerations may be beneficial for pollinator habitat, adding points for these elements without also increasing the point values for other elements dilutes the relative weight of those other elements (such as plant diversity). Notably, the contribution of plant diversity scoring elements for Maryland is 52%, which is among the lowest plant diversity contributions. However, the high maximum possible score, plus a relatively high minimum passing scoring percentage (70%, or approximately 1.5 standard deviations higher than the mean) may indicate a higher amount of effort required to meet the minimum passing score for the Maryland scorecard. This may also relate to the number of questions – the Maryland scorecard includes 13 questions, which is the highest of any state (Table 4-3).

Scoring Approaches

The scorecards use two basic approaches to assessment: 1) questions associated with numeric scores and 2) questions used to collect information. The non-numeric, information-collecting questions provide input to a state agency or other third-party reviewer who can use the input to make a qualitative pass/fail type assessment of a solar site's pollinator value (see Third-Party Reviews for more discussion). Some scorecards, such as the Wisconsin scorecard, use a combination of numerically scored and non-numerically scored questions within each individual scorecard (initial and maintenance). Some scorecards, such as South Carolina, use non-numerically scored questions for the initial assessment and a numerically scored scorecard for yearly maintenance (on a five-year cycle, in the case of South Carolina). However, the majority of the scorecards exclusively use questions that are numerically scored, as shown in Table 4-4 and Table 4-5.

Table 4-4
Detailed Scoring by Category – All Numerical Scorecards

Scorecard	Site Planning and Management	Site Preparation	Invasive Preparation	Site Size	Runoff and Erosion	Vegetation Buffer (size)	Plant Diversity	Invasive Species Management	Available Pollinator Habitat	Insecticide Risk	Insecticide Use	Herbicide Use	Wildlife Habitat Features	Signage / Public Engagement
Initial														
Northern California / Oregon	12%	0%	0%	0%	0%	0%	66%	0%	6%	8%	-31%	-31%	0%	8%
Florida	15%	7%	-7%	0%	0%	0%	59%	0%	0%	7%	-30%	0%	4%	7%
Illinois	6%	12%	-6%	0%	0%	9%	60%	0%	5%	3%	-24%	0%	3%	2%
Indiana	8%	15%	-5%	0%	0%	3%	62%	0%	0%	3%	-20%	0%	0%	10%
Maryland	17%	7%	0%	0%	0%	0%	52%	7%	11%	0%	-17%	0%	0%	7%
Michigan	13%	9%	-18%	0%	0%	0%	54%	0%	4%	18%	-36%	0%	0%	3%
Minnesota	11%	0%	0%	0%	0%	0%	67%	0%	11%	8%	-30%	0%	0%	4%
Missouri	16%	12%	-18%	0%	0%	0%	49%	0%	4%	18%	-35%	0%	0%	3%
North Carolina	9%	6%	-6%	0%	0%	6%	51%	0%	5%	3%	-25%	0%	16%	3%
Ohio	15%	8%	-5%	0%	0%	8%	59%	0%	5%	-10%	-21%	0%	3%	3%
Vermont	18%	0%	0%	0%	0%	7%	70%	0%	4%	0%	-29%	0%	0%	0%
Virginia	14%	0%	-14%	0%	0%	0%	54%	4%	14%	0%	-29%	0%	7%	7%
Wisconsin	20%	0%	0%	0%	0%	10%	65%	0%	0%	5%	-40%	0%	0%	0%
Fresh Energy *(national)*	12%	0%	0%	0%	0%	0%	66%	0%	6%	8%	-31%	-31%	0%	8%
Maintenance														
Illinois	7%	0%	0%	0%	0%	11%	56%	11%	6%	4%	-29%	0%	4%	2%
Minnesota	10%	0%	0%	0%	0%	0%	71%	0%	10%	6%	-16%	0%	0%	3%
South Carolina	8%	0%	0%	0%	0%	12%	60%	12%	6%	0%	-32%	0%	0%	2%
Virginia	14%	0%	-14%	0%	0%	0%	54%	4%	21%	0%	-29%	0%	0%	7%
Wisconsin	0%	0%	0%	0%	0%	10%	75%	0%	0%	5%	-40%	0%	0%	0%
Minimum	0%	0%	-18%	0%	0%	0%	49%	0%	0%	-10%	-40%	-31%	0%	0%
Maximum	20%	15%	0%	0%	0%	12%	75%	12%	21%	18%	-16%	0%	16%	10%
Mean	12%	4%	-5%	0%	0%	4%	60%	2%	6%	4%	-29%	-3%	2%	4%
Standard Deviation	5%	5%	6%	0%	0%	5%	7%	4%	5%	6%	7%	10%	4%	3%
Coefficient of Variation	40%	127%	-127%	-	-	115%	12%	192%	85%	139%	-23%	-292%	202%	72%

Table 4-5
Detailed Scoring by Category – Early Scorecards Only

Scorecard	Site Planning and Management	Site Preparation	Invasive Preparation	Site Size	Runoff and Erosion	Vegetation Buffer (size)	Plant Diversity	Invasive Species Management	Available Pollinator Habitat	Insecticide Risk	Insecticide Use	Herbicide Use	Wildlife Habitat Features	Signage / Public Engagement
Michigan	15	10	-20	0	0	0	60	0	4	20	-40	0	0	3
Minnesota	15	0	0	0	0	0	88	0	14	10	-40	0	0	5
Vermont	25	0	0	0	0	10	95	0	6	0	-40	0	0	0
Minimum	15	0	-20	0	0	0	60	0	4	0	-40	0	0	0
Maximum	25	10	0	0	0	10	95	0	14	20	-40	0	0	5
Mean	18	3	-7	0	0	3	81	0	8	10	-40	0	0	3

Among numerically-scored questions, there are several variations:

- **Positive Scoring**: Points are awarded for beneficial actions or features. This is the basic and most common type of scoring.
- **Negative Scoring**: Penalties are imposed for adverse actions or features. The most prolific of these penalties observed in the scorecards is a penalty for the (planned or actual) application of insecticides on the site.
- **Multiple Sub-Questions (Mutually Exclusive)**: For example, question 1 on the Indiana scorecard contains four subparts (worth 4, 6, 8, and 10 points respectively), but specifies "select one." Therefore, the maximum possible points for this question is 10. The numeric assessment in this section reflects 10 possible points for this question.
- **Multiple Sub-Questions (Additive)**: For example, question 6 on the Florida scorecard contains four subparts (worth five points each) and specifies "check all that apply." Therefore, the maximum possible score contribution for this question is 20.
- **Multiple Sub-Questions (Different Scoring Categories)**: For example, question 12 on the Indiana scorecard contains four subparts. The first subpart pertains to the Site Planning and Management category, as defined in Section 2 of this report, while the remaining three subparts pertain to the Signage / Public Engagement category. The numeric assessment in this report section allows question 12 to contribute up to 10 points to the first category and 20 points to the second category. While such scoring pertains more to the categorization of elements as defined in this report, this approach does indicate that some scorecards included scoring elements from entirely different categories within a single question and sometimes within even a single answer selection.
- **Positive and Negative Scoring within the Same Question (Mutually Exclusive)**: This occurrence was uncommon but observed in a few cases. For example, question 9 of the Indiana scorecard contains multiple sub-elements related to site preparation. It is possible to score 15 points, but it is also possible to score negative (lose) 15 points. The positive and negative points are mutually exclusive. It is possible to score -15, 2, 5, 10, or 15 (but not, for example, +10 -15 = -5, if the points were additive). This inconsistency presented a challenge in analyzing the scoring data across all scorecards. In this case, the negative points were not included in the numeric analysis since the key insights from the numeric assessment were driven by the weighting of the positive contribution points.
- **Both Positive and Negative Scoring within the Same Question (Additive)**: This was also uncommon but observed in at least one case, namely question 1 on the Missouri scorecard. This question contains five sub-questions pertaining to Site Planning and Management, with 18 possible positive points and -2 possible negative (penalty) points. It would be possible to achieve many combinations of points because these sub-questions are additive. This presented a challenge in analyzing the scoring data; however, in this case, because the negative points here were unique to Missouri and the points would be only a minor contributor to the overall score, these potential negative points were ignored for the numerical analysis.

Table 4-4 presents the scoring for all state and nonspecific scorecards by category, while Table 4-5 summarizes scoring for the first (chronologically) three scorecards that were published: Michigan, Minnesota, and Vermont.

Point Weighting and Degree of Variation

Point Weighting

For this study, percentages were used to compare the relative contribution of each category to the overall score. Specifically, the total of possible points by category was compared to the total of maximum possible points in the scorecard. This percentage-based analysis allowed for comparison between scorecards and normalized variability (coefficient of variation) in both total score and minimum passing scores across the scorecards, which allowed for analysis of relative weighting of each category to the overall scorecard. See further discussion in Section 2.

The resulting category contribution percentages reflect the relative weighting of points and are indicators of the importance of each specific element in the scorecard. For example, with this type of analysis, it is possible to consider the importance of Signage/Public Engagement (0–10% of possible points) vs. Plant Diversity (49–75% of possible points) for acquiring pollinator-friendly designation (Table 4-4). Based on the relative contribution of points, the most important categories across all scorecards are:

- Plant Diversity with 49–75% of possible points
- Insecticide Use with -16% to -40% (penalty) of possible points

Scorecards that had a high number of total maximum points generally included more scoring elements. However, adding more points has the effect of diluting the relative weight of the other points and those elements. For example, while nearly all scorecards used a 40-point deduction for insecticide use on the property, the weighting of this category ranged from a low of 17% in Maryland that offers a maximum score of 230 points (40/230 = 17%) to a high of 40% in Wisconsin that offers a maximum score of 100 points (40/100 = 40%). As more elements are added and total possible points increase, the weighting and relative importance of each issue changes. In another example, some scorecards introduced points associated with supporting wildlife other than pollinators. North Carolina, as a specific example, includes points for non-pollinator wildlife considerations including bird boxes, wildlife passages in fencing, and riparian buffer zones. While it is ecologically understandable to add points for supporting broader wildlife, this will dilute the weighting of the other pollinator-specific attributes. It is unknown whether or not the scorecard creators intentionally introduced this dilution effect.

A complicating element in a few scorecards was a requirement for one item (or multiple items) without which a site cannot be considered pollinator-friendly. For example, in Illinois a plan for Establishment and Management is required, suggesting that it is impossible to pass the scorecard without this item, even though it is only worth 10 points. This absolute scoring methodology for pass/fail was an aberration and could lead to errors in assumptions related to the importance of an element based on the point allocation alone.

Degree of Variation

There is a high degree of variation (see the coefficient of variation results in Table 4-4) for most scoring categories with three notable exceptions.

- The Plant Diversity scoring category is somewhat consistent across most of the scorecards (12% coefficient of variability), contributing around 60% to the overall score on average.
- The Insecticide Use category also shows some consistency across most of the scorecards (-23% coefficient of variability), representing a penalty of 29% on average. All scorecards include a penalty for insecticide use.
- A "low variation" situation also exists for the Site Size and Runoff and Erosion categories. This is a result of no numeric scoring elements for these categories on any of the scorecards.

The low variability for Plant Diversity and Insecticide Use suggests consensus among scorecard authors that Plant Diversity should account for ~60% of the overall score and that the penalty for Insecticide Use should account for ~29% of the overall score. One possible implication here can be discerned by comparing these values against the minimum passing scoring percentages. Whether this was intended by scorecard designers, or is simply a consequence of point weighting, is unknown.

- Based on average (mean) values, if a solar site were to achieve the full score for all Plant Diversity elements and no other points, it would receive 60%, which would be sufficient to meet the average minimum passing score of 56%.
- On the other hand, if a solar site planned to apply insecticides, the penalty for doing so (29%) would not necessarily prevent the site from obtaining a passing score on the average scorecard (100% - 29% =71%, which exceeds 56%).

Other categories may have a high degree of variation (as much as 292%), indicating that some scorecards include certain elements where others do not, such as the following:

- **Site Preparation**: Approximately half of the scorecards do not explicitly include points in the Site Preparation category, which causes a high degree of variation across the scorecards. Possibly some (or many) of these instances of zero points exist because the scorecard creators intended for site preparation considerations to be included as part of a site management plan.
- **Invasive Preparation**: Approximately half of the scorecards do not explicitly include points in the Invasive Preparation category, which causes a high degree of variation. Possibly some (or many) of these instances of zero points exist because the scorecard creators intended for invasive species preparation considerations to be included as part of a site preparation or site management plan.
- **Invasive Species Management**: Only 5 of the scorecards (counting initial and maintenance scorecards separately) include points for the management of invasive species (after initial establishment). This results in a high degree of statistical variation.

- **Insecticide Risk:** Although this category is defined in such a way as to include other possible risk reduction actions, this category corresponds directly to "communication with local chemical applicators about the need to prevent drift from adjacent areas" for all but one of the observed scorecards. Either 5, 10, or 20 points were assigned to this category. Michigan and Missouri scorecards are at the high end of the range, with 20 points (corresponding to 18% of the overall score for both). The one notable outlier in this category is Ohio, which includes a penalty (-20 points, worth 10% of the overall score) when the solar site is adjacent to other lands where insecticides are used.
- **Herbicide Use**: Only two scorecards, Northern California / Oregon and Fresh Energy, include a penalty for "perpetual bare ground under the panels as a result of [herbicide use]." This penalty is of equal severity to the planned use of insecticides on the site.
- **Wildlife Habitat Features**: Some scorecards attempt to include overlap with the broader opportunity for enhancement of wildlife habitat when establishing native vegetation on a solar site. The North Carolina scorecard, in particular, includes dedicated "extra credit" points for riparian zones, permeable fencing, and bird boxes along with the acknowledgement of these broader ecological benefits in the technical guide. Virginia and Ohio both include some language in the scorecard indicating benefits to birds or other wildlife (though the scoring system used in Appendix A did not reveal these ecological overlap type points for Virginia due to subtleties in the scorecard language vs. points). The Massachusetts scorecard program also indicates a strong focus on non-pollinator wildlife benefits, though this scorecard does not include a numeric scoring system.
- **Site Planning and Management**: Some of the variability in this category exists because a number of scorecard programs require a site management plan as an entry requirement, whether or not points were assigned.

Number of Questions

Scorecards include 7–13 questions, with an average of 10 (Table 4-3). While to some degree the number of questions does correspond to the level of effort and number of scoring elements, the number of questions is largely inconsequential as many of the scorecards include multiple sub-questions and/or compounding questions.

Third-Party Reviews

While the majority of state scorecards are self-directed, self-reviewed, and self-approved, five exceptions are shown in Table 4-6.

Table 4-6
States Requiring Third-Party Scorecard Review

State	Who is Requiring	Third-Party Reviewer
Maryland	The law, §B(2)(a) states: *Have a Department-approved inspector conduct an onsite inspection of the facility…*	Preapproved list of seven independent companies, primarily vegetation consultants.
Massachusetts	The law, 20.07(4)(e) states: *Pollinator Adder. A Solar Tariff Generation Unit that obtains and maintains at least a silver certification from the University of Massachusetts Clean Energy Extension (CEE) Pollinator-Friendly Certification Program, or other equivalent certification as determined by the Department, shall be eligible to receive an additional $0.0025/kWh Compensation Rate Adder.* According to the UMass CEE certification process, UMass CEE reviews the application. The initial certification, if granted, does not require on-site verification. After three growing seasons, recertification *does* require on-site verification by CEE.	University of Massachusetts Clean Energy Extension (CEE)
Minnesota	The law states: *An owner making a beneficial habitat claim must:* *…report on its site management practices to the Board of Water and Soil Resources, on a standard reporting form developed by the board for solar site management practices…* The scorecards (both initial and maintenance) state: *Send completed forms, project plans, seed mixes (showing seeds per square foot for each species) and any communications with pesticide applicators to local government staff with decision making authority for the project or BWSR… if local government staff are not involved in reviewing the project.*	Minnesota Board of Water and Soil Resources (BWSR)
South Carolina	DNR companion guide to the scorecard states: *Application submitted to Clemson's Department of Fertilizer and Certification Services. Application submittal will require soil test results and a seed list and the percentage proposed to be planted. Additionally, the landowner will need to describe how they plan to prepare the site [and] plant and manage the solar site.*	Clemson's Department of Fertilizer and Certification Services
Virginia	The scorecard itself requires Virginia DCR to review project details prior to designation. There is a 21-day review process during which the "Pollinator-Smart Solar Industry Review Board" determines certification status.	Virginia Department of Conservation and Recreation (DCR) – Virginia Pollinator-Smart Program

The processes for Massachusetts, South Carolina, and Virginia are potentially more flexible in that there is a greater degree of qualitative review. The initial applications for the pollinator-friendly certifications in Massachusetts and South Carolina are not score-based, but rather require the submission of a fairly substantial amount of information such as site plans and seed mix. A program is then assessed by qualified personnel rather than relying on a numeric score. Virginia does use a numeric score for the initial certification, but also requires a substantial amount of information to be submitted for review separate from the numeric score.

State Laws

While there is some variation, the majority of the state laws[4] related to pollinator-friendly solar site establishment and maintenance allow for site owners and managers to claim that a site is "pollinator-friendly" if a certain score is met on the specified scorecard. This is a voluntary practice; states do not require solar sites to obtain or maintain a "pollinator-friendly" designation. If a requirement for a site to obtain (and/or maintain) a "pollinator-friendly" designation exists, the requirement is typically enforced at the county or municipal level (see Discussion section).

Alternatively, Massachusetts and Michigan have notably unique solar-pollinator site laws.

- Massachusetts 225 CMR 20.07(4)e (https://www.mass.gov/doc/225-cmr-2000-final-071020-clean/download, Accessed on Sept 1, 2021) incentivizes site owners and managers to develop pollinator habitat at solar facilities by offering a rate adder of $0.0025 per kWh ("Compensation Rate Adder") for sites that obtain and maintain at least a silver certification from the University of Massachusetts CEE Pollinator-Friendly Certification Program.
- The Michigan Farmland Preservation Program (https://www.michigan.gov/mdard/0,4610,7-125-1599_2558---,00.html, Accessed on Sept 1, 2021. https://www.michigan.gov/documents/mdard/MDARD_Policy_on_Solar_Panel_and_PA116_Land_656927_7.pdf, Accessed on Sept 1, 2021) (formerly and commonly referred to as PA 116) allows the use of otherwise protected farmland for solar PV sites meeting a scorecard score of 76 or higher. Specifically, a score of 76 or higher is required in order for "solar energy facilities to be placed on lands enrolled in the Farmland Development Rights Program."

Initial vs. Maintenance Scorecards

Illinois, Minnesota, South Carolina, Virginia, and Wisconsin each have two separate scorecards – one for initial use and one for maintenance use. This allows for the potential differentiation of use. The most unique example is South Carolina, where the initial scorecard is *not* based on numeric scores, while the maintenance scorecard is based on numeric scores. All parts of the process for South Carolina (including initial application, certification after four growing seasons, and recertification every five years) allow for expert judgement by way of a third-party review.

[4] As noted previously, the term "law," in the context of this report, is used generally to mean any public policy, bill, act, regulation, statute at any stage of legislation.

Other possible ways to differentiate between initial and maintenance scorecards include:

- No points for a management plan on the maintenance scorecard (for example, Wisconsin)
- On-site verification of the success of desired species or the successful management of undesired / invasive species (such as question 5 on the Illinois maintenance scorecard)

In other ways, some of the initial and maintenance scorecards are very similar. For example:

- Both Virginia scorecards award the same number of points (15) for "site has an approved vegetation management plan."

Florida, Indiana, Maryland, Michigan, Missouri, North Carolina, Northern California / Oregon, Ohio, Vermont, and Fresh Energy each use a single scorecard. While some of these limit the scope of the single scorecard to planning / initial establishment questions only (for example, Maryland), many of these single scorecards *also* include some questions which are worded in such a way that the question is likely to be applicable only after a site is established (after three or four years). For example, question 5 on the North Carolina scorecard asks: "Seasons with at Least Three Blooming Species **Present**." (Emphasis added). Another example is question 7 on the Vermont scorecard, which enquires about "on-site insecticide use on plants" – taken literally, this question is only applicable once plants are established.

In these cases where only a single scorecard is published, the scorecard is typically labeled or otherwise contextualized as being the "initial" scorecard. While the intent of the scorecard creators is unknown, it is likely that these scorecards are intended primarily for "initial" use, but the wording of specific questions may be unintentionally phrased to have maintenance applicability instead of planning applicability as intended. Note also that many of the questions are very similar across states, indicating that instances of misleading wording may have been propagated through the collective design process.

During the interviews, several scorecard designers from states without separate initial and maintenance scorecards indicated that this was an area of desired future improvement. The similarities between the initial and maintenance scorecards (the two Virginia scorecards exhibit the most apparent example of similarities) may therefore be indicative of scorecard programs that are still in development. This includes even the two South Carolina scorecards which, while very different, still includes questions about buffer dimensions (question 2) and the existence of a site management plan (question 9) on the maintenance scorecard in addition to the initial scorecard. Both of these elements would seemingly be static once the program is established and therefore not necessarily an important consideration as part of the maintenance assessments.

The Massachusetts scorecards are not directly comparable to the design of other scorecards. These are comprised of checklists with the certification criteria – planning / initial establishment questions as well as maintenance items are included together on the same checklist(s). However, the primary document for obtaining certification is the application form, and not the checklist. Therefore, the distinction of a "single" vs. "separate initial and maintenance" scorecard design is not applicable for Massachusetts.

Panel Design

Design aspects of the PV modules (commonly referred to as panels) that could potentially impact the success of pollinator plantings are generally not addressed. Panel runoff is not addressed in

the analyzed scorecard programs through the allocation of points. Panel height is acknowledged in several of the scorecard companion guides as an important factor in the establishment and maintenance of pollinator-friendly plant species, but the scorecards do not provide points for a specific panel height, except for Maryland, which does include points for panel height (up to 20 points for 36 inches or higher). Important aspects of PV design and engineering are not considered in the scorecards, including vegetative options to maximize generation capacity when using bifacial panels, racking height vs. ground clearance, erosion resulting from panel runoff, row spacing, or associated cost considerations.

Former Land Use

Former land use (i.e., "brownfield" vs. "greenfield") is not addressed in the majority of scorecard programs and is not numerically addressed in any scorecard. The Massachusetts program awards a "platinum" level certification only for facilities sited on land that was previously developed (meaning, facilities are *not* sited on land that was formally in agricultural production or open, undeveloped land, such as a grassland, shrubland, or forest). The North Carolina technical guide also discusses the benefits of siting on degraded land as opposed to siting over existing habitat (pages 16–17 of the guide) but does not include this as an explicit scoring criteria.

Herbicide Use

While herbicide risk considerations are accounted for on the various scorecards, the use of herbicides is not easily characterized as "good" or "bad." Herbicides are inherently dangerous to existing plant life, but they are also a useful tool in prepping the site for pollinator and native plant species establishment as well as for the spot control of invasive or unwanted species. Risks include herbicide drift – from the intended application to neighboring land such as adjacent agricultural sites or within the solar site during maintenance treatment – and ecological concerns particularly with certain types of herbicides.

As a result, a range of recommendations and points related to herbicide considerations are present throughout the various scorecards. The Northern California / Oregon and Fresh Energy scorecards include a heavy penalty (-40 points, corresponding to 31% of the total possible score) for the presence of perpetual bare ground under the panels due to herbicide use. The Maryland scorecard includes positive points for initial herbicide treatment to control weed germination (question 7 gives 15 points). Some of the scorecard companion guides recommend glyphosate specifically for invasive species management (such as Illinois, Indiana, Minnesota, and Ohio). Many of the scorecards (or guides) simply state the caution: "Be sure to follow manufacturer's instructions when applying chemical herbicides," likely because the potential risks associated with herbicide use are variable and not well-known in all cases.

Site Size

EPRI researchers decided to include a separate scoring category in this report for site size for the following reasons:

- Presence of related discussion in various scorecard companion guides (but without accompanying scores in the scorecards themselves)
- Mention of site size in some of the state laws as discussed above
- Overall importance of site size for both ecological and cost implications.

Although most of the scorecards inquire about the size of the solar site (for example, "Total acres:_____"), this question was neither scored (with points) nor associated with the pass/fail outcome for any of the scorecards. However, ecologically, site size and the placement of the project within the larger landscape is important from the pollinator perspective.

None of the scorecards, companion guides, or laws define a maximum site size for which the scorecards are applicable. Three states specify a minimum site size before it is necessary to use the scorecard (with anything smaller, the state does not require scorecard use to claim "pollinator-friendly" designation). These minimum size specifications are part of the state laws, not part of the scorecards themselves, as shown in Table 4-7. As noted in Table 2-1, all conversions from *acres to generation capacity* were calculated using 2020 EPRI report 3002018729.

Table 4-7
Minimum Site Size Before Scorecard Is Required to Qualify for Pollinator-Friendly Designation

State	Minimum Site Size Before Scorecard Requirement
Illinois	40 kW, which equates to approximately 0.14–0.25 acres
Maryland	1 acre, which equates to approximately 160–290 kW
Minnesota	40 kW, which equates to approximately 0.14–0.25 acres

Guidance regarding the applicability of the scorecards for utility-scale vs. community-scale solar (Table 4-8) is absent in the scorecards, companion guides, and laws.

Table 4-8
Community Scale Solar vs. Utility Scale Solar

Type of Solar	Size of Solar
Community-Scale Solar	• Typically less than ~10 MW_{AC} • Most often developed as a distributed generation (DG) resource connected to the distribution grid
Utility-Scale Solar	• Typically defined as greater than 1 MW_{AC} (though most new projects have much higher capacities) • Most often connected to the transmission grid

Runoff and Erosion

Similar to Site Size, the EPRI researchers decided to include a separate scoring category in this report for Runoff and Erosion for the following reasons:

- Presence of related discussion in various scorecard companion guides (but without accompanying scores in the scorecards themselves)
- Presence of runoff requirements in many permitting laws

In some companion guides, native vegetation was noted as having erosion control benefits. For example, the Virginia companion guide lists 15 native species that can help provide stabilization (primarily grasses). Several scorecards or companion guides also mention various methods of controlling erosion during site establishment such as cover crops, mulch, and erosion control blankets.

Despite the brief discussion in the guides, Runoff and Erosion was not included as a scored question (with points) for any of the scorecards.

5
DISCUSSION

Scorecard Purpose

In considering the effectiveness of the scorecards, it is necessary to understand their purpose. At the highest level, the scorecards are intended to provide criteria for using the "pollinator-friendly" designation on sites co-located with ground mounted solar.

However, based on interviews and associated research, there is broader consideration of the scorecard purposes, including:

- Increasing pollinator habitat beyond what would have otherwise occurred. If this is the case, it is necessary to compare what would have been there (often times gravel or turf grass) to what was changed as a result of using the scorecard.
- Supporting apiaries with honey bees (*Apis mellifera*). Siting managed bee boxes for honey harvesting could cause competition for nectar and pollen resources that native wild bees may otherwise utilize. All bees are "pollinators," but they have varying needs, particularly between wild native bees and the highly managed honey bees.
- Increasing yields of pollinator-dependent crops. If this is a goal, the fly distance of the pollinators needs to be considered in relation to the solar site and agricultural fields, which is not part of the scorecards at this time.
- Easing the process for permitting safe, reliable, affordable, and environmental responsible energy. However, there are no considerations for the cost impacts or savings associated with co-locating solar and pollinator habitat within the scorecards or associated laws.
- Creating a voluntary checklist for solar developers to reference if they are interested in designing sites that can be co-located with pollinator habitat.
- Creating a basis for laws related to solar installations and pollinator protection.
- Protecting not only pollinators but also local wildlife. Some of the scorecards include wildlife elements that have no relation to floral, nectar, or pollinator nesting resources.

Evaluating the purpose is further complicated by the fact that the initial scorecards reflect plans (that is, intentions) for the site, not what was actually achieved. A site can receive the "pollinator-friendly" designation prior to installing any vegetation or habitat. Therefore, it is possible that the scorecards reflect plans, not achievements.

Without clarifying the purpose or goals of the scorecards, it is difficult to assess if they are being effective. A clarifying purpose of the scorecards in their next generation could address a few of the possible goals, for example, with a purpose statement:

> *Encourage the co-location of solar sites with habitat elements that are considered supportive of primary pollinators (invertebrates that transfer pollen between flowers: bees, butterflies, and flies) compared to what would have occurred otherwise, and at a cost that the solar developer can withstand without impacting the primary purpose of affordable, safe, reliable, and renewable electricity.*

Scorecard Creation

Early Scorecards and Influencers

Fresh Energy was a primary force behind the conceptualization and development of the first state-specific scorecard released in 2016 in Minnesota, followed by Vermont later the same year. For the subsequent scorecards, it was common for individual university researchers to lead scorecard creation and include their logo on the final card, which were "published" to their university lab website and sometimes also on Fresh Energy's website (https://fresh-energy.org/beeslovesolar). With a few exceptions, interviews with scorecard creators often mentioned Fresh Energy as either a motivation for developing a scorecard or as a source for consultation during scorecard design.

Minnesota (2016) and Vermont (2016), and in some cases Michigan (2018), were cited during the interviews as primary references for designing other scorecards. Themes and specific details in later scorecards are very similar to these three "early scorecards," reflecting heavy adoption of previously developed elements, points, and scoring methods.

Comparison of the early scorecards (Michigan, Minnesota, Vermont) is important to understanding the later scorecards. Interviews repeatedly noted the use of these three scorecards as initial templates for developing scorecards in their own states. Inspection of the current versions of these three scorecards shows more similarities than differences (Table 4-5). For example, each of these three scorecards include a 40-point penalty for planned on-site insecticide use. This seems to have strongly influenced the design of other scorecards; all but one of the scorecards that followed included this same element and assigned the same 40-point penalty (Florida assigned negative 20 points), even when the overall number of possible points changed – see discussion on point weighting.

Scientific Basis

The majority of the scorecards and guides provide few references, scientific or otherwise, for the scores, except for the Massachusetts, Virginia, and North Carolina guides that do provide many references. However, some of these references are pseudo-scientific in nature, based on qualitative observation. The other references are non-scientific. The Virginia guide is an outlier in that it references a large percentage of peer-reviewed scientific research.

The Massachusetts guide includes an insightful discussion as to why this may be the case:

> *"It is important to recognize that 'pollinator-friendly' practices and programs are relatively new to the United States and to the Northeast in particular, and little research is available concerning best practices to establish native plants at solar PV facilities, or the extent to which these sites can offer meaningful habitat benefits to native species. Currently, no published scientific studies are available quantifying actual impacts of pollinator-friendly practices on pollinators or other native species at solar facilities. The*

best management practices included in this document are drawn from pollinator, vegetation, and wildlife management guidelines designed for use at other types of sites and facilities, as well as research publications and reports regarding invasive species control, pollinator biology, and related topics. As more solar arrays are specifically designed to be pollinator-friendly, and more research is conducted, we expect to gain a better understanding of how solar PV facilities can be established and managed to maximize habitat benefits to native plants and wildlife, and minimize negative impacts of development. These guidelines will be updated to reflect our growing understanding as additional information becomes available. "

Note: The scientific basis that underpins the scorecards warrants deeper consideration and will be discussed further in a companion paper.

Version Control and Design Process

Throughout the research period for this report (2020–2021), there were several instances when scorecards were removed, reposted, updated, or otherwise modified. However, it was difficult to track these changes, as version control on the scorecards seemed to be lacking. Some scorecards included a date, but many did not. Some did not list a version number or a date. In a few instances, when EPRI researchers revisited the website where the scorecard was posted, there was no clear indication that the scorecard had been changed, but through line-by-line review, it became apparent the scorecard had been modified since the last time it was retrieved. This led the authors to establish their own version control process during the research period – downloading all the scorecard versions and associated laws that would be considered in this analysis (provided in this report as Attachment 1 and Attachment 2, respectively).

The process for developing the scorecards varied widely, according to interview input, ranging from a single expert creating the criteria to fully organized stakeholder discussion sessions. Based on interviews, consistency across the scorecards related to both eliciting and responding to comments from solar developers, entomologists, and conservation practitioners was generally a point of concern. As noted, a scorecard can be "published" simply by posting it on a self-managed public website.

Several scorecards had typos, nebulous scoring methods, or uncertainty in mutually exclusive point escalations within a question (a repeated example related to buffers: there are points for a 30-foot buffer and a 50-foot buffer. If you have a 50-foot buffer, it is not specified if the points are additive, or you only get the 50-foot points). These issues could create opportunities for errors during the self-assessment process resulting in higher or lower scores depending on interpretation.

"Standards", Laws, and Requirements

The scorecard can carry the appearance of standardization. For example, the Northern California / Oregon scorecard and the non-state-specific Fresh Energy scorecard headers state that the scorecards are, *"The entomologist-approved standard for what constitutes 'beneficial to pollinators' within the managed landscape of a PV solar facility."* For the electric power industry, "standards" are heavily regulated by federal and state laws, including the Clean Air Act, Clean Water Act, Endangered Species Act, and more. The use of terms such as "standard" in solar scorecards raise questions regarding the basis for the standard, who or what organization oversees the standard, and what industry or scientific engagement process was followed during

standard development? The answers to these questions are not clear at the time of writing, however, the Fresh Energy website claims credit as "a national clearinghouse and catalyzer of pollinator-friendly solar information, standards, best practices, and state-based initiatives." As an organization, Fresh Energy is an independent nonprofit organization "working to speed [Minnesota's] transition to a clean energy economy."[5] The pollinator-friendly solar appears to be their primary area that has expanded beyond Minnesota: "Fresh Energy and partners across the country are accelerating momentum into 2019, advocating for pollinator-friendly habitat in solar siting opportunities throughout the United States.[6]"

The scorecards being used as the basis for laws may be creating a mismatch between the rigor of the scorecards themselves and the assumed rigor of cited law. While the state laws reviewed in this analysis typically do not require use of the scorecard for solar permitting (that is, the use of the scorecards is voluntary), there are local laws that require scorecard use before permits are awarded. For example, Stearns County, Minnesota makes use of the scorecard a requirement for permitting[7]:

> *"The Solar Site Pollinator Habitat Assessment Form shall be completed to show that the beneficial habitat standard is met and submitted, along with the planting plan, with the construction site permit application."*

Further, financial guarantee is required:

> *"A cash escrow or letter of credit meeting the County letter of credit requirements in the amount of 125% of the cost to vegetate the project area is required. A work and material list shall be submitted to determine the guarantee amount. The guarantee shall be kept for a minimum of three years or may be held longer if vegetation is not sufficiently established after three years. The Solar Site Pollinator Habitat Assessment Form for Established Plantings shall be completed prior to release."*

There are also emerging procurement requests that include a preference for pollinator-friendly solar installations and point to the applicable state scorecard(s), for example, MCE in California:

> *"MCE is excited to announce a pollinator program requirement designed to safeguard critical habitats. MCE is the first Community Choice Aggregation (CCA) program that requires new solar project partners to plant pollinator-friendly ground cover throughout the project site and submit a pollinator scorecard every three years. This new requirement – which applies to both our Feed-in Tariff program and power purchase agreements – will take even greater advantage of land where solar projects are built, ensuring that the space is used to generate clean energy for our customers, while providing much-needed habitat for pollinators such as monarch butterflies."*[8]

[5] https://fresh-energy.org/about-us. Last visited September 29, 2021.

[6] https://fresh-energy.org/notable-news-pollinator-friendly-solar. Last visited September 29, 2021.

[7] Stearns County Land Use and Zoning Ordinance #439, Updated June 3, 2021. https://content.civicplus.com/api/assets/792bd40d-2473-47ec-b1cd-7f85b8a4a9f1#SOLRENGY

[8] Posted Feb 12, 2020 at https://www.mceclean energy.org/news/local-projects/pollinator-requirement/. Also, see https://www.mceclean energy.org/energy-procurement/

The trade press has raised concerns about the possibility of "greenwashing" from the pollinator-friendly designation[9].

Overall, the design process of the scorecards is not controlled by any central organization and is, instead, being developed on a state-by-state basis using various processes by a variety of subject matter experts who employ a range of review approaches. There is a lack of rigor, consistency, and oversight for scorecard design methodology and version control, which raises concerns when those same scorecards are cited in law.

[9] Ilana Cohen, "Pollinator-Friendly Solar Could be a Win-Win for Climate and Landowners, but Greenwashing is a Worry," Inside Climate News, Nov. 28, 2020. https://insideclimatenews.org/news/28112020/pollinator-friendly-solar-greenwashing-risk/

6
SUMMARY

In 2019, EPRI published a concise assessment (3002014869)[10] that summarized the key considerations related to development of pollinator-friendly solar, including site design, construction and maintenance, procurement, and business case. Given the continuing solar industry interest in co-location of solar with pollinator habitat, this comprehensive study of existing pollinator solar scorecards considers the level of consistency across the scorecards, analyzes the specific scorable elements and their relative weighting, and investigates the factors that influenced scorecard development.

There seems to be a strong influence from early scorecards in three states, as shown by the duplication of common elements and associated points (for example, -40 points for insecticide use) without evidence that the relative scores of other elements were adjusted accordingly. Even when the total maximum points doubled, the -40 allocation for insecticide use was carried over. It is unclear if the scorecard designers were conscientiously adjusting the weighting of elements, or if there was simply an addition of scoring elements that increased the maximum points possible and inadvertently changed the relative weighting of specific elements. It is potentially problematic that the intentionality in scorecard design is unknown, particularly given the common origin of some scorecard attributes and carryover of the original scientific basis.

Importantly, there is a lack of clarity regarding the application of scorecards to specific geographic regions, property sizes, or landscapes. Regarding property size, solar site design scale varies widely; however, in neither the scorecards nor in the laws is there mention of the applicability of the scorecards on a 5-acre property vs. a 5,000-acre property (community-scale vs. utility-scale). Based on the interviews, the confirmed examples of existing scorecard use have been on community-scale sites, raising the question of whether the scorecards are designed for smaller projects and not grid-scale solar.

Regarding geographic region and landscape dynamics, none of the scorecards provided guidance on when *not* to establish pollinator habitat on a particular property due to ecological risk and/or unintentional creation of habitat sinks (for example, attracting pollinators to a solar site adjacent to an agricultural field that aerially applies insecticides with significant chemical drift). Some solar sites can provide important refugia for pollinators, while other sites such as those with soil contamination, adjacent insecticide application, or inappropriate climate or water conditions may not be appropriate for pollinators habitat – even with the recognition of the need to protect and restore pollinator habitat across the landscape.

The scorecards imply, via numerical scores, which factors are more important than others. Based on the relative contribution of points, the most important categories across all scorecards are Plant Diversity with 49–75% of possible points and Insecticide Use with -16% to -40% (penalty) of possible points. Based on average (mean) values, if a solar site were to achieve the full score

[10] *Overview of Pollinator-Friendly Solar Energy*. EPRI, Palo Alto, CA: 2019. 3002014869.

for all Plant Diversity elements and no other points, it would receive 60%, which would be sufficient to meet the average minimum passing score of 56%.

The issue of the scorecards being "required" or "encouraged" is of considerable concern among those interviewed. While the scorecards are not required in the state-level laws reviewed during the research period, the scorecards may lead to laws with permit-connected requirements. In some states, pollinator habitat has become required at the local level after the creation of a scorecard; some local laws are emerging that use the scorecards to establish permit thresholds for developments in their counties.

The initial scorecards are based on plans, not on implementation of those plans.; scores reflect intentions, not outcomes. A site can receive the "pollinator-friendly" designation prior to installing any vegetation or habitat. Even the maintenance scorecards have limited oversight via third-party review to confirm effective implementation of the plans. This raises some questions about the purpose of the scorecards – are they intended to acknowledge *plans* for supporting pollinators or to confirm that those plans have been executed effectively from the perspective of pollinators?

According to interview input, the process for scorecard development varied widely, ranging from a single expert creating the criteria to organized stakeholder listening sessions. Scoring attributes, point allocation and weighting, pass/fail thresholds, and companion documents could be developed by a single individual expert or a set of self-selected reviewers. There was also lack of consistency in version control for scorecards, with "publication" generally meaning scorecard were self-posted to a public website. This has led to potential concerns regarding a mismatch between the rigor of scorecard and the rigor presumed in law that cites the scorecard. Further, except for the scorecards used on established sites (i.e. maintenance scorecards), they typically reflect plans for the site, not the execution of the plans (i.e. ecological outcomes). Vulnerabilities in the scorecard design process, combined with self-assessment based on intentions (not achievements), could cause concern for both power companies and environmental conservationists regarding the legitimacy of pollinator-friendly solar designation.

Without clarity on the purpose of the scorecards, it is difficult to assess if they are realizing their purpose. In the end, if the scorecards are predictive of ecological outcomes – healthy pollinator habitat –they may be doing the basic job intended. Conceptually, the scorecards have certainly catalyzed consideration for the potential to meet a renewable energy goal while also supporting pollinators. It is unlikely that there will be objection to the concept of helping the monarch butterfly or saving bumblebees, which has eased the promotion of this concept to agencies and lawmakers.

There are inherent challenges in creating a simple tool, such as a single-page scorecard, to quickly assess complex ecological conditions. The task requires condensation of highly complex ecological systems to the most influential habitat elements - elements that some experts spend their entire careers studying. The condensation process will come with trade-offs generally aimed at balancing ecological relevance, level of effort for measurement, cost, and achievability. Still, the value and interest in a tool for assessing the benefit of establishing plants that promote pollinator habitat on a solar PV site is clear, as growth in ground-mounted solar is expected to increase dramatically over the next 20 years.

The scorecards and associated laws have incentivized consideration of opportunities to co-locate pollinator habitat at solar sites. Another generation of scorecards that address some of the issues identified in this research would be useful for resolving the mismatch between the scorecards themselves, the presumed rigor of cited law, and the larger societal objective to advance a sustainable and equitable energy future.

Additional research is needed, as follows:

- Field-based research to determine if there is a correlation between the points received on a pollinator-friendly scorecard and the actual PV site habitat conditions.
- Economic analysis to assess the costs and savings associated with establishing and maintaining a solar site that also supports pollinators.
- A better understanding of the connection between laws and scorecards that have not followed a standardized creation process or application.
- Potential for scorecards to play a role in realizing a sustainable renewable energy future that includes pollinators.

7
ATTACHMENTS

Attachment 1

Versions of the scorecards available at the time of research for this report are included as Attachment 1.

Attachment 2

State laws available at the time of research for this report are included as Attachment 2.

A
SCORING CATEGORIZATION

As discussed in Section 2, the categories listed on the dashboards do not match the contents of the scorecards one-for-one. Rather, due to the variability among scorecard designs, a categorization system was used to normalize the comparison across different scorecards. See Table 2-1 for a description of each category.

The specific assignment of points into one of the categories is shown in Table A-1.

Table A-1
Detailed Scoring Categorization

Scorecard	Initial / Maintenance	Question	Sub-question	Category	Points	Points (negative / penalty)	Notes
Northern California / Oregon	Initial	1	-	Plant Diversity	15	-	
Northern California / Oregon	Initial	2	-	Plant Diversity	15	-	
Northern California / Oregon	Initial	3	-	Plant Diversity	15	-	
Northern California / Oregon	Initial	4	-	Plant Diversity	20	-	
Northern California / Oregon	Initial	5	-	Available Pollinator Habitat	8	-	

Table A-1 (continued)
Detailed Scoring Categorization

Scorecard	Initial / Maintenance	Question	Sub-question	Category	Points	Points (negative / penalty)	Notes
Northern California / Oregon	Initial	6	a	Site Planning and Management	15	-	
Northern California / Oregon	Initial	6	b	Signage / Public Engagement	5	-	
Northern California / Oregon	Initial	7	-	Plant Diversity	20	-	
Northern California / Oregon	Initial	8	a	Insecticide Use	-	-40	
Northern California / Oregon	Initial	8	b	Herbicide Use	-	-40	
Northern California / Oregon	Initial	8	c	Insecticide Risk	10	-	
Northern California / Oregon	Initial	9	-	Signage / Public Engagement	5	-	
Florida	Initial	1	a	Site Planning and Management	10	-	
Florida	Initial	1	b	Signage / Public Engagement	5	-	
Florida	Initial	1	c	Signage / Public Engagement	5	-	
Florida	Initial	2	2a	Site Preparation	10	-	

Table A-1 (continued)
Detailed Scoring Categorization

Scorecard	Initial / Maintenance	Question	Sub-question	Category	Points	Points (negative / penalty)	Notes
Florida	Initial	2	2b	Invasive Preparation	-	-10	
Florida	Initial	3	-	Plant Diversity	20	-	
Florida	Initial	4	-	Plant Diversity	15	-	
Florida	Initial	5	-	Plant Diversity	15	-	
Florida	Initial	6	-	Plant Diversity	20	-	
Florida	Initial	7	a/b	Plant Diversity	10	-	
Florida	Initial	7	c	Wildlife habitat	5	-	
Florida	Initial	8	-	Site Planning and Management	10	-	
Florida	Initial	9	a	Insecticide Risk	10	-	
Florida	Initial	9	b	Insecticide Use	-	-20	
Florida	Initial	9	c	Insecticide Use	-	-20	
Illinois	Initial	1	-	Plant Diversity	18	-	
Illinois	Initial	2	a	Vegetation Buffer (size)	5	-	
Illinois	Initial	2	b/c	Vegetation Buffer (size)	10	-	Although the scorecard notes "choose all that apply," it was assumed that the second two sub-questions (b and c) are intended to be mutually exclusive. This means that a site cannot score points for both of these sub-questions.

Table A-1 (continued)
Detailed Scoring Categorization

Scorecard	Initial / Maintenance	Question	Sub-question	Category	Points	Points (negative / penalty)	Notes
Illinois	Initial	2	d	Wildlife Habitat	5	-	
Illinois	Initial	3	-	Plant Diversity	20	-	
Illinois	Initial	4	-	Plant Diversity	15	-	
Illinois	Initial	5	-	Plant Diversity	15	-	
Illinois	Initial	6	-	Plant Diversity	15	-	
Illinois	Initial	7	-	Plant Diversity	15	-	
Illinois	Initial	8	a	Site Preparation	10	-	
Illinois	Initial	8	b	Site Preparation	10	-	
Illinois	Initial	8	c	Invasive Preparation	-	-10	
Illinois	Initial	9	-	Available Pollinator Habitat	8	-	
Illinois	Initial	10	a	Site Planning and Management	10	-	
Illinois	Initial	10	b	Signage / Public Engagement	3	-	
Illinois	Initial	11	a	Insecticide Use	-	-40	
Illinois	Initial	11	b	Insecticide Risk	5	-	
Illinois	Maintenance	1	-	Plant Diversity	18	-	

Table A-1 (continued)
Detailed Scoring Categorization

Scorecard	Initial / Maintenance	Question	Sub-question	Category	Points	Points (negative / penalty)	Notes
Illinois	Maintenance	2	a	Vegetation Buffer (size)	5	-	
Illinois	Maintenance	2	b/c	Vegetation Buffer (size)	10	-	Although the scorecard notes "choose all that apply," it was assumed that the second two sub-questions (b and c) are intended to be mutually exclusive. This means that a site cannot score points for both of these sub-questions.
Illinois	Maintenance	2	d	Wildlife habitat	5	-	
Illinois	Maintenance	3	-	Plant Diversity	15	-	
Illinois	Maintenance	4	-	Plant Diversity	15	-	
Illinois	Maintenance	5	-	Invasive Species Management	15	-	
Illinois	Maintenance	6	-	Plant Diversity	15	-	
Illinois	Maintenance	7	-	Plant Diversity	15	-	
Illinois	Maintenance	8	-	Available Pollinator Habitat	8	-	
Illinois	Maintenance	9	a	Site Planning and Management	10	-	
Illinois	Maintenance	9	b	Signage / Public Engagement	3	-	
Illinois	Maintenance	10	a	Insecticide Use	-	-40	

Table A-1 (continued)
Detailed Scoring Categorization

Scorecard	Initial / Maintenance	Question	Sub-question	Category	Points	Points (negative / penalty)	Notes
Illinois	Maintenance	10	b	Insecticide Risk	5	-	
Indiana	Initial	1	-	Plant Diversity	10	-	
Indiana	Initial	2	a	Site Planning and Management	5	-	
Indiana	Initial	2	b	Vegetation Buffer (size)	5	-	
Indiana	Initial	2	c	Plant Diversity	10	-	
Indiana	Initial	3	-	Plant Diversity	20	-	
Indiana	Initial	4	-	Plant Diversity	10	-	
Indiana	Initial	5	-	Plant Diversity	10	-	
Indiana	Initial	6	-	Plant Diversity	12	-	
Indiana	Initial	7	-	Plant Diversity	12	-	
Indiana	Initial	8	-	Plant Diversity	10	-	
Indiana	Initial	9	a/b/c/d	Plant Diversity	15	-	

Table A-1 (continued)
Detailed Scoring Categorization

Scorecard	Initial / Maintenance	Question	Sub-question	Category	Points	Points (negative / penalty)	Notes
Indiana	Initial	9	e	Plant Diversity	-	-15	Negative (penalty) points for this category on the Indiana scorecard are not included in the report because a) the use of penalty points for this category is unique to Indiana and b) summing these penalty points together with the positive score that can also be achieved from this same question would skew the results.
Indiana	Initial	10	-	Plant Diversity	15	-	
Indiana	Initial	11	a/b/c	Site Preparation	30	-	
Indiana	Initial	11	d	Invasive Preparation	-	-10	
Indiana	Initial	12	a	Site Planning and Management	10	-	
Indiana	Initial	12	b/c/d	Signage / Public Engagement	20	-	
Indiana	Initial	13	a	Insecticide Use	-	-40	
Indiana	Initial	13	b	Insecticide Risk	5	-	
Maryland	Initial	1	-	Plant Diversity	30	-	
Maryland	Initial	2	-	Plant Diversity	30	-	
Maryland	Initial	3	-	Plant Diversity	5	-	

Table A-1 (continued)
Detailed Scoring Categorization

Scorecard	Initial / Maintenance	Question	Sub-question	Category	Points	Points (negative / penalty)	Notes
Maryland	Initial	4	-	Plant Diversity	10	-	Question 4 is also somewhat related to Insecticide Risk, but Plant Diversity was chosen as the best fit.
Maryland	Initial	5	-	Plant Diversity	5	-	
Maryland	Initial	6	-	Plant Diversity	15	-	
Maryland	Initial	7	a/b	Site Preparation	10	-	
Maryland	Initial	7	c	Invasive Species Management	5	-	
Maryland	Initial	8	a	Site Preparation	5	-	
Maryland	Initial	8	b/c	Invasive Species Management	10	-	
Maryland	Initial	8	d	Plant Diversity	5	-	
Maryland	Initial	9	-	Available Pollinator Habitat	25	-	
Maryland	Initial	10	-	Site Planning and Management	20	-	
Maryland	Initial	11	-	Plant Diversity	20	-	
Maryland	Initial	12	-	Signage / Public Engagement	15	-	
Maryland	Initial	13	-	Insecticide Use	-	-40	

Table A-1 (continued)
Detailed Scoring Categorization

Scorecard	Initial / Maintenance	Question	Sub-question	Category	Points	Points (negative / penalty)	Notes
Michigan	Initial	1	a/b	Site Planning and Management	15	-	
Michigan	Initial	1	c	Signage / Public Engagement	3	-	
Michigan	Initial	2	a	Site Preparation	10	-	
Michigan	Initial	2	b	Invasive Preparation	-	-20	
Michigan	Initial	3	a	Insecticide Use	-	-40	
Michigan	Initial	3	b	Insecticide Risk	20	-	
Michigan	Initial	4	-	Available Pollinator Habitat	4	-	
Michigan	Initial	5	-	Plant Diversity	10	-	
Michigan	Initial	6	-	Plant Diversity	10	-	
Michigan	Initial	7	-	Plant Diversity	15	-	
Michigan	Initial	8	-	Plant Diversity	10	-	
Michigan	Initial	9	-	Plant Diversity	15	-	
Minnesota	Initial	1	-	Plant Diversity	15	-	
Minnesota	Initial	2	-	Plant Diversity	15	-	
Minnesota	Initial	3	-	Plant Diversity	15	-	

Table A-1 (continued)
Detailed Scoring Categorization

Scorecard	Initial / Maintenance	Question	Sub-question	Category	Points	Points (negative / penalty)	Notes
Minnesota	Initial	4	-	Plant Diversity	20	-	
Minnesota	Initial	5	-	Available Pollinator Habitat	14	-	
Minnesota	Initial	6	a	Site Planning and Management	15	-	
Minnesota	Initial	6	b	Signage / Public Engagement	5	-	
Minnesota	Initial	7	-	Plant Diversity	23	-	
Minnesota	Initial	8	a	Insecticide Use	-	-40	
Minnesota	Initial	8	b	Insecticide Risk	10	-	
Minnesota	Maintenance	1	-	Plant Diversity	25	-	
Minnesota	Maintenance	2	-	Plant Diversity	30	-	
Minnesota	Maintenance	3	-	Plant Diversity	30	-	
Minnesota	Maintenance	4	-	Plant Diversity	20	-	
Minnesota	Maintenance	5	-	Available Pollinator Habitat	10	-	
Minnesota	Maintenance	6	a	Plant Diversity	5	-	
Minnesota	Maintenance	6	b	Site Planning and Management	15	-	

Table A-1 (continued)
Detailed Scoring Categorization

Scorecard	Initial / Maintenance	Question	Sub-question	Category	Points	Points (negative / penalty)	Notes
Minnesota	Maintenance	c	-	Signage / Public Engagement	5	-	
Minnesota	Maintenance	d	-	Available Pollinator Habitat	5	-	
Minnesota	Maintenance	7	a	Insecticide Use	-	-25	
Minnesota	Maintenance	7	b	Insecticide Risk	10	-	
Missouri	Initial	1	a/b/c	Site Planning and Management	18	-	
Missouri	Initial	1	d/e	Site Planning and Management	-	-2	Negative (penalty) points for this category on the Missouri scorecard are not included in the report because a) inclusion of penalty points for mowing is unique to Missouri, b) this category represents a minor impact to the score, and c) summing these penalty points together with the positive score that can also be achieved from this same question would skew the results.
Missouri	Initial	1	f	Signage / Public Engagement	3	-	
Missouri	Initial	2	a/b/c	Site Preparation	13	-	
Missouri	Initial	2	d	Invasive Preparation	-	-20	
Missouri	Initial	3	a	Insecticide Use	-	-40	

Table A-1 (continued)
Detailed Scoring Categorization

Scorecard	Initial / Maintenance	Question	Sub-question	Category	Points	Points (negative / penalty)	Notes
Missouri	Initial	3	b	Insecticide Risk	20	-	
Missouri	Initial	4	-	Available Pollinator Habitat	4	-	
Missouri	Initial	5	-	Plant Diversity	10	-	
Missouri	Initial	6	-	Plant Diversity	10	-	
Missouri	Initial	7	-	Plant Diversity	10	-	
Missouri	Initial	8	-	Plant Diversity	10	-	
Missouri	Initial	9	-	Plant Diversity	15	-	
North Carolina	Initial	1	-	Plant Diversity	15	-	
North Carolina	Initial	2	-	Plant Diversity	5	-	
North Carolina	Initial	3	-	Plant Diversity	10	-	
North Carolina	Initial	4	-	Plant Diversity	20	-	
North Carolina	Initial	5	-	Plant Diversity	20	-	
North Carolina	Initial	6	a	Site Preparation	10	-	
North Carolina	Initial	6	b	Invasive Preparation	-	-10	
North Carolina	Initial	7	-	Available Pollinator Habitat	8	-	

Table A-1 (continued)
Detailed Scoring Categorization

Scorecard	Initial / Maintenance	Question	Sub-question	Category	Points	Points (negative / penalty)	Notes
North Carolina	Initial	8	a	Site Planning and Management	10	-	
North Carolina	Initial	8	b	Site Planning and Management	5	-	
North Carolina	Initial	8	c	Signage / Public Engagement	5	-	
North Carolina	Initial	9	a	Insecticide Use	-	-40	
North Carolina	Initial	9	b	Insecticide Risk	5	-	
North Carolina	Initial	10	a	Plant Diversity	5	-	
North Carolina	Initial	10	b	Plant Diversity	5	-	
North Carolina	Initial	10	c	Vegetation Buffer (size)	10	-	
North Carolina	Initial	11	-	Wildlife Habitat	25	-	
Ohio	Initial	1	-	Plant Diversity	30	-	
Ohio	Initial	2	-	Plant Diversity	30	-	
Ohio	Initial	3	-	Plant Diversity	15	-	
Ohio	Initial	4	-	Plant Diversity	20	-	
Ohio	Initial	5	-	Plant Diversity	15	-	
Ohio	Initial	6	-	Available Pollinator Habitat	10	-	

Table A-1 (continued)
Detailed Scoring Categorization

Scorecard	Initial / Maintenance	Question	Sub-question	Category	Points	Points (negative / penalty)	Notes
Ohio	Initial	7	a/b/c	Vegetation Buffer (size)	15	-	
Ohio	Initial	7	d	Plant Diversity	5	-	
Ohio	Initial	8	a	Site Preparation	10	-	
Ohio	Initial	8	b	Site Preparation	5	-	
Ohio	Initial	8	c	Invasive Preparation	-	-10	
Ohio	Initial	9	a/b/c	Site Planning and Management	20	-	
Ohio	Initial	9	d	Signage / Public Engagement	5	-	
Ohio	Initial	9	e	Wildlife Habitat	5	-	
Ohio	Initial	9	f	Site Planning and Management	10	-	
Ohio	Initial	10	a	Insecticide Risk	-	-20	
Ohio	Initial	10	b	Insecticide Use	-	-40	
South Carolina	Maintenance	1	-	Plant Diversity	10	-	

Table A-1 (continued)
Detailed Scoring Categorization

Scorecard	Initial / Maintenance	Question	Sub-question	Category	Points	Points (negative / penalty)	Notes
South Carolina	Maintenance	2	a/b/c	Vegetation Buffer (size)	15	-	Although the scorecard notes "choose all that apply," it was assumed that the second two sub-questions (b and c) are intended to be mutually exclusive. This means that a site cannot score points for both of these sub-questions.
South Carolina	Maintenance	2	d	Plant Diversity	5	-	
South Carolina	Maintenance	3	-	Plant Diversity	15	-	
South Carolina	Maintenance	4	-	Plant Diversity	15	-	
South Carolina	Maintenance	5	-	Invasive Species Management	15	-	
South Carolina	Maintenance	6	-	Plant Diversity	15	-	
South Carolina	Maintenance	7	-	Plant Diversity	15	-	
South Carolina	Maintenance	8	-	Available Pollinator Habitat	8	-	
South Carolina	Maintenance	9	a	Site Planning and Management	10	-	
South Carolina	Maintenance	9	b	Signage / Public Engagement	3	-	
South Carolina	Maintenance	10	-	Insecticide Use	-	-40	
Vermont	Initial	1	-	Plant Diversity	20	-	

Table A-1 (continued)
Detailed Scoring Categorization

Scorecard	Initial / Maintenance	Question	Sub-question	Category	Points	Points (negative / penalty)	Notes
Vermont	Initial	2	-	Plant Diversity	25	-	
Vermont	Initial	3	-	Plant Diversity	15	-	
Vermont	Initial	4	-	Plant Diversity	25	-	
Vermont	Initial	5	a/b/c	Available Pollinator Habitat	6	-	
Vermont	Initial	5	d	Wildlife Habitat	0	-	Although this question is very similar to question 10d on the Virginia scorecard, this question on the Vermont scorecard is not clear. As such, it was impossible to confidently make any assumptions about the possible scores for question 5d on the Vermont scorecard.
Vermont	Initial	6	-	Site Planning and Management	25	-	
Vermont	Initial	7	-	Insecticide Use	-	-40	
Vermont	Initial	8	a/b	Plant Diversity	10	-	
Vermont	Initial	8	c	Vegetation Buffer (size)	10	-	
Virginia	Initial	1	-	Plant Diversity	15	-	
Virginia	Initial	2	-	Plant Diversity	5	-	
Virginia	Initial	3	-	Plant Diversity	15	-	

Table A-1 (continued)
Detailed Scoring Categorization

Scorecard	Initial / Maintenance	Question	Sub-question	Category	Points	Points (negative / penalty)	Notes
Virginia	Initial	4	-	Plant Diversity	15	-	
Virginia	Initial	5	-	Plant Diversity	10	-	
Virginia	Initial	6	-	Plant Diversity	15	-	
Virginia	Initial	7	a/b	Site Planning and Management	20	-	
Virginia	Initial	7	c	Invasive Species Management	5	-	
Virginia	Initial	7	d	Insecticide Use	-	-40	
Virginia	Initial	8	-	Invasive Preparation	-	-20	
Virginia	Initial	9	-	Signage / Public Engagement	10	-	
Virginia	Initial	10	a/b/c/e	Available Pollinator Habitat	20	-	
Virginia	Initial	10	d	Wildlife Habitat	10	-	Up to a maximum of 10 points is specified. This was categorized as "wildlife habitat" because this was assumed to cover primarily bird nest features, which is different from question 10c.
Virginia	Maintenance	1	-	Plant Diversity	15	-	
Virginia	Maintenance	2	-	Plant Diversity	5	-	

Table A-1 (continued)
Detailed Scoring Categorization

Scorecard	Initial / Maintenance	Question	Sub-question	Category	Points	Points (negative / penalty)	Notes
Virginia	Maintenance	3	-	Plant Diversity	15	-	
Virginia	Maintenance	4	-	Plant Diversity	15	-	
Virginia	Maintenance	5	-	Plant Diversity	10	-	
Virginia	Maintenance	6	-	Plant Diversity	15	-	
Virginia	Maintenance	7	a/b	Site Planning and Management	20	-	
Virginia	Maintenance	7	c	Invasive Species Management	5	-	
Virginia	Maintenance	7	d	Insecticide Use	-	-40	
Virginia	Maintenance	8	-	Invasive Preparation	-	-20	
Virginia	Maintenance	9	-	Signage / Public Engagement	10	-	
Virginia	Maintenance	10	a/b/c/e	Available Pollinator Habitat	20	-	
Virginia	Maintenance	10	d	Available Pollinator Habitat	10	-	For the per-feature points, a maximum reasonable number of features was assumed to be 20. Therefore, 0.2 x 20 = 10.
Wisconsin	Initial	0	-	Site Planning and Management	20	-	
Wisconsin	Initial	1	-	Vegetation Buffer (size)	10	-	

Table A-1 (continued)
Detailed Scoring Categorization

Scorecard	Initial / Maintenance	Question	Sub-question	Category	Points	Points (negative / penalty)	Notes
Wisconsin	Initial	2	-	Insecticide Risk	5	-	
Wisconsin	Initial	3	-	Insecticide Use	-	-40	Question: "Insecticide Use" #1
Wisconsin	Initial	4	-	Plant Diversity	10	-	Question: "See Mix" #1
Wisconsin	Initial	5	-	Plant Diversity	15	-	Question: "See Mix" #2
Wisconsin	Initial	6	-	Plant Diversity	15	-	Question: "See Mix" #3
Wisconsin	Initial	7	-	Plant Diversity	15	-	Question: "See Mix" #4
Wisconsin	Initial	8	-	Plant Diversity	5	-	Question: "See Mix" #5
Wisconsin	Initial	9	-	Plant Diversity	5	-	Question: "See Mix" #6
Wisconsin	Maintenance	1	-	Plant Diversity	15	-	
Wisconsin	Maintenance	2	-	Plant Diversity	15	-	
Wisconsin	Maintenance	3	-	Plant Diversity	20	-	
Wisconsin	Maintenance	4	-	Plant Diversity	20	-	
Wisconsin	Maintenance	5	-	(No Score)	0	-	
Wisconsin	Maintenance	6	-	(No Score)	0	-	
Wisconsin	Maintenance	7	-	Plant Diversity	5	-	
Wisconsin	Maintenance	8	-	Insecticide Use	-	-40	
Wisconsin	Maintenance	9	-	Vegetation Buffer (size)	10	-	

Table A-1 (continued)
Detailed Scoring Categorization

Scorecard	Initial / Maintenance	Question	Sub-question	Category	Points	Points (negative / penalty)	Notes
Wisconsin	Maintenance	10	-	Insecticide Risk	5	-	
Wisconsin	Maintenance	0	-	(Photograph)	10	-	Extra points are available for including a site photo, not associated with any particular category.
Fresh Energy	Initial	1	-	Plant Diversity	15	-	
Fresh Energy	Initial	2	-	Plant Diversity	15	-	
Fresh Energy	Initial	3	-	Plant Diversity	15	-	
Fresh Energy	Initial	4	-	Plant Diversity	20	-	
Fresh Energy	Initial	5	-	Available Pollinator Habitat	8	-	
Fresh Energy	Initial	6	a	Site Planning and Management	15	-	
Fresh Energy	Initial	6	b	Signage / Public Engagement	5	-	

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