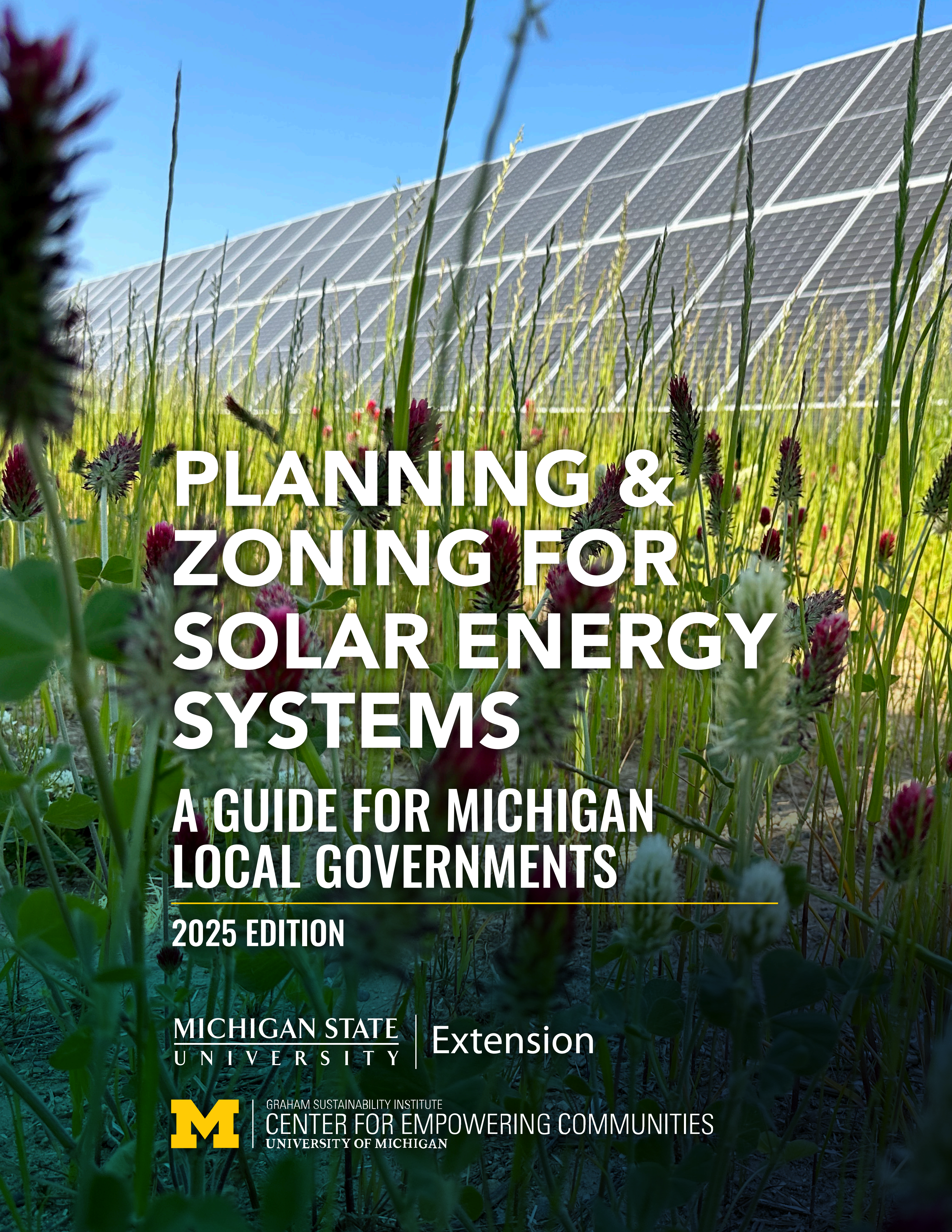

PLANNING & ZONING FOR SOLAR ENERGY SYSTEMS

A GUIDE FOR MICHIGAN LOCAL GOVERNMENTS

2025 EDITION

MICHIGAN STATE UNIVERSITY | Extension

GRAHAM SUSTAINABILITY INSTITUTE
CENTER FOR EMPOWERING COMMUNITIES
UNIVERSITY OF MICHIGAN

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Find this document and more about the project online at extension.msu.edu/solarzoning

Cover image: *Ground-mounted SES with pollinator garden. Photo by Fatimah Bolhassan.*

TABLE OF CONTENTS

MICHIGAN STATE UNIVERSITY | Extension

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BACKGROUND & PURPOSE

Calhoun Solar Energy Center in Calhoun County. Photo by Kelly Jones.

Solar energy development in Michigan is in full motion. From residential rooftop solar to solar systems supporting local businesses and utility-scale solar power plants, the prevalence of solar energy systems (SES) is growing across the state.[1] This shift is evidenced by the expanding installations of smaller on-site SES[2] and the number of utility-scale SES currently under construction or in the grid interconnection queue.[3]

The rise in solar development is largely driven by technology advancements that have significantly reduced costs at all levels of solar development, making solar a cost-competitive option compared to natural gas and coal, both nationally and in Michigan specifically.[4] Even though the solar resources in Michigan and other Midwestern states are not as abundant as in the Southwest United States[5] (a solar panel in Michigan produces approximately 70% of the energy it would generate in Phoenix, Arizona, over the course of a year),[6] Michigan utility companies, homeowners, and businesses are increasing the amount of power generated from solar energy.

Michigan communities are now tasked with planning for renewable energy development in their jurisdictions.[7] By addressing these solar development proposals through thoughtful master planning and zoning ordinance development, communities have the opportunity to proactively determine how SES can fit into their

1 To learn more about how much solar is operational in Michigan, refer to the hub site of the Michigan Public Service Commission: https://data-michiganpsc.hub.arcgis.com/pages/solar-resources.

2 Michigan Public Service Commission (MPSC). (2024). Status of Renewable Energy, Distributed Generation, and Legacy Net Metering in Michigan. https://www.michigan.gov/mpsc/-/media/Project/Websites/mpsc/regulatory/reports/RE-DG/2024-RE-DG-Report.pdf

3 Midcontinent Independent System Operator (MISO). Generator Interconnection Queue. https://www.misoenergy.org/planning/resource-utilization/GI_Queue/

4 For national data, see Lazard. (2024). Levelized Cost of Energy+. https://www.lazard.com/research-insights/levelized-cost-of-energyplus/. Specifically for Michigan, National Renewable Energy Laboratory's (NREL) State and Local Planning for Energy (SLOPE) tool averages cost of utility-scale solar energy as $47 per megawatt-hour (MWh), compared to coal with $83 per MWh and gas ranging between $31 per MWh for gas combined cycle and $53 per MWh for gas combined with carbon capture and sequestration in 2020. https://maps.nrel.gov/slope/data-viewer?filters=%5B%5D&layer=lcoe.levelized-cost-of-electricity&geoId=G26&year=2020&res=state

5 National Renewable Energy Laboratory (NREL). Solar Resource Data, Tools, and Maps. https://www.nrel.gov/gis/solar

6 National Renewable Energy Laboratory (NREL). PVWatts Calculator. https://pvwatts.nrel.gov/pvwatts.php

7 Guidance for planning and zoning for wind energy systems and battery energy storage systems is available online: https://www.canr.msu.edu/resources/sample_zoning_for_wind_energy_systems_1 and https://graham.umich.edu/project/bess-guide.

landscapes—rural, suburban, or urban. The purpose of this guide is to help Michigan communities navigate these local land-use policy decisions and adopt plans and regulations that meet their needs.

This guide is written for local planners, officials, attorneys, and policymakers within the State of Michigan. It outlines the current policy landscape for solar in Michigan, describes the various SES components and configurations, and provides principles for how SES might fit within various land-use patterns across the state. The guide includes a discussion of local zoning options for large-scale SES in light of Michigan's new energy siting law Public Act 233 of 2023. Starting on Page 26, the guide provides sample language for regulating SES through a community's zoning ordinance.

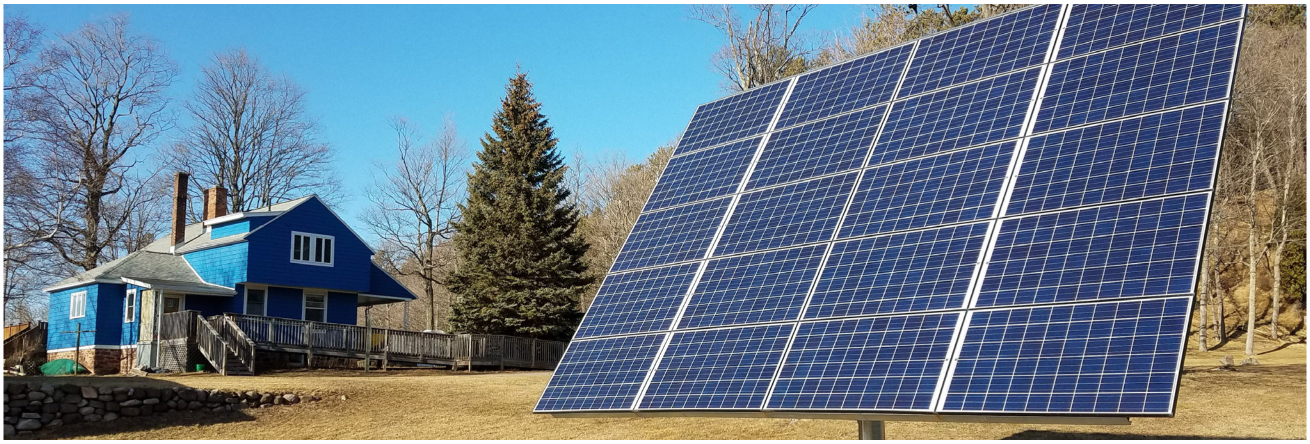
The findings and recommendations in this document are based on federal guidance, university peer-reviewed research (whenever available and conclusive), and the parameters of Michigan law as it relates to the topic(s) in Michigan. The zoning and regulatory rules and concepts discussed here may not apply in other states.

Planning and Zoning for Solar Energy Systems: A Guide for Michigan Local Governments was developed by experts within Michigan State University Extension in partnership with the Center for EmPowering Communities at the University of Michigan's Graham Sustainability Institute. Further review of this document was completed by content experts from local units of government, energy-related non-profits, utility experts, attorneys, and members of academia.

This guide, first published in 2021, has been significantly updated in 2025 and will continue to be updated as solar technology evolves, as the legal framework changes, and as we learn more from the deployment of existing technology.

Ground-mounted SES with pollinator garden. Photo by Rob Davis.

STATE-LEVEL POLICY CHANGES FOR SOLAR ENERGY IN MICHIGAN



Ground-mounted monopole SES. Photo by Bradley Neumann.

Recent state legislation makes it essential for Michigan's local governments to (re)consider SES at all scales within their master plans and zoning ordinances. This chapter overviews key state policies affecting solar energy in Michigan, providing the context in which local governments operate.

Public Act 235 of 2023 (PA 235), adopted by the Michigan legislature in November 2023, requires utilities to source 50% of their electricity from renewable sources by 2030 and 60% by 2035.[8] Even prior to this legislation, the economic models of Michigan's two largest utilities found that an energy mix including significant increases in solar energy was the most cost-effective means to keep the lights on. Specifically, DTE Energy expected to add 6,500 megawatts (MW) of solar energy by 2042,[9] and Consumers Energy announced plans to build roughly 8,000 MW of solar energy by 2040.[10] New state-mandated renewable energy portfolio standards accelerate the utilities' plans by providing binding target milestones for the next several years.

Beyond adopting new renewable energy standards, Michigan also became the first state in the Midwest to set a statewide renewable energy storage mandate, requiring utilities to collectively procure 2,500 MW of energy storage by 2029.[11] Because some of these storage megawatts are expected to be paired with utility-scale SES, communities should be aware of increased development of these hybrid projects when planning and zoning for utility-scale SES.

PA 235 also included changes to distributed generation policy and now enables more build-out of accessory SES, such as rooftop solar for homeowners or local businesses. Prior to PA 235, Michigan's distributed generation cap stood at 1%, meaning utilities were not required to purchase excess energy from residential solar installations above 1% of the utilities' average peak loads. This cap was a limiting factor to the expansion of rooftop solar. PA 235 increased the cap to 10%, enabling more rooftop solar projects to qualify for compensation through net metering and supporting a broader adoption of rooftop solar for homeowners and businesses.

8 Michigan Legislature. (2023). Public Act 235 of 2023. https://www.legislature.mi.gov/documents/2023-2024/publicact/pdf/2023-PA-0235.pdf

9 DTE Energy. (2022). 2022 DTE Electric Integrated Resource Plan. https://dtecleanenergy.com/downloads/IRP_Executive_Summary.pdf

10 Michigan Public Service Commission (MPSC). (2022). Issue Brief: Consumers Energy 2021 Integrated Resource Plan. https://www.michigan.gov/mpsc/-/media/Project/Websites/mpsc/consumer/info/briefs/Consumers-Energy-2021-Integrated-Resource-Plan-Issue-Brief.pdf

11 MLive. (2023). Michigan First State in Midwest to Set Power Storage Benchmark. https://www.mlive.com/public-interest/2023/11/michigan-first-in-midwest-to-set-power-storage-benchmark.html

Public Act 233 of 2023 (PA 233) is Michigan's new renewable energy siting law, which provides developers the opportunity to bypass local zoning and obtain land use approval from the Michigan Public Service Commission (MPSC) for large-scale projects—including SES with a nameplate capacity of 50 MW or more.[12] However, developers and utilities must still obtain local zoning approval if:

1. All local zoning[13] authorities where a project is proposed have enacted a Compatible Renewable Energy Ordinance (CREO) that does not impose stricter provisions than those outlined in PA 233.
2. The SES project is entirely within a city or village, and that city or village is the SES developer, owns participating property, or owns a utility that will utilize the SES.[14] This exception does not extend to townships.

While PA 233 provides a new state-permitting option, utilities and developers may still opt for local zoning approval, particularly if the applicable local zoning regulations are deemed "workable" by the developer. Page 21 of this document outlines the pros and cons for local governments considering whether to adopt a CREO, establish a workable ordinance, or stipulate that all large projects undergo the state-level process.[15] Regardless of the path chosen for large SES projects (≥ 50 MW), any SES below this threshold remains subject to local zoning authority. Alongside PA 233, the legislature amended the Michigan Zoning Enabling Act accordingly through the companion bill PA 234.

Public Act 108 of 2023 (PA 108), also known as the Solar Energy Facilities Taxation Act or the Solar "Payment in Lieu of Taxes (PILT)" Act, offers an alternate tax treatment for utility-scale solar energy facilities.[16] Utility-scale SES are generally taxed as industrial personal property. The taxable value decreases over time based on depreciation schedules adopted by the State Tax Commission. In response to litigation over changing depreciation schedules applied to wind turbines, PA 108 offers communities the option of accepting payments in lieu of taxes for utility-scale SES installations, creating a predictable revenue stream for local governments. Under PA 108, using a solar PILT requires both the local government and the developer to agree to enter into this tax arrangement. Under this PILT, qualified solar energy facilities (with a capacity of 2 MW or larger) are exempt from the ad valorem industrial personal property tax and any new real property improvements and instead are locked into a fixed rate of $7,000 per MW (AC) annually for 20 years. After this period, properties return to the ad valorem tax roll.[17] Properties located on brownfields, on state-owned land, or in opportunity zones are subject to a reduced rate of $2,000 per MW. PILT revenue is shared among the taxing jurisdictions based on each jurisdiction's millage rate.

Public Act 68 of 2024 (PA 68), the Michigan Homeowners' Energy Policy Act, addresses restrictions on residential SES. It nullifies any provisions in homeowners' association (HOA) rules that prohibit or effectively hinder SES installation and maintenance.[18] This law aims to remove private barriers such as HOA rules, deed restrictions, or architectural standards that can limit the installation of SES despite supportive local government policies.

12 Michigan Legislature. (2023). Public Act 233 of 2023. https://www.legislature.mi.gov/documents/2023-2024/publicact/pdf/2023-PA-0233.pdf

13 Whether a local government that does not have zoning authority (e.g., an unzoned township or a county government where there is township zoning) can enact a CREO is one of several questions raised in a November 2024 lawsuit (COA #373259), which was still pending as of the publication of this guide.

14 Michigan Legislature. (2023). Public Act 233 of 2023, Section 222(4). https://www.legislature.mi.gov/documents/2023-2024/publicact/pdf/2023-PA-0233.pdf

15 The University of Michigan Center for EmPowering Communities has resources on PA 233, including an overview of the Act and FAQs: https://graham.umich.edu /project/MI-energy-siting.

16 Michigan Legislature. (2023). Public Act 108 of 2023. https://www.legislature.mi.gov/documents/2023-2024/publicact/pdf/2023-PA-0108.pdf

17 The Michigan Department of Treasury has FAQs, memos, and more on PA 108: https://www.michigan.gov/taxes/property/exemptions/solar-energy-facility-exemption.

18 Michigan Legislature. (2024). Michigan Homeowners' Energy Policy Act, PA 68 of 2024. https://www.legislature.mi.gov/documents/2023-2024/publicact/pdf/2024-PA-0068.pdf

COMPONENTS, TYPES & SCALES

This section discusses SES across a range of sizes, scales, configurations, and related components. SES cannot be treated uniformly by local governments because the scale of installations and energy generation capacity can vary dramatically. For example, a small solar panel powering a streetlight might be exempt from regulation, while a large-scale SES, providing power to the grid through a system of components, may require more rigorous local review.

COMMON SOLAR COMPONENTS

(Clockwise from top left) Racking and tracking system; inverter, weather station and collector box (both Madeleine Krol); bifacial panels; transformer and inverter (both Mary Reilly).

All SES require specific equipment to operate properly, although this equipment may differ based on the scale and configuration of the system. Besides the solar panels, or modules as they are sometimes called, the four common components of an SES include an inverter, a battery system (if in use), racking, and wiring. There are also other "balance of system" components that may or may not be present: combiner boxes, disconnect switches, a weather station, performance monitoring equipment, and transformers.

Solar Panels: Photovoltaic (PV) solar panels convert light (photons) to electricity (voltage). The majority of today's solar panels are made of silicon solar cells, but there are also panels that use cadmium telluride technology, with the United States at the forefront of global manufacturing in this field.[19] An individual solar panel is typically mounted on racking to function with other panels as part of an array. Commercial solar panels are constructed with one or more anti-reflective coatings, often made of magnesium fluoride. Antireflective coatings have highly improved in the last 20 to 30 years to ensure that panels maximize how much light reaches the PV cells. Glare from modern solar panels is insignificant, and local regulation of glare, even adjacent to airports, is not necessary.

19 National Renewable Energy Laboratory (NREL). Cadmium Telluride Solar Cells. https://www.nrel.gov/pv/cadmium-telluride-solar-cells

Bifacial Panels: Bifacial PV panels capture sunlight and produce electricity from both the front and back sides of the panel. These modules specifically take advantage of light reflected from a surface, such as snow, through the albedo effect.[20] Field data and analyses from Sandia National Laboratories and Michigan Technological University have shown that bifacial panels have the potential to increase system outputs, particularly in snowy environments, by 10%–20%.[21,22] These panels are initially more expensive due to higher technology and labor costs, but may pay off over time with increased energy production.

Inverter: Inverters convert direct current (DC) electricity generated by photovoltaic modules into alternating current (AC) electricity that is compatible with the electrical grid.[23] Inverters may produce sound when in operation, which can be managed by placement as well as other sound mitigation measures (e.g., surrounding inverters with damping walls). Communities may choose to adopt sound regulations to influence the placement and design of inverters within an SES.[24]

Battery Energy Storage: Some homeowners or solar developers include batteries in their solar installations, allowing the solar energy to be stored and used later when it is needed (such as at night). These on-site batteries make solar energy more accessible and reliable as an electricity source, as they provide energy for use during peak-rate hours or when solar production is low, such as during the evening or on cloudy days. They also serve as an emergency backup during power outages. Batteries are becoming increasingly common for all scales of SES as per-unit costs of batteries decline. Batteries can vary in size depending on the level of storage needed and may also vary in their location on the site. For rooftop solar systems, the batteries may be within the building that supports the solar panels. Currently, lithium-ion batteries for energy storage are the prevailing technology deployed across the country. They are favored over other types of batteries due to better energy retention and their quick response time in delivering energy to customers, among other advantages. For more information on lithium-ion battery energy storage systems, refer to *Planning & Zoning for Battery Energy Storage Systems: A Guide for Michigan Local Governments*, by the University of Michigan's Graham Sustainability Institute.[25]

Racking: SES may be ground or roof mounted. The frames, support posts, hardware, and foundations (if required) used to secure solar panels and other SES equipment are often collectively referred to as "racking."

Trackers: Solar trackers are systems that move during the day to align solar panels with the location of the sun. There are two common types: single-axis trackers, which adjust the panels along one direction, and dual-axis trackers, which offer movement in two directions for optimal alignment. By positioning panels to remain perpendicular to the sun's rays throughout the day, solar trackers enable more direct sunlight to strike the panels, therefore significantly increasing energy absorption and maximizing efficiency. Though these technologies allow the facility to produce more energy per panel, they are more expensive and may not last as long as the panels themselves.[26]

Wiring: Solar panels are wired together to create an electrical circuit that allows current to flow through the component parts. Wiring extends beyond the panels to inverters, batteries, electronic devices, transformers, and distribution lines, depending on whether the SES generates electricity for use on-site or export to the electrical

20 U.S. Department of Energy, Solar Energy Technologies Office. Project Profile: Performance Models and Standards for Bifacial PV Module Technologies. https://www.energy.gov/eere/solar/project-profile-performance-models-and-standards-bifacial-pv-module-technologies

21 Sandia National Laboratories. Bifacial PV Project. https://pvpmc.sandia.gov/pv-research/bifacial-pv-project/

22 Hayibo, K. S., et al. (2022). Monofacial vs Bifacial Solar Photovoltaic Systems in Snowy Environments. Renewable Energy, 193, 657–668. https://doi.org/10.1016/j.renene.2022.05.050

23 U.S. Department of Energy, Solar Energy Technologies Office. Solar Integration: Inverters and Grid Services Basics. https://www.energy.gov/eere/solar/solar-integration-inverters-and-grid-services-basics

24 Kaliski, K., Old, I., & Duncan, E. (2020). An Overview of Sound from Commercial Photovoltaic Facilities. June 29–July 1. NOISE-CON 2020. https://rsginc.com/wp-content/uploads/2021/04/Kaliski-et-al-2020-An-overview-of-sound-from-commercial-photovolteic-facilities.pdf

25 The guide is available at: https://graham.umich.edu/project/bess-guide.

26 Reca-Cardeña, J., & López-Luque, R. (2018). Design Principles of Photovoltaic Irrigation Systems. In I. Yahyaoui (Ed.), Advances in Renewable Energies and Power Technologies (pp. 295–333). Elsevier Science. https://www.sciencedirect.com/topics/engineering/solar-tracking-system

grid. While cabling within a solar array often runs along the racking system, wiring between arrays is typically underground, unless soil conditions prevent this. Wiring from the inverter to the transformer is generally buried to comply with electrical codes.

Larger SES also include transformers and project-specific substations for connecting to transmission lines that serve the electrical grid. Often, solar developers connect to existing distribution substations, but new or upgraded substations or dedicated generation tie-lines may be proposed as part of the SES. Transformers in substations increase voltage to higher levels for more efficient transmission over long distances. Transformers may produce low audible noise.

(Clockwise from top left) Rooftop SES, Petosky (Richard Neumann); Ground-mounted SES, Grand Traverse waterfront (Mary Reilly); Coldwater Solar Field Park (City of Coldwater, MI); Electric City Solar in Sturgis (Mary Reilly).

TYPES

Solar energy generation is a unique land use, at both the large and small scale. As such, these developments should be clearly defined as a separate land use within a zoning ordinance. Treating all scales of SES the same may unnecessarily restrict accessory and small-scale installations. In addition, solar developments are scalable and can be sited across many zoning districts. Therefore, in zoning ordinances, SES should be defined at the different system scales that the community desires (e.g., accessory vs. principal-use SES, small vs. large SES, ground- vs. roof-mounted SES).

The first distinction to consider for SES is accessory versus principal use. System types can also be standalone or hybrid integrated with other supporting energy generation or energy storage.

Accessory: These SES are accessory structures to the primary use of a property, such as a residence or a commercial building, and provide electricity that is intended for use by a primary building located on the same parcel as the SES. Accessory systems can range in size and configuration. They typically range from being small enough to power a single-family home to being large enough to power electricity for multiple buildings, such as livestock or equipment barns. On-site systems can be integrated into the building materials, affixed to the roof of a building, or freestanding, ground-mounted structures.

Principal: Principal-use SES generate electricity for transmission to the grid and export to a wholesale utility market. These projects occupy one or more large parcels of land and are typically the primary use on the site. These SES vary greatly in size, covering as little as an acre to thousands of acres.

Hybrid: Project sites may also contain wind energy generation or battery energy storage systems (BESS), creating what are often termed hybrid or co-located projects. Many newly developed solar projects in the United States are co-located with BESS to help smooth out variations in how solar energy flows on the grid. Similarly, wind and solar energy generation may be co-located to make more efficient use of grid connections. These uses all have characteristics that make them more or less suitable for particular districts or situations. In a hybrid project, it may be appropriate to consider the different technologies—such as solar, wind, and battery energy storage—as distinct principal land uses requiring distinct siting considerations, even though they may be located in proximity or sometimes even on the same property.[27] At a smaller scale, residential hybrid SES, where a rooftop solar system is paired with a battery capable of providing backup power, are also increasingly common. A companion guide—*Planning & Zoning for Battery Energy Storage Systems*—provides more information about BESS and sample language to help municipalities incorporate BESS-specific regulations into their zoning ordinances.[28]

In addition, SES have four primary configurations: building integrated, roof mounted, wall mounted, and ground mounted.

Building Integrated: A building-integrated SES is an integral part of a primary or accessory building or structure (rather than a separate mechanical device), replacing or substituting for an architectural or structural component of the building or structure. Building-integrated systems include, but are not limited to, PV or water heating solar energy systems that are contained within roofing materials, windows, and skylights.

Roof Mounted: A roof-mounted SES has solar panels affixed to a racking system on the roof of a structure or building. Roof-mounted panels are often installed parallel to the roof surface on a pitched roof, or protrude from the roof at an angle on a flat room. A roof-mounted SES typically has fixed mounts that do not rotate throughout the day to track the sun. By definition, roof-mounted systems are accessory structures relative to the principal use of the building.

Wall Mounted: A solar energy system mounted or attached to the wall of a building or structure is sometimes parallel to the wall surface but often protrudes at an angle like an awning. Wall-mounted systems are a functional component of the building, accessory or principal, to which they are attached.

Ground Mounted: A ground-mounted SES is a structure composed of solar panels affixed to a racking system on one or more support posts. These posts are most commonly driven into the ground, without requiring a concrete foundation. In cases where the soil cannot be penetrated, such as with a brownfield or capped landfill, ground-mounted SES can be designed with ballasted supports that sit atop the ground. A ground-mounted SES may be fixed (i.e., stationary) or have single- or double-axis trackers to follow the sun throughout the day. While nearly all principal-use SES are ground mounted, some accessory SES may be ground mounted too. For example, solar parking canopies are becoming more common in Michigan and present unique characteristics as compared with a typical ground-mounted SES. These characteristics include unique panel height, vehicle support post collision mitigation, lighting, and site configurations.

Ground-mounted SES can also be distinguished by scale—small, medium, or large—as described in the following section.

27 U.S. Department of Energy. Solar Integration: Solar Energy and Storage Basics. https://www.energy.gov/eere/solar/solar-integration-solar-energy-and-storage-basics

28 The guide is available at: https://graham.umich.edu/project/bess-guide.

Figure 1. Examples of Solar Energy System Types Across Different Geographies

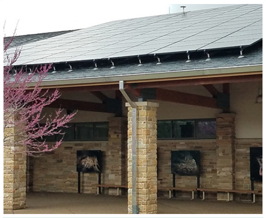
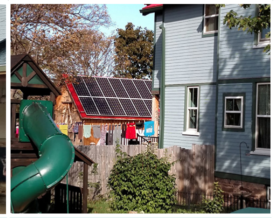
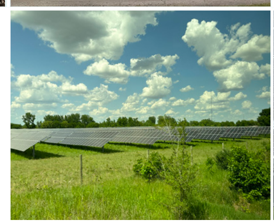
Solar Energy System Type	Natural	Rural	Urban	General Urban
Accessory Roof Mounted				
Accessory Ground Mounted				
Principal Use (Small)				
Principal Use (Medium/Large)				

Figure 1 shows the type and scale of SES that exhibit predominant factors for compatibility in a given setting.

SCALES

As mentioned, even principal-use SES vary greatly in size, covering as little as an acre to thousands of acres. Because of this variety in the size and impacts on a site, many communities may choose to distinguish between small, medium, and large principal-use SES in their ordinances. There is no established definition of "small," "medium," or "large," and for other industry or taxation purposes, scale distinctions may differ.

To assist a community in making a distinction between scales of SES based on size, Table 1 (below) illustrates common SES outputs measured in megawatts (MW) of alternating current (AC) and the average acreage of land required to host an SES of that output.[29] While the amount of space the solar panels themselves take up is consistent across scales (roughly 4.2 acres per MW),[30] larger projects have a higher variability in land required per megawatt (5–10 acres per MW)[31] because they often include multiple internal access roads. Furthermore, while smaller projects may be sited on a single parcel, larger solar projects span multiple parcels that may include areas with wetlands or county drains. While solar panels are not developed on these portions of the site, they may be within the overall project footprint.

29 Ong, S., et al. (2013). Land-Use Requirements for Solar Power Plants in the United States. National Renewable Energy Laboratory, Technical Report NREL/TP-6A20-56290. Table ES-1, Page v. https://www.nrel.gov/docs/fy13osti/56290.pdf

30 Bolinger, M., & Bolinger, G. (2022). Land Requirements for Utility-Scale PV: An Empirical Update on Power and Energy Density. IEEE Journal of Photovoltaics, 12(2). https://ieeexplore.ieee.org/document/9676427

31 Solar Energy Industries Association. Land Use & Solar Development. https://seia.org/initiatives/land-use-solar-development/

Table 1. Comparison Chart: Megawatt Outputs to Acreage Needed for SES

Megawatts (AC)	1 MW*	5 MW	50 MW	100 MW	200 MW
Acres	5-10	25-50	250-500	500-1,000	1,000-2,000

*The current national average (through Q1 2024) number of homes powered by 1 MW of solar is 172.[32]

In this guide, the scale threshold between small and medium principal-use SES is 5 MW (or approximately 40 acres). This is generally the largest scale of a project that would connect into the local distribution power lines, though some distribution lines may be capable of hosting more. Currently, there are dozens of SES projects of 5 MW and less being developed in the state.[33] These projects are being approved by local communities, suggesting they fit within the character of the landscapes in which they are proposed. Thus, they could perhaps be permitted by right, with no public hearing, after an administrative site plan review (see discussion on Page 20).

This guide sets the threshold for large principal-use SES at 50 MW (to match PA 233). By default, medium principal-use SES are those between 5 MW and 50 MW. Each community, however, should determine what the right demarcation of scale is between small, medium, and large principal-use SES given the community's context. In an urban environment, where parcels are smaller, the threshold to classify as a large principal-use SES may have fewer megawatts. In a community abundant with rural land or experience with expansive developments, a larger megawatt or acreage threshold for large projects may be more appropriate. Of further note, while research finds that there is generally more social acceptance of smaller projects rather than larger ones,[34] larger solar projects benefit from economies of scale and so are more cost-effective to install than multiple small projects.[35, 36] Communities that wish to see more small projects may need to significantly streamline the local zoning and approval pathway for smaller projects to incentivize them.

32 Solar Energy Industries Association. What's in a Megawatt? https://seia.org/whats-in-a-megawatt/

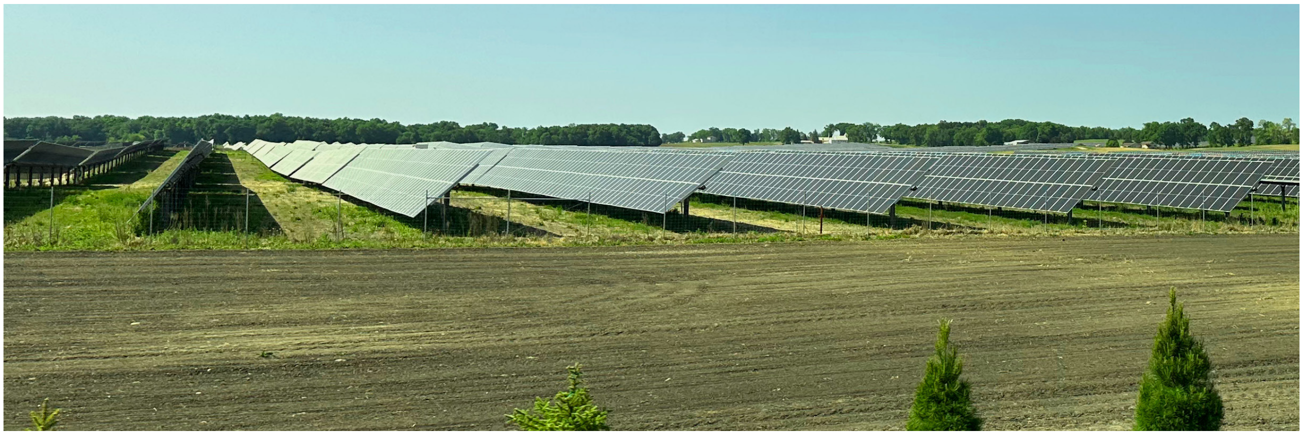
33 Most of these small projects are sized so that they can be considered "qualifying facilities" under PURPA, a federal law enacted in 1978, intended to diversify electricity generation. Specific capacity (MW) thresholds to receive the "standard offer tariff" vary from utility to utility. The current standard offer capacity threshold and more about PURPA can be found on the Michigan Public Service Commission's website: https://www.michigan.gov/en/mpsc/commission/workgroups/2016-energy-legislation/purpa.

34 Hoesch, K., et al. (2024). Perceptions of Large-Scale Solar Neighbors. https://graham.umich.edu/media/files/Perceptions-of-Large-Scale-Solar-Neighbors-2024-05.pdf

35 Burger, S. P., et al. (2019). Why Distributed? A Critical Review of the Tradeoffs Between Centralized and Decentralized Resources. IEEE Power and Energy Magazine, 17(2). https://ieeexplore.ieee.org/stamp/stamp.jsp?tp=&arnumber=8643507

36 Lazard. (2024). Levelized Cost of Energy+. https://www.lazard.com/research-insights/levelized-cost-of-energyplus/

LAND-USE CONSIDERATIONS



Calhoun Solar Energy Center in Calhoun County with active farmland in the foreground. Photo by Fatimah Bolhassan.

Ultimately, the compatibility of an SES at a given site depends on how it is perceived relative to local planning goals and the pattern and density of the surrounding physical and built environment. A community's master plan sets the vision and high-level goals for the community. Local policy related to renewable energy generation begins first in the master plan, with an explanation of how SES could fit into the unique landscapes and character of the jurisdiction. In addition to the master plan, goals related to SES are established in other local plans, which could include district or sub-area plans, resiliency plans, climate action plans, or renewable energy plans. Here, specific geographical areas are designated as ideal for SES development. A master plan ideally includes a spatial analysis of land-use suitability and incorporates community engagement to establish formal guidance for the regulations.

These local planning efforts build the foundation for any regulations or policies a community may choose to adopt related to SES. Communities should consult their local plans as they make policy decisions for SES, including choosing one of the zoning pathways for large SES projects (50 MW or greater). (See Page 21 for a discussion on zoning options). The weight that local plans will carry in siting decisions made by the MPSC under PA 233 remains to be seen. Though the law does not mention planning, the MPSC aims to take planning into consideration in their process by requiring applicants to submit local planning documents for review. Furthermore, the MPSC must consider the "percentage of land area in energy generation" when making permitting decisions.[37] A community's master plan should document existing energy generation infrastructure in the community to inform the conversation about future land-use needs.

37 Michigan Legislature. (2023). Public Act 233 of 2023, Section 226(6). https://www.legislature.mi.gov/documents/2023-2024/publicact/pdf/2023-PA-0233.pdf. As of the publication of this guide, the MPSC had not yet determined how it would measure land area for different energy generators nor how it would apply this standard.

Lapeer Solar Park. Photo by Bradley Neumann.

Zoning, as a local regulatory mechanism, can mitigate the impacts of SES if standards are appropriately tailored to the various development patterns of a community. The plans described above would support the establishment of related zoning regulations, consistent with the requirements of the Michigan Zoning Enabling Act (MZEA).

The MZEA requires that all zoning be based on a plan.[38] The master plan, therefore, establishes the community's formal policy position on solar energy development. A plan should include guidance on SES at different scales, including accessory, small, medium, and large (see Page 9). For example, the master plan might set a goal that permits accessory SES throughout the jurisdiction. For small or medium principal-use SES, it might define what scale is appropriate as a permitted use (i.e., use by right) or determine appropriateness based on the location of marginal lands, soil types, or steep slopes. It could document community attributes or characteristics that are important to consider and/or protect when siting solar energy development.

After a community has incorporated solar development into its master plan, the zoning ordinance can be amended to include regulations for the various configurations and scales of SES. The zoning regulations protect the community's health, safety, and welfare and are based on policies outlined in the master plan. Zoning regulations define the location, scale, and form or configuration of SES allowed in the community and establish the permits and processes by which solar energy is allowed and even incentivized.

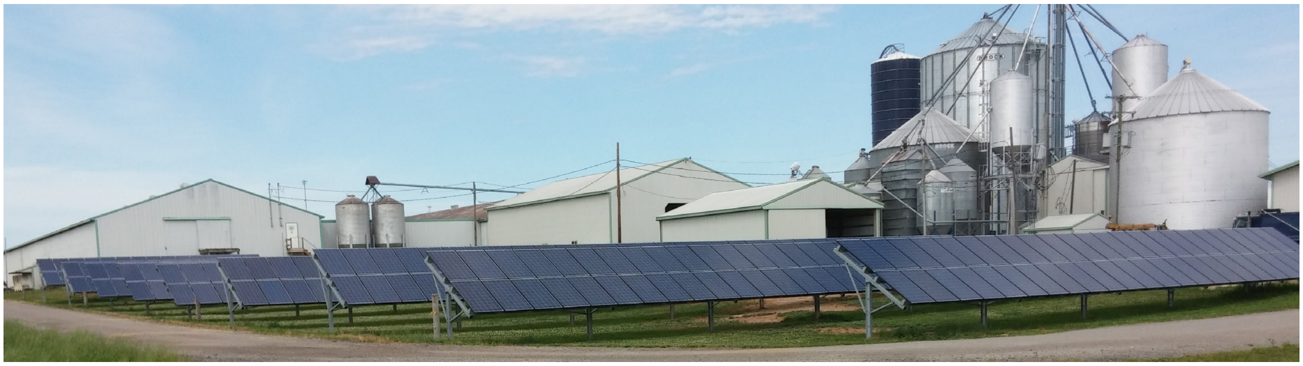
COMMENTARY: A zoning request for an SES may come before a community that has no mention of solar in the zoning ordinance or master plan. While neither ideal nor recommended, communities sometimes zone first and plan second. If a community cannot delay amending the zoning ordinance to first amend the plan, they should work closely with a qualified planner or municipal attorney to perform a master plan review in order to find elements that support or contradict a solar energy zoning amendment. Master plan elements to consider in this review:

- Vision statement: How do these broad community statements align with or contradict the contemplated ordinance amendment? Does the vision include renewable energy?
- Goals and objectives: If the solar amendment includes multiple scales of SES, then review the goals, objectives, and policies for all relevant land-use classifications on the future land-use map, such as agricultural, residential, commercial, forestry, industrial, etc.
- Brownfields or grayfields: Review plans, policies, and maps for recommended zoning approaches.
- Future land-use map: Review the map for projected areas of growth (infrastructure extension, type of growth, or change in land use) or areas with goals, objectives, and policies to preserve or maintain a unique community asset.
- Zoning plan: While not required as a precursor to a zoning amendment, a statement in the zoning plan[39] affirming the preferred scope and/or location of SES relative to other land-use classifications and zoning districts may be sufficient to show the community anticipated the solar zoning amendment but had not yet taken action to amend the ordinance.

38 Michigan Legislature. (2006). Michigan Zoning Enabling Act, MCL 125.3203(1). https://legislature.mi.gov/Laws/MCL?objectName=MCL-125-3203

39 Michigan Legislature. (2008). Michigan Planning Enabling Act, MCL 125.3833(2)(d). https://www.legislature.mi.gov/Laws/MCL?objectName=mcl-125-3833

FARMLAND CONSIDERATIONS



Langeland Farms SES. Photo by M. Charles Gould.

Solar projects are often built on cropland because it is flat and has direct access to sunlight.[40] Practices implemented when a solar project is built or decommissioned can impact the ability of the soil to grow crops in the future. For example, soil compaction, which occurs when equipment used to build or remove arrays is operated on partially frozen or wet soils, can hinder plant growth and reduce the soil's water-holding capacity. Site design standards, including stormwater management and visual screening with trees or berms, might further limit farming potential and impact drainage. Grading changes to prevent water pooling and ensuring uniform panel installation may not only involve moving of topsoil but also alter the natural water flow. Any landscaping and deep-rooting ground cover should be designed to not damage or negatively impact existing drain tile, and communities may want to consult with their county drain commissioners. However, implementing conservation practices, such as planting pollinator habitats or prairie strips, can improve soil carbon content.[41, 42]

Currently, more than 3 million acres of land in Michigan are enrolled in the Farmland and Open Space Preservation Program, which was created by Public Act 116 of 1974 (PA 116).[43, 44] The program preserves farmland from being developed for non-agricultural uses through the use of development rights agreements offering income tax benefits for the landowner. The Michigan legislature, through Public Act 230 of 2023 (PA 230), has determined that the placement of solar panels on property enrolled in the program is considered to be a permitted use when specific conditions are met.[45] These conditions include:

- The solar project is designed, established, and maintained in a manner that ensures the land can be returned to agricultural use.
- The site upon which the solar facility is located should be designed, planted, and maintained with ground cover that achieves a score of at least 76 on the Michigan Pollinator Habitat Planning Scorecard for Solar Sites[46] developed by the Michigan State University Department of Entomology, as well as designed, planted, and maintained in compliance with Natural Resource Conservation Cover Standard 327.[47] Michigan State

40 PA 233 allows for solar development on farmland but does require that projects must "not unreasonably diminish farmland," including "prime farmland" and "farmland dedicated to the cultivation of specialty crops."

41 Michigan State University. (2025). Long-term Study Reveals Best Practices for Building Soil Carbon in Agriculture. https://www.canr.msu.edu/news/long-term-study-reveals-best-practices-for-building-soil-carbon-in-agriculture

42 Colorado State University. (2021). Soil Carbon: What It Is and Why It Is Important. https://agnext.colostate.edu/2021/10/26/soil-carbon-what-it-is-and-why-it-is-important/

43 Michigan Department of Agriculture & Rural Development. (2024). Annual Equalization Report. https://www.michigan.gov/mdard/environment/farmland/general/annual-equalization-reports

44 Michigan Legislature. (2023). Natural Resources and Environmental Protection Act, MCL 324.36104e. https://www.legislature.mi.gov/Laws/MCL?objectName=mcl-324-36104e

45 Michigan Legislature. (2023). PA 230 of 2023. https://www.legislature.mi.gov/documents/2023-2024/publicact/pdf/2023-PA-0230.pdf

46 Rowe, L., & Isaacs, R. (2018). Michigan Pollinator Habitat Planning Scorecard for Solar Sites. https://www.canr.msu.edu/news/michigan-pollinator-habitat-planning-scorecard-for-solar-sites

47 U.S. Department of Agriculture, Natural Resources Conservation Service. (2015). Conservation Practice Standard: Conservation Cover: Code 327. https://efotg.sc.egov.usda.gov/api/CPSFile/4729/327_MI_CPS_Conservation_Cover_2015_pdf

University Extension has a Michigan Pollinator Habitat Planning Scorecard for Solar Sites certification program to help consultants understand the intent of each section in the scorecard.[48]

- A bond or irrevocable letter of credit is posted with the state to ensure that solar panels will be removed and the land returned to agricultural use.

When these conditions are met, the landowner's agreement is amended to "pause" the preservation status for the portions of the land used by the solar project for the duration of the lease agreement. During this pause the landowner does not qualify for tax credits. This policy allows farmland owners to take advantage of the economic opportunity presented by solar development while maintaining the farmland preservation intent of PA 116. Under the terms of the Farmland Development Rights Agreement, it is the landowner's responsibility to work with the solar energy developer to ensure that all conditions associated with the program are satisfied. Therefore, a landowner will need to address such conditions in the solar energy lease, easement, or other agreement with the developer.

AGRICULTURAL DUAL USE

There are various co-location approaches to siting, designing, constructing, and managing SES to reduce impacts of solar land use on farmland and enhance a wide range of ecological and human-centered services. Land management and conservation practices within SES increasingly incorporate agrivoltaics or ecovoltaics. The approach of combining the two, generally referred to as agrisolar PV, emphasizes holistic farm integration beyond just vertical integration of solar and agricultural production. Agrisolar PV offers farmers and solar developers flexibility in choosing co-location models that best suit the land and enables farmers to implement ecologically sustainable farm plans.

Ground-mounted SES with grazing sheep. Photo by M. Charles Gould.

48 Learn more about the program and related courses at: https://www.canr.msu.edu/courses/michigan-pollinator-habitat-planning-scorecard-for-solar-sites-certification-program

Agrivoltaics

An agrivoltaic system is defined as a ground-mounted PV system that has been intentionally planned and designed with agricultural producers or experts. The system is constructed, installed, and operated to achieve integrated and simultaneous production of both solar energy and marketable agricultural products throughout the life of the solar project.[49] Though agrivoltaics is not the default practice for every SES development or may not be feasible or desired by all property owners, it offers a valuable approach for integrating solar with agriculture. Agricultural products and activities may happen on land beneath and between rows of solar panels and can include crop production, grazing, or animal husbandry.

The 2024 Solar Grazing Census reports that roughly 130,000 acres across more than 506 solar sites in 30 different U.S. states are being grazed by 113,050 sheep.[50] In Michigan, over 400 acres of SES are grazed by sheep. To manage the vegetation, sheep producers receive new farm income. Solar grazing also supports the livelihoods of veterinarians, feed suppliers, and other parts of the rural agriculture economy. Landowners and developers typically start planning for agrivoltaics during lease negotiations or early in the site design process since grazing sheep requires careful site design to ensure compatibility with project infrastructure, as well as vegetation planning so that the right forages are planted and the proper rotational grazing system is implemented.[51,52,53]

In the United States, roughly 1,700 acres across 34 SES are producing crops alongside solar energy as of April 2025.[54] A Michigan example for agrivoltaics with crop production includes the urban agriculture project in Detroit, launched by Lightstar Renewables in 2024, where Detroit farmers will grow fresh vegetables and berries at two community-centered sites in 2026.[55] Additionally, Lightstar Renewables will provide energy efficiency upgrades to qualifying homeowners in the neighborhoods directly touched by the project, enhancing their quality of life. These upgrades, coupled with frequent community check-ins to incorporate feedback into the project design, result in development that aligns with the preferences and needs of the neighborhoods.[56]

COMMENTARY: Integrating SES with agriculture offers an exciting opportunity for Michigan's sheep industry. In February 2025, the USDA National Agricultural Statistics Service Sheep and Goat Inventory reported 85,000 head of sheep and lambs in Michigan.[57] Michigan sheep producers have the potential capacity to graze on between 7,200 to 22,000 acres of solar, depending on grazing models used and ground cover. According to the American Sheep Industry Association, 73% of the lamb and mutton supply in the United States is currently imported.[58] This provides Michigan sheep producers an opportunity to build a market to replace imports with Michigan-grown lamb and mutton.

49 American Farmland Trust. (2025). Policy Recommendations to Increase Agrivoltaic Development. https://farmland.org/wp-content/uploads/2025/02/AFT_Final_Policy_Recommendations_to_Increase_Agrivoltaic_Development_Definition_and_Incentives.pdf

50 American Solar Grazing Association. (2025). Solar Grazing Census. https://solargrazing.org/census/

51 Agrivoltaic Solutions. (2020). Agricultural Integration Plan: Managed Sheep Grazing & Beekeeping. https://www.edf-re.com/wp-content/uploads/004C_Appendix-04-B.-Agricultural-Integration-Plan-and-Grazing-Plan.pdf

52 Cassida, K., & Kaatz, P. (2019). Recommended Hay and Pasture Forages for Michigan. Extension Bulletin E-3309. Michigan State University. https://forage.msu.edu/wp-content/uploads/2019/11/E3309-RecommendedHayPastureForagesForMichigan-2019.pdf

53 Undersander, D., et al. (2014). Pastures for Profit: A Guide to Rotational Grazing. Extension Bulletin A3529. University of Wisconsin–Extension and Minnesota Extension Service. https://cdn.shopify.com/s/files/1/0145/8808/4272/files/A3529.pdf

54 OpenEI InSPIRE. Agrivoltaics Map. https://openei.org/wiki/InSPIRE/Agrivoltaics_Map

55 Reference to Lightstar Renewables is for educational purposes only and does not imply endorsement by the authors or bias against those not mentioned.

56 Lightstar. (2025). Press Release: Lightstar and the City of Detroit Illuminate the Future with Innovative Neighborhood Agrivoltaic Solar. https://www.lightstar.com/news/detroit-innovative-neighborhood-agrivoltaic-solar

57 U.S. Department of Agriculture, National Agricultural Statistics Service, Great Lakes Region. (2025). Sheep and Goat Inventory. https://www.nass.usda.gov/Statistics_by_State/Michigan/Publications/Current_News_Release/2025/nr2509mi.pdf

58 American Sheep Industry Association. (2025). Overview of Lamb and Mutton Imports. https://www.sheepusa.org/wp-content/uploads/2025/03/ASI-Trade-One-Pager-on-Lamb-and-Mutton-Imports-final.pdf; and U.S. Department of Agriculture, Research Service. (2025). Sheep, Lamb & Mutton: Sector at a Glance. https://www.ers.usda.gov/topics/animal-products/sheep-lamb-mutton/sector-at-a-glance

Dual-use ground-mounted SES and blueberry farm. Photo by Mary Reilly.

Ecovoltaics

Ecovoltaics is a term used to describe projects that co-prioritize energy production and ecosystem services during the design and management phases of solar development. This can include planting vegetation that provides food sources for pollinators or planting species that offer ecological services such as carbon sequestration, improved soil health, habitat preservation, surface water management, and enhanced water quality.[59] These approaches can be used to restore severely degraded or abandoned land. Ecovoltaic approaches could help restore and even enhance biodiversity in these places while providing clean energy.[60]

SOLAR ON BROWNFIELDS AND GRAYFIELDS

A recommended practice is to use regulation to encourage the siting of SES on land that is difficult to develop or marginal for other uses. Examples of marginal land include brownfield sites, capped landfills, grayfield sites (previously developed property with no known contamination), and required safety buffer areas around industrial sites. On brownfields or capped landfills, solar development can allow productive use of land that might be compromised or have other development challenges.[61] Solar arrays can be designed to avoid penetrating the ground and do not require as much remediation as other kinds of development. In a similar vein, development of solar on grayfield sites can provide an economic development opportunity for land that is otherwise disadvantaged from a redevelopment perspective.

While the use of marginal land for solar energy development is recommended, it is not a common practice, particularly among large SES, for a range of reasons.[62] One reason is that most of these marginal lands are smaller than the preferred 500+ acres for a more typical SES, and these smaller sites typically do not allow for achieving economies of scale. Even when solar developers are building a smaller-scale project, developing on a brownfield site may require using ballasted support structures (rather than driven posts), which can be more expensive, or may require a less-than-ideal panel layout.

Communities wanting to attract solar development to marginal lands may need to reduce other costs or barriers to development, such as expediting review and permitting, providing land at low or no cost, decreasing required

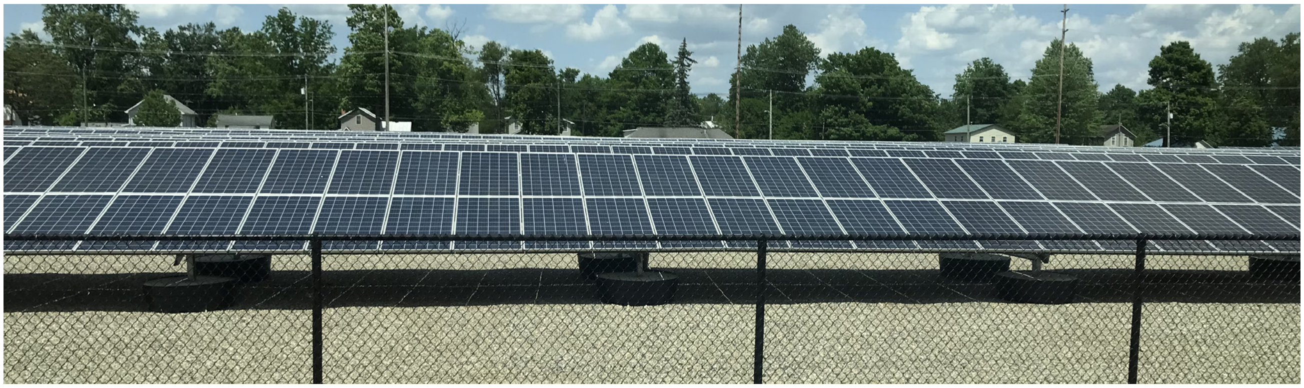
59 Steinberger, K. (2021). Native Plant Installation and Maintenance for Solar Sites. The Nature Conservancy in Michigan. https://www.nature.org/content/dam/tnc/nature/en/documents/Native-Plant-Management-at-Solar-Sites.pdf

60 Sylte, A. (2023). How Can Solar Energy Installations Prioritize Ecosystems? Colorado State University. https://natsci.source.colostate.edu/agrivoltaics-ecovoltaics-research/

61 Michigan Department of Environment, Great Lakes, and Energy (EGLE). (2024). Design and Regulatory Considerations for Developing and Installing Photovoltaic (PV) Solar Arrays on Closed Landfills. https://www.michigan.gov/egle/-/media/Project/Websites/egle/Documents/Programs/MMD/Landfills/Guidance-Solar-Installations-Landfills.pdf?rev=9e72fe5bb1294cdd8b18b7a990e29ab2

62 Schaap, B., et al. (2020). Reducing Barriers to Solar Development on Brownfields. https://graham.umich.edu/media/files/dow/Dow-Masters-2019-Brownfields-GIS.pdf

setbacks, or providing other incentives. A community can further financially incentivize solar on brownfields by offering property tax incentives where that is allowed,[63] or through the payment in lieu of taxes option, at a reduced rate of $2,000 per MW for former industrial sites.[64] While Michigan has seen modest development of solar on brownfields to date,[65] that is expected to change soon. In 2024, Michigan was awarded funding from the U. S. Environmental Protection Agency to create a Brownfield Renewable Energy Pilot program to "provide grants for renewable energy projects on brownfields."[66] While the details of the program were not known when this guide was published, the expectation is that the program will help provide communities with additional tools to incentivize renewable energy deployment on contaminated properties.



Coldwater Solar Field Park, a brownfield redevelopment in Coldwater. Photo by Mary Reilly.

SOLAR AND HISTORIC OR CULTURALLY SIGNIFICANT SITES

Solar panels can have a variety of impacts on character-defining features of historic or culturally significant structures or sites. Panels can obscure character-defining features of a structure or be incompatible with a structure's roofline, exterior color, and the texture or shape of building materials. Despite these potential impacts, many Michigan communities allow for and regulate SES in historic districts and on other significant sites. It is important to allow ground-mounted or rooftop SES on historic sites and structures in a context-sensitive way, granting the use while preserving the integrity of site aspects deemed historic or culturally significant.

The U.S. Secretary of the Interior advises that solar panels installed on a historic property that cannot be seen from the ground will generally meet the Standards for Rehabilitation that govern most local historic districts.[67]

Communities with historic district ordinances should update their ordinances to address roof and ground-mounted SES. For example, the cities of Grand Rapids[68] and Ypsilanti[69, 70] provide for regulations that address these issues. For state or federally designated historic sites, applicants should review the U.S. Secretary of the Interior's Standards for Rehabilitation or contact Michigan's State Historic Preservation Office.

63 Michigan Department of Treasury. New Personal Property Exemption. https://www.michigan.gov/taxes/property/exemptions/new-personal-property/new-personal-property-exemption

64 Michigan Legislature. (2023). Public Act 108 of 2023. https://www.legislature.mi.gov/documents/2023-2024/publicact/pdf/2023-PA-0108.pdf

65 U.S. Environmental Protection Agency. RE-Powering America's Land Initiative Mapper. https://geopub.epa.gov/repoweringApp/

66 Executive Office of the Governor. (2024). Gov. Whitmer Announces $129.1 Million Investment from Biden-Harris Administration to Lower Costs, Create Jobs, Protect Clean Air and Water. https://www.michigan.gov/whitmer/news/press-releases/2024/07/22/gov-whitmer-announces-291-million-investment-from-biden-harris-administration-to-lower-costs

67 National Park Service, Technical Preservation Services. (2022). Solar Panels on Historic Properties. https://www.nps.gov/orgs/1739/solar-panels-on-historic-properties.htm

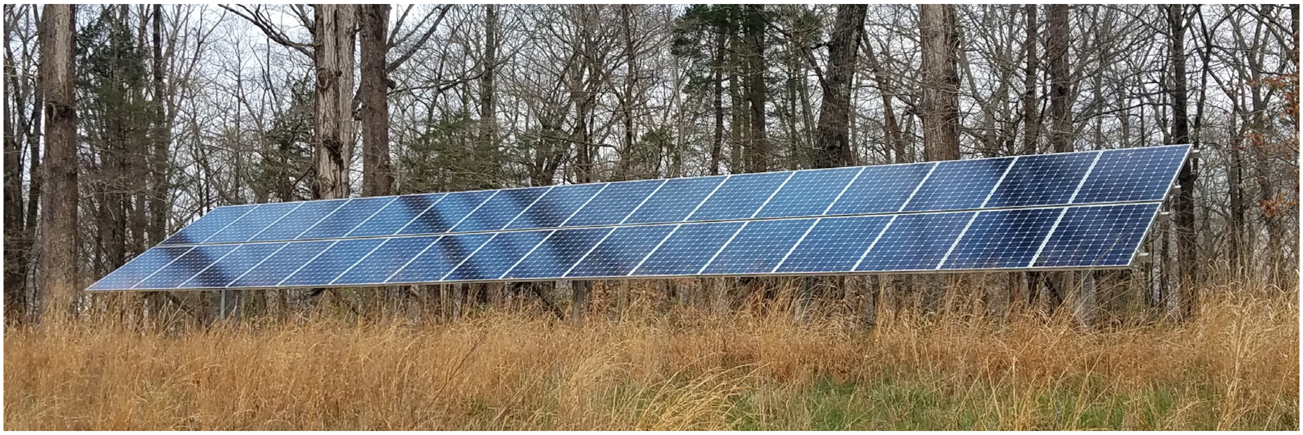
68 City of Grand Rapids, Historic Preservation Commission. (2024). Historic Preservation Guidelines. Solar Collectors (p. 57). https://www.grandrapidsmi.gov/Government/Boards-and-Commissions/Historic-Preservation-Commission

69 City of Ypsilanti. Historic District. https://cityofypsilanti.com/263/Historic-District

70 City of Ypsilanti. (2019). Historic District Fact Sheet: Alternative Energy. https://cityofypsilanti.com/DocumentCenter/View/1998/Alternative-Energy

DECOMMISSIONING AND REPOWERING

A question that commonly arises when communities are considering solar as a primary land use is what happens at the end of the solar project's life. Most solar panels are designed to operate for 25 to 40 years, so it is common for solar developers to have a lease or easement of roughly this length with a landowner. However, many landowner agreements include the option to extend, sometimes because there is still life left in the original panels and sometimes because the developer hopes to repower the project.



Ground-mounted SES in rural setting. Photo by Bradley Neumann.

It is important to note the distinction between the two primary options at the end of a solar project's life: decommissioning and repowering. Decommissioning is the process of removing the equipment and other infrastructure associated with the project. PA 233 defines repowering as refurbishing or replacing system components for the purpose of extending its life, excluding repairs related to the ongoing operations as long as they do not increase the energy facility's capacity of energy output.[71] When repowering, some of the original infrastructure (e.g., racking, access roads, fencing) may be reused, even if other components have reached the end of their useful life. A community with zoning jurisdiction seeking to retain authority over repowering large SES (see discussion on zoning options for large SES on Page 21) should work with a municipal attorney to specify standards for approval. If a local ordinance does not adequately address repowering or is otherwise incompatible with PA 233, the system owner may apply to the MPSC for certification.[72]

COMMENTARY: A fundamental zoning concept is that a zoning ordinance must allow for nonconformities—that is, the continuation of a land use, lot, building, or structure that was legally established before a change in zoning that no longer permits the use, the lot size, or the building or structure location. Zoning ordinances may provide for the completion, resumption, restoration, reconstruction, extension, or substitution of nonconformities. For example, if an ordinance no longer allows large SES projects in a zoning district or the setback requirements for SES change, the solar project (or elements of the project) could be nonconforming and a proposal to repower the SES might require a dimensional variance or be subject to ordinance standards on reconstruction or extension of nonconformities. If a proposal to expand or reconstruct an existing large SES is at odds with ordinance standards pertaining to nonconformities or other applicable standards, the applicant may seek certification through the MPSC. If retaining local review and approval is a priority, the local unit of government could negotiate a workable ordinance with the developer to modify or eliminate the regulation giving rise to the nonconformity. Communities should work closely with a municipal attorney if nonconformities exist for a large SES that is proposed to be expanded or repowered.

71 Michigan Legislature. (2023). Public Act 233 of 2023, MCL 460.1221(v). https://www.legislature.mi.gov/Laws/MCL?objectName=mcl-460-1221

72 Michigan Legislature. (2023). Public Act 233 of 2023, MCL 460.1221(v,g). https://www.legislature.mi.gov/Laws/MCL?objectName=mcl-460-1221

While decommissioning is commonly a provision in a landowner's agreement with a solar developer, many communities also require a decommissioning plan that includes a financial commitment as part of the approval process. The decommissioning plan details how the project equipment will be removed and the land restored when the contract for the SES expires, and the financial commitment guarantees there will be funding to implement the plan.

Large SES projects that go through the MPSC certification process must have a decommissioning agreement between the developer and the State. This agreement ensures the return of the properties to useful condition, similar to pre-construction, including removal of all above-ground facilities and infrastructure. The agreement must include a financial assurance that at least equals the estimated decommissioning cost.[73] A sample decommissioning agreement is included in the MPSC's Application Filing Instructions and Procedures for PA 233.[74]

COMMENTARY: There are opportunities to recover valuable raw materials or reuse solar panels when SES are decommissioned. PV module materials are 99% non-hazardous, and 95% of the material is recyclable with current technologies.[75] PV panels in the United States are still relatively young, with approximately 70% of panels installed since 2017.[76] As a result, recycling facilities that take SES components are also new and still growing. Crystalline-silicon panels (the most common on the market today) contain recyclable materials such as glass, aluminum, copper, and plastic parts. Other components such as inverters, racks (steel), and batteries may also be recycled.[77] Some panels contain trace amounts of hazardous metals (lead, cadmium telluride, silver), and these materials vary by manufacturer and sourcing for components. If these metals are present in high enough quantities, they could be considered hazardous waste.[78] "Preliminary studies have shown that the amount of lead from modules are below the limits that EPA sets for determining if waste is hazardous."[79] The EPA and Department of Energy have further guidance on recycling of solar panels.

Questions about solar panel toxicity are occasionally raised due to general environmental and human health concerns associated with toxic metals and per- and polyfluoroalkyl substances (PFAS), a class of chemical compounds. PFAS are not used in PV panels, and no studies have shown the presence or leaching of PFAS from PV panels throughout their life cycle.[80] If panels break due to extreme conditions (e.g., tornado, tree limb impact), then a careful and professional removal process should be practiced when handling broken solar panels. Soil remediation may be necessary if solar panel components are not handled correctly or are otherwise improperly disposed of. Provided that broken solar panels are safely removed from the solar array, damaged PV modules can be sent to solar panel recycling providers. These specialists meet environmental compliance standards and disassemble solar panels into component parts that can be safely refurbished and reused, refined, or disposed of.[81]

73 Michigan Legislature. (2023). Public Act 233 of 2023, MCL 460.1225(r). https://www.legislature.mi.gov/Laws/MCL?objectName=mcl-460-1225

74 Michigan Public Service Commission (MPSC). (2024). Application Filing Instructions and Procedures. https://www.michigan.gov/mpsc/regulatory/facility-siting/renewable-energy-and-storage-facility-siting

75 U.S. Department of Energy, Office of Energy Efficiency and Renewable Energy. (2022). Solar Energy Technologies Office Photovoltaics End-of-Life Action Plan. https://www.energy.gov/sites/default/files/2023-10/SETO-PV-End-of-Life-Action-Plan-1.pdf

76 U.S. Department of Energy. End-of-Life Management for Solar Photovoltaics: What Is End of Life Management for Photovoltaics? https://www.energy.gov/eere/solar/end-life-management-solar-photovoltaics

77 U.S. Environmental Protection Agency, Hazardous Waste. Solar Panel Recycling. https://www.epa.gov/hw/solar-panel-recycling

78 U.S. Environmental Protection Agency, Hazardous Waste. End-of-Life Solar Panels: Regulations and Management: Are Solar Panels Hazardous Waste? https://www.epa.gov/hw/end-life-solar-panels-regulations-and-management

79 U.S. Department of Energy, Office of Energy Efficiency and Renewable Energy. (2022). Solar Energy Technologies Office Photovoltaics End-of-Life Action Plan (p. 11). https://www.energy.gov/sites/default/files/2023-10/SETO-PV-End-of-Life-Action-Plan-1.pdf

80 Anctil, A. (2020). Facts About Solar Panels: PFAS Contamination. Clean Energy in Michigan Series, No. 12. https://graham.umich.edu/sites/default/files/pubs/Facts-about-solar-panels--PFAS-contamination-47485.pdf

81 U.S. Environmental Protection Agency, Hazardous Waste. End-of-Life Solar Panels: Regulations and Management. https://www.epa.gov/hw/end-life-solar-panels-regulations-and-management

ZONING CONSIDERATIONS

Table 2. Example SES Scale and Type as Applied to Typical Zoning Districts

Example Zoning District	Resource Production / Agricultural	Low-Density Residential	Commercial / Office	Industrial	Medium-Density Residential	Mixed Use
Roof Mounted	P	P	P	P	P	P
Accessory Ground Mounted	P	P	P	P	P	P
Principal Use (Small) (e.g., up to 5 MW)	SPR	SPR/SLU	SPR	SPR	SPR/SLU	SPR
Principal Use (Medium) (e.g., 5-50 MW)	SLU	SLU	SLU	SPR/SLU	X	X
Principal Use (Large) (e.g., over 50 MW)	See Page 21 for discussion of options in light of PA 233					

P = Permitted (zoning standards apply); **SPR** = Site Plan Review; **SLU** = Special Land Use; **X** = Not Permitted

Local units of government have zoning jurisdiction for a range of SES, from a residential roof-mounted SES to a larger development up to a 50 MW system, typically 250 to 500 acres. Local units may opt to retain jurisdiction for large SES over 50 MW. Importantly, each community should tailor the SES type and scale to its own development patterns, zoning district characteristics, and local goals.

An appropriate zoning approval process should be calibrated to the necessary level of review and public input. Table 2 describes general zoning districts, proposed SES size thresholds, and permitting options. At the smallest site scale, such as a roof- or accessory ground-mounted system, SES should be classified as a permitted accessory structure reviewed by a zoning administrator with non-discretionary requirements (e.g., height, setback).

For the small principal-use SES, up to 5 MW, an administrative site plan review or special land use is recommended depending on zoning classification, context, and community goals. An administrative review can be done by the zoning administrator, still applying the same SES-specific land-use standards as those applied to a special land use.

For the medium principal-use SES, a special land use permit would offer site plan review and increased opportunity for public input. A local threshold for determining the upper size limit for a small principal-use system (versus medium) could be the maximum acreage where site plan review/use by right is a locally acceptable regulatory approach. This could range from 2 to 80 acres, for example, depending on local context. Above a certain acreage, or megawatt threshold, a special land use may be preferred. Table 2 suggests that large solar developments are potentially incompatible in medium-density residential and mixed-use districts that support a variety of uses such as commercial, residential, and retail that are likely to have significant infrastructure investments (sidewalks, water/sewer). However, a site plan review-only option for medium principal-use SES could incentivize redevelopment on large brownfields, grayfields, or abandoned industrial sites in support of community goals.

Large principal-use SES (250–3,000+ acres) are typically located in agricultural zoning districts due to the size of the projects and preferred site characteristics (e.g., clear of vegetation/trees, relatively flat, well drained).

ZONING PATHWAYS FOR LARGE SOLAR ENERGY SYSTEMS

When planning for large-scale solar project development, choosing a zoning pathway is one of the most important decisions for Michigan local governments. This section outlines three different zoning pathways for large principal-use SES under PA 233, each with its own set of pros and cons. Table 3 on Pages 24-25 compares key zoning items across those three pathways.

For more information about the law and these options—especially any updates since this guide was published—consult the Michigan Department of Environment, Great Lakes, and Energy's (EGLE) Renewable Energy Academy[82] and the University of Michigan's Graham Sustainability Institute,[83] which offer resources, recorded workshops, and programming to help communities understand the law and their options within it.

OPTION 1: ADOPT A COMPATIBLE RENEWABLE ENERGY ORDINANCE

The law defines a compatible renewable energy ordinance (CREO) as an ordinance "the requirements of which are no more restrictive than the provisions included in Section 226(8)" of the law.[84]

Pros: This is the only option that ensures that developers must seek approval through local zoning. Additionally, because local authorities using a CREO are subject to strict time limits for approving or denying applications, this option is generally viewed as favored by developers and has the potential to attract more projects. SES projects approved at the local level under a CREO are also eligible for the Renewables Ready Communities Award.[85]

Cons: A CREO does not allow for additional local requirements beyond those specified in the law, including common zoning provisions, such as locational requirements or screening.[86] Moreover, local governments with a CREO lose access to intervenor funds if they fail to approve a project within the mandated time limits, deny a project that meets the standards set in Section 226(8) of the Act, or amend their zoning ordinance to impose additional restrictions after a project has been announced.

Calhoun Solar Energy Center in Calhoun County. Photo by Madeleine Krol.

82 Michigan Department of Environment, Great Lakes, and Energy (EGLE). Renewable Energy Academy. https://www.michigan.gov/egle/about/organization/materials-management/energy/renewable-energy/renewable-energy-academy

83 Resources on PA 233: https://graham.umich.edu/project/MI-energy-siting.

84 Michigan Legislature. (2023). Public Act 233 of 2023, Section 225(1)(f). https://www.legislature.mi.gov/documents/2023-2024/publicact/pdf/2023-PA-0233.pdf

85 Michigan Department of Environment, Great Lakes, and Energy (EGLE). Renewables Ready Communities Award. https://www.michigan.gov/egle/about/organization/materials-management/energy/rfps-loans/renewables-ready-communities-award

86 The definition of a CREO is one of several questions raised in a November 2024 lawsuit (COA #373259), which was still pending as of the publication of this guide.

OPTION 2: LET LARGE SES PROJECTS BE PERMITTED BY THE MICHIGAN PUBLIC SERVICE COMMISSION

The law allows communities to "request the MPSC to require" all large-scale SES to seek approval from the MPSC.[87] This process offers the same provisions laid out in Section 226(8) of PA 233 as well as additional evaluation criteria and conditions, such as ground cover. For the most current information, consult the MPSC's Renewable Energy and Storage Facility Siting web page[88] and review available resources for local governments navigating the MPSC renewable energy siting process.[89]

Pros: This option requires minimal effort from the local government in terms of establishing zoning or evaluating projects. It allows experts at the State to assess proposed projects and, in communities where SES may be contentious, pushes any controversy to the State. Additionally, the local government will receive a one-time payment of $2,000/MW after entering into a host community agreement with the SES developer.[90]

Cons: The final decision for a project will be made by the MPSC, although affected local governments can intervene in the MPSC contested case process and can receive intervenor funding to hire legal representation to aid them in the process. There may be limited opportunity for community members who are not granted intervenor status to influence the outcome of the proposal or to incorporate local community priorities into the approval process. Additionally, projects approved by the MPSC are not eligible for the Renewables Ready Communities Award.[91]

Ground-mounted SES with grazing sheep. Photo by Mary Reilly.

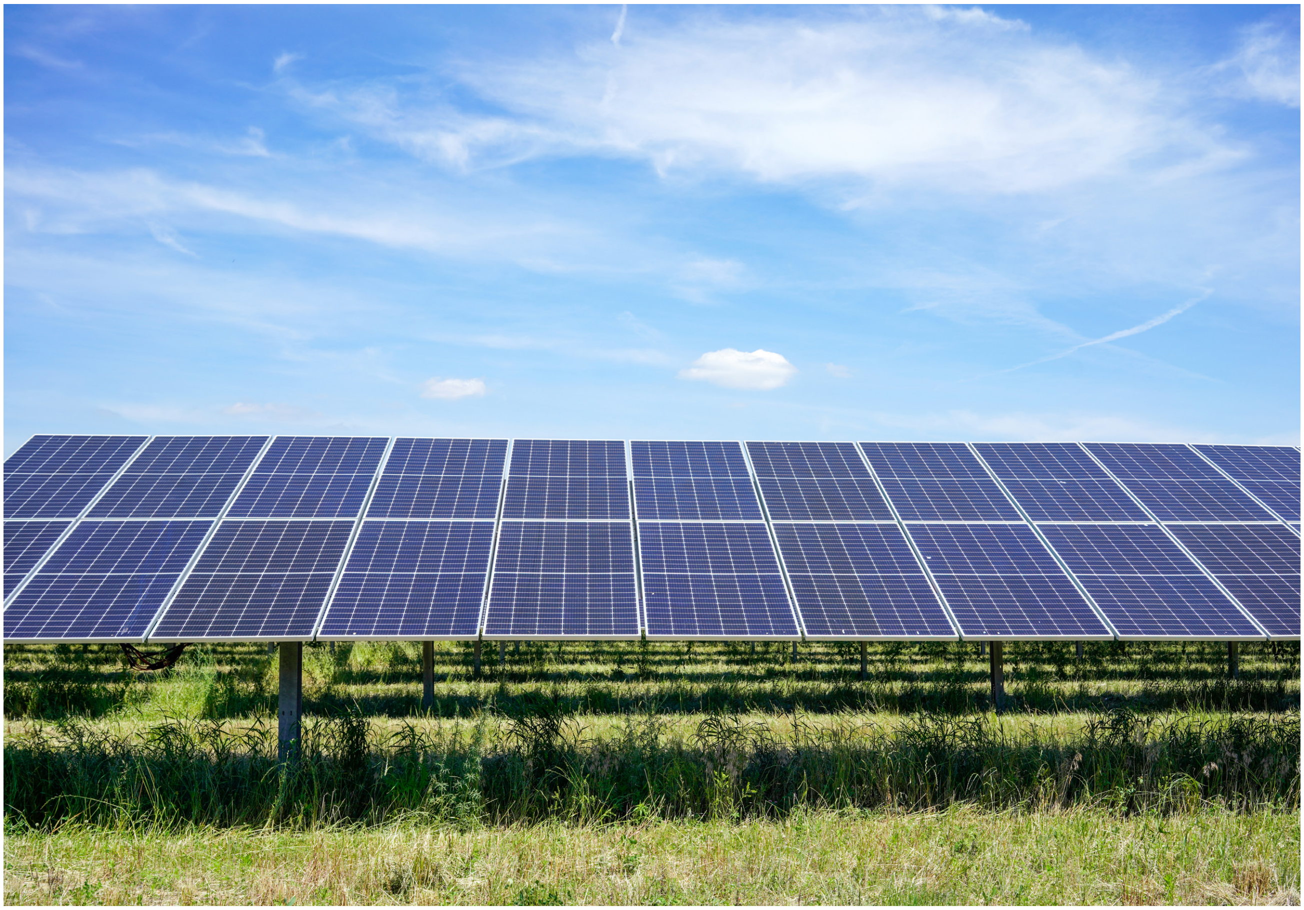
87 Michigan Legislature. (2023). Public Act 233 of 2023, Section 222(2). https://www.legislature.mi.gov/documents/2023-2024/publicact/pdf/2023-PA-0233.pdf

88 Michigan Public Service Commission (MPSC). Renewable Energy and Storage Facility Siting. https://www.michigan.gov/mpsc/regulatory/facility-siting/renewable-energy-and-storage-facility-siting

89 Access a checklist for local governments navigating the MPSC siting process at https://graham.umich.edu/project/MI-energy-siting.

90 Michigan Legislature. (2023). Public Act 233 of 2023, Section 227(1). https://www.legislature.mi.gov/documents/2023-2024/publicact/pdf/2023-PA-0233.pdf

91 Michigan Department of Environment, Great Lakes, and Energy (EGLE). Renewables Ready Communities Award. https://www.michigan.gov/egle/about/organization/materials-management/energy/rfps-loans/renewables-ready-communities-award



Calhoun Solar Energy Center in Calhoun County. Photo by Kelly Jones.

OPTION 3: ADOPT A WORKABLE INCOMPATIBLE ZONING ORDINANCE

PA 233 does not define a workable ordinance, but it is generally understood as a local zoning ordinance that is somewhat more restrictive than a CREO (therefore, it is considered "incompatible") yet still preferable to MPSC approval for developers. For more information on why a developer might favor permitting a project through a workable ordinance rather than the MPSC process (Option 2) and how a community can strike the balance of workability, refer to available resources, including recorded Renewable Energy Academy workshop webinars[92] and FAQs.[93]

Pros: This option allows local governments to incorporate local preferences for SES development within their ordinance, provided these preferences are not overly burdensome for developers (otherwise, the ordinance would not be considered "workable"). Additionally, large SES projects approved at the local level, including through a workable ordinance, are eligible for the Renewables Ready Communities Award. [94]

Cons: There is no guarantee that a developer will choose local approval over MPSC approval. Additionally, there is no consensus among SES developers on what constitutes a workable ordinance, meaning that what one developer considers workable may not be seen the same way by another.

92 Access EGLE's Renewable Energy Academy workshop recordings at https://www.michigan.gov/egle/about/organization/materials-management/energy/renewable-energy/renewable-energy-academy.

93 Resources on PA 233, including FAQs: https://graham.umich.edu/project/MI-energy-siting.

94 Michigan Department of Environment, Great Lakes, and Energy (EGLE). Renewables Ready Communities Award. https://www.michigan.gov/egle/about/organization/materials-management/energy/rfps-loans/renewables-ready-communities-award

Table 3. Comparison of Zoning Items Between Zoning Pathways for Large SES

	Compatible Renewable Energy Ordinance (CREO)	MPSC	Workable Incompatible Ordinance (WIO)
Process	Use by right with site plan review by Zoning Administrator or Planning Commission **[A]**	Michigan Public Service Commission (MPSC) contested case **[B]**	Use by right with site plan review or special land use (SLU)
Location Control	All districts, subject to locally adopted CREO **[A]**	Sec. 226(7)(f), Sec. 225(1)(n) All districts + Evaluation Criteria: 1) Will not unreasonably diminish prime farmland/ farmland devoted to specialty crops. 2) Shall consider feasible alternative development locations. 3) Shall consider the impact on local land use, including the % of land dedicated to energy generation.	Locally designated zoning districts or overlay as long as it provides ample and suitable land for development **[C, D]**
Setbacks	Sec. 226(8)(a) Non-Participating (NP) property line: 50 feet NP structure (outer wall): 300 feet Public road right-of-way: 50 feet	Sec. 226(8)(a) Non-Participating (NP) property line: 50 feet NP structure (outer wall): 300 feet Public road right-of-way: 50 feet	Varies widely, see **[D]**
Height	Sec. 226(8)(a) 25 feet at full tilt	Sec. 226(8)(a) 25 feet at full tilt	Varies from about 16 to 25 feet, per local ordinance

[A] PA 233 is silent on this specific item, but this represents the most conservative interpretation of CREO, meaning provisions are no more restrictive than those outlined in Section 226(8) of PA 233. The definition of a CREO is one of several questions raised in a November 2024 lawsuit (COA #373259), which was still pending as of the publication of this guide.

[B] A contested case is a quasi-judicial process administered by the MPSC that allows local jurisdictions, and other parties, to intervene in the review of an application before the MPSC.

[C] If an applicant determines the location controls are unworkable (prohibitive), they may apply to the MPSC. See Zoning Pathways on Page 21.

[D] See "Guidance on 'Workable' Renewable Energy Ordinances" at https://graham.umich.edu/project/MI-energy-siting

	Compatible Renewable Energy Ordinance (CREO)	MPSC	Workable Incompatible Ordinance (WIO)
Sound	Sec. 226(8)(a)(iv) Non-Participating (NP) structure (outer wall): 55 dBA Leq (1-hour)	Sec. 226(8)(a)(iv) Non-Participating (NP) structure (outer wall): 55 dBA Leq (1-hour) Conditions of Approval: 1) Contract with a third-party acoustics expert for post-construction sound monitoring. 2) Demonstrate compliance and maintain compliance through sound mitigating measures if necessary.	Varies widely, see **[D]**
Screening	None **[A]**	Sec. 226(6) Condition of Approval: Agreement to implement screening, approved on a case-by-case basis by the Commission.	Varies widely, see **[D]**
Groundcover	None **[A]**	Sec. 226(6)(a,b) Evaluation Criteria: Vegetative ground cover in consideration of MSU's Michigan Pollinator Habitat Planning Scorecard for Solar Sites + condition of approval.	May be a condition of approval, established and maintained for the life of the facility (e.g., pollinator, forage, conservation cover). Brownfield exception may apply.
Decommissioning	Sec. 226(8)(r) Financial assurance after deducting salvage value: 25% on operation, 50% by 5th year, 100% by 10th year	Sec. 225(1)(r) Same as CREO plus Conditions of Approval: 1) Repair all drainage systems damaged during construction and decommissioning. 2) Demonstrate that financial assurance has been acquired and will be maintained.	Varies widely, see **[D]**

[A] PA 233 is silent on this specific item, but this represents the most conservative interpretation of CREO, meaning provisions are no more restrictive than those outlined in Section 226(8) of PA 233. The definition of a CREO is one of several questions raised in a November 2024 lawsuit (COA #373259), which was still pending as of the publication of this guide.

[B] A contested case is a quasi-judicial process administered by the MPSC that allows local jurisdictions, and other parties, to intervene in the review of an application before the MPSC.

[C] If an applicant determines the location controls are unworkable (prohibitive), they may apply to the MPSC. See Zoning Pathways on Page 21.

[D] See "Guidance on 'Workable' Renewable Energy Ordinances" at https://graham.umich.edu/project/MI-energy-siting

SAMPLE ZONING FOR SOLAR ENERGY SYSTEMS

This sample zoning language is meant to be a starting point for dialogue between officials, staff, and residents before or during a zoning amendment process related to SES. (See Page 21 for a discussion on Zoning Pathways for Large-Scale SES.) Communities can (and should) work with their municipal attorney and a knowledgeable planner to modify the sample zoning language to develop regulations that fit a community's unique circumstances, meet identified community goals, and are tied to master plan objectives, upon which zoning must be based. To aid these modifications, the commentary throughout this section provides additional context, including how individual zoning standards compare to PA 233, Michigan's siting legislation affecting zoning for large SES projects.

DEFINITIONS

The definitions below are needed for the SES provisions. Select, modify, and add these definitions to the Definitions Section/Article of your zoning ordinance as appropriate. Not all ordinances will require all these terms. Note that some may already be included in the Definitions Section/Article of your zoning ordinance with similar or identical meanings (e.g., Participating Property, Decommissioning).

Alternatively, you may adopt the Sample Zoning as its own Article or Section within your code, using the following:

> *The following definitions apply only to the provisions of ______ [e.g., Article or Section for Solar Energy Systems, depending on the naming convention in your jurisdiction's zoning ordinance].*

Accessory Ground-Mounted Solar Energy System: A ground-mounted solar energy system with the purpose primarily of generating electricity for the principal use or building on the site.

Building-Integrated Solar Energy System: A solar energy system that is an integral part of a principal or accessory building or structure (rather than a separate mechanical device), replacing or substituting for an architectural or structural component of the building or structure. Building-integrated systems include, but are not limited to, photovoltaic or water heating solar energy systems that are contained within roofing materials, windows, and skylights.

Ground-Mounted Solar Energy System: A solar energy system mounted on support posts, like a rack or pole, that are attached to or rest on the ground.

Invasive Plant: Non-native (or alien) to the ecosystem under consideration and whose introduction causes or is likely to cause economic or environmental harm or harm to human health.

Maximum Tilt: The maximum angle of a solar array (i.e., most vertical position) for capturing solar radiation as compared to the horizon line.

Minimum Tilt: The minimal angle of a solar array (i.e., most horizontal position) for capturing solar radiation as compared to the horizon line.

Non-Participating Property: Land that is not a participating property.

Participating Property: Land that either is owned by an applicant or is the subject of an agreement that provides for the payment by an applicant to a landowner of monetary compensation related to an SES regardless of whether any part of the SES is constructed on the property.

Photovoltaic (PV) System: A semiconductor material that generates electricity from sunlight.

Principal-Use Solar Energy System: A commercial solar energy system that converts sunlight into electricity for the primary purpose of off-site use through the electrical grid or export to the wholesale market.

- Small Principal-Use Solar Energy System: A Principal-Use Solar Energy System with a nameplate capacity less than ______ [e.g., 5] MW AC.
- Medium Principal-Use Solar Energy System: A Principal-Use Solar Energy System with a nameplate capacity ______ [e.g., 5] MW AC and greater but less than 50 MW AC.
- Large Principal-Use Solar Energy System: A Principal-Use Solar Energy System with a nameplate capacity of 50 MW AC and more, any portion of which is on property regulated by this zoning ordinance.

Repowering: Replacement of all or substantially all of the SES for the purpose of increasing the power rating of the project.

Roof-Mounted Solar Energy System: A solar energy system mounted on racking that is attached to or ballasted on the roof of a building or structure.

Solar Array: A photovoltaic panel, solar thermal collector, or collection of panels or collectors in a solar energy system that collects solar radiation.

Solar Carport: A solar energy system of any size that is installed on a structure that is accessory to a parking area and which may include electric vehicle supply equipment or energy storage facilities. Solar panels affixed on the roof of an existing carport structure are considered a Roof-Mounted SES.

Solar Energy System (SES): A photovoltaic system for generating electricity, including all above- and below-ground equipment or components required for the system to operate properly and to be secured to a roof surface, structure, or the ground. This does not include any operations or maintenance buildings, temporary construction offices, substation(s), or other transmission facilities between the SES and the point of interconnection to the electric grid.

Wall-Mounted Solar Energy System: A solar energy system mounted or attached to the wall of a building or structure.

Commentary on Large Principal-Use SES: This language addresses the possibility that a large principal-use SES may span zoning jurisdictions. Solar energy facilities greater than 50 MW are subject to PA 233, regardless of whether they span zoning jurisdictions. A developer may, for example, propose a 100 MW solar facility, only 10 MW of which is in your jurisdiction. This language says that the large principal-use SES regulations would apply to the 10 MW portion in your jurisdiction.

GENERAL PROVISIONS

A. BUILDING-INTEGRATED SES

1. Building-Integrated SES are subject only to zoning regulations applicable to the structure or building and not subject to Roof-Mounted, Wall-Mounted, or Accessory Ground-Mounted SES permits.

B. ROOF-MOUNTED SES

1. Roof-Mounted SES are permitted in all zoning districts where buildings or structures are allowed, are considered part of the building or structure to which they are attached.
2. **Height:** Roof-Mounted SES shall not exceed ______ [e.g., 5–10] feet above the finished roof and are exempt from any rooftop equipment or mechanical system screening.
3. **Nonconformities:** A Roof-Mounted SES installed on a nonconforming building, structure, or use does not constitute an expansion of the nonconformity.
4. **Application:** All SES applications must include ______ plan [e.g., plot or site, whichever is required for a zoning compliance review]. Applications for Roof-Mounted SES must include horizontal and vertical elevation drawings that show the location and height of the SES on the building and the dimensions of the SES.

C. WALL-MOUNTED SES

1. Wall-Mounted SES are permitted in all zoning districts where buildings or structures are allowed and are considered a part of the building or structure to which they are attached.
2. Wall-Mounted SES are subject to only those regulations applicable to the structure or building to which they are attached.
3. **Nonconformities:** A Wall-Mounted SES installed on a nonconforming building, structure, or use shall not be considered an expansion of the nonconformity.

Commentary on Height (Roof-Mounted SES): Because of concerns over wind load, most roof-mounted systems are not the same dimensions as ground-mounted SES. Given current SES design considerations, 10 feet is sufficient to accommodate most roof-mounted systems. If a zoning ordinance has height exceptions for other mechanical equipment, it might alternatively just include roof-mounted SES in this exception. In addition to listing this in the section of your ordinance with those exceptions, you could also use the following language in this section of the solar provisions: *Roof-Mounted SES shall be given an equivalent exception to height standards as building- or roof-mounted mechanical devices, chimneys, antennae, or similar equipment, as specified in Section ______ [height exceptions] of the ______ [municipality name] Zoning Ordinance.*

Commentary on Nonconformities: Nonconformities may be addressed within the General Provisions as indicated or in a chapter addressing nonconformities.

D. ACCESSORY GROUND-MOUNTED SES

1. Accessory Ground-Mounted SES are permitted as an accessory structure in all zoning districts where buildings or structures are allowed.
2. **Height:** Accessory Ground-Mounted SES shall not exceed ______ [e.g., 20 or maximum height for accessory structures in the district] feet measured from the ground to the top of the system when oriented at maximum tilt.
3. **Setbacks:** An Accessory Ground-Mounted SES must be a minimum of ______ [e.g., 5] feet from the property line or ______ [e.g., ½] the required setback for accessory structures in a side or rear yard in the respective zoning district, whichever is greater. Setback distance is measured from the property line to the closest point of the SES at minimum tilt.
4. **Lot Coverage** (Residential)**:** The area of the solar array in residential districts [list districts here] shall not exceed ______ [e.g., 50] % of the square footage of the principal building of the lot or parcel unless it is sited over required parking (i.e., solar carport), in which case there is no maximum lot coverage for the Accessory Ground-Mounted SES. An Accessory Ground-Mounted SES shall not be included when calculating the maximum square footage of buildings or structures allowed on site or maximum impervious surface area limits if the ground under the array is pervious.
5. **Visibility** (Residential): An Accessory Ground-Mounted SES in residential districts [list districts here] shall be located in the side or rear yard to minimize visual impacts from the public right-of-way(s).
   - **a.** Accessory Ground-Mounted SES may be placed in the front yard with administrative approval, where the applicant can demonstrate that placement of the SES in the rear or side yard will:
     - **i.** Decrease the efficiency of the SES due to topography, accessory structures, or vegetative shading from the subject lot or adjoining lots;
     - **ii.** Interfere with septic system, accessory structures, or accessory uses; or
     - **iii.** Require the SES to be placed on the waterfront side of the building housing the primary use [where applicable].
6. **Exemptions:** An SES used to power a single device or specific piece of equipment such as a lawn ornament, lights, weather station, thermometer, clock, well pump, or other similar singular device is exempt from Section ______ [Ground-Mounted SES provisions].
7. **Nonconformities:** An Accessory Ground-Mounted SES installed on a nonconforming building, structure, or use shall not be considered an expansion of the nonconformity.
8. **Application:** All Accessory Ground-Mounted SES applications must include a ______ plan [e.g., plot or site, whichever is required for a zoning compliance review]. Applications must include drawings that show the location of the system on the property, height, tilt features (if applicable), the primary structure, accessory structures, and setbacks to property lines.

Commentary on Height (Accessory Ground-Mounted SES): Height of a ground-mounted SES can vary from 4 to 15 feet, depending on how many rows of panels are installed and the maximum tilt height, if applicable. If the SES is co-located with an active agricultural operation, such as livestock grazing or crop production, it may need as much as 8 feet of clearance, which can increase the overall height to up to roughly 20 feet. Similarly, a solar carport would need additional clearance to accommodate vehicle access. The carports at Michigan State University are 14’6’’ to accommodate snow removal and paving trucks. A relatively straightforward way to regulate the height of SES and account for this range of applications is to apply the same height standard as other accessory buildings or structures within the zoning district.

In addition to the General Provisions (above), also add the following standards for Principal-Use SES to the General Provisions or Supplemental Regulations (wherever you have use-specific standards) article of the zoning ordinance.

Also add "Small Principal-Use SES," "Medium Principal-Use SES," and "Large Principal-Use SES" to the list of permitted or special land uses in the appropriate districts. Based on Table 2 *on Page 20, this might include:*

Small Principal-Use SES:

- *Are a permitted (by right) use in non-residential zoning districts subject to Site Plan Review.*
- *Are a Special Land Use in residential zoning districts.*

Medium Principal-Use SES:

- *Are a permitted (by right) use in industrial zoning districts subject to Site Plan Review.*
- *Are a Special Land Use in agricultural, low-density residential, and commercial zoning districts.*

Large Principal-Use SES:

- *[Workable Pathway] If you have chosen a workable path (see Page 23 for zoning pathway options), add "Large Principal-Use SES" as a special land use in your chosen districts (e.g., typically all districts).*
- *[CREO Pathway] If you have chosen the CREO pathway, add "Large Principal-Use SES" as a [permitted/special land] use in all districts.*[95] *Also, using the sample language for CREOs,*[96] *create a new section within your ordinance. This section should include all relevant definitions, as well as the standards and procedures applicable to SES and any other energy technologies (e.g., wind, battery energy storage systems) that you wish to include in your ordinance.*
- *[MPSC Pathway] If you have chosen the MPSC pathway, omit any reference to "Large Principal-Use SES" throughout your ordinance (e.g., use tables or definitions) but do include the appropriate "Applicability" provision below.*

E. PRINCIPAL-USE SES

1. **Applicability** *[Pick one of the following three actions]:*
   [Workable Pathway: Delete this "Applicability" provision]
   [OR]
   [CREO Pathway] Large Principal-Use SES are not subject to the provisions or procedures in this section. Instead, Large Principal-Use SES are subject to the provisions and procedures for ______ [e.g., Large Principal-Use Solar Energy Systems (SES)] laid out in the Compatible Renewable Energy Ordinance section of this ordinance.
   [OR]
   [MPSC Pathway] Large Principal-Use SES are not subject to the provisions or procedures in this section and are not regulated by this zoning ordinance. Instead, Large Principal-Use SES shall require a siting certificate from the Michigan Public Service Commission pursuant to Public Act 233 of 2023, Section 222(2).

95 There are some districts that may be patently incompatible for a large-scale solar energy project. But these are also very likely patently infeasible for a developer to find enough land to develop a project. While PA 233 and MPSC Application Filing Instructions and Procedures are silent on whether a CREO can restrict locations or limit the overall size of an energy facility, doing so within the context of a CREO may be risky. If your community wishes to place locational or footprint restrictions on renewables projects, it should weigh the risks of labeling your ordinance as a CREO.

96 A sample CREO is available on our website at https://graham.umich.edu/project/MI-energy-siting. Other organizations have created sample CREOs as well, such as the Michigan Townships Association at https://michigantownships.org/renewable-energy-siting-and-permitting/ (members only).

2. **Hybrid Energy Projects:** If a Principal-Use SES is to be established together with another energy facility, such as a wind or battery energy storage system, both land uses may be included in one application, and each component shall be reviewed for compliance with the appropriate standards.

3. **Use Standards**

   a. **Setbacks:**

      i. Setback distances shall be measured from the nearest edge of the perimeter fencing, or, where there is no perimeter fence, setback distances shall be measured from the property line or edge of a road right-of-way to the closest point of the solar array at minimum tilt or any SES components.

      ii. Principal-Use SES are not subject to property line setbacks for common property lines of two or more participating properties, except ______ [i.e., "road right-of-way" or "front property line"] setbacks shall apply.

      iii. Small Principal-Use SES: A Small Principal-Use SES shall follow the setback distance for principal buildings or structures for the district in which it is sited.

      iv. Medium Principal-Use SES: The following minimum setback distance shall apply to any Medium Principal-Use SES:

         1. ______ [e.g., 300] feet from any community buildings and occupied dwellings on a non-participating property.

         2. ______ [e.g., underlying zoning district or 50] feet from ______ [i.e., "the nearest edge of a public road right-of-way" or "the front property line"].

         3. ______ [e.g., 50] feet from the side or rear property line of a non-participating property.

      v. Large Principal-Use SES: ______. [For a Workable path, see Table 3 on Pages 24-25 to inform options. For CREO or MPSC paths, delete this provision.]

   b. **Fencing:** A Principal-Use SES may [shall] be secured with perimeter fencing to restrict unauthorized access. If installed, perimeter fencing shall be a minimum height of ______ [e.g., 7] feet [and shall not be subject to the fencing requirements in Section ______ of this zoning ordinance]. [Barbed wire is prohibited.]

   c. **Height:** Total height of a Principal-Use SES shall not exceed ______ [e.g., 25] feet measured from the ground to the top of the system when oriented at maximum tilt.

Commentary on Setbacks: The setback standards for large principal-use SES in Public Act 233 of 2023 are measured from the nearest edge of the perimeter fencing (see Section 226(8)(a)(i)). For more information on the kinds of setbacks and the values, refer to Table 3 on Pages 24-25.

Commentary on Fencing: PA 233 calls for fencing to comply with the latest version of the National Electrical Code (NEC). The current NEC standards call for a 6-foot fence with three lines of barbed wire, or a 7-foot fence with no barbed wire. A community may decide to ban the use of barbed wire at an SES and still allow for compliance with the NEC, as long as the fencing is allowed to be at least 7 feet. While some communities have aesthetic concerns about taller fences, taller fences (e.g., those taller than 8 feet) may be more effective at excluding deer. Voluntary best management practices from Michigan's Department of Natural Resources that address deer interaction with fences surrounding solar farms were not yet available as of May 2025 but were expected imminently.

Commentary on Height: This height standard is consistent with the height standard for large SES in PA 233 (see Section 226(8)(a)(iii)).

d. Sound:

i. Small Principal-Use SES shall comply with the ______ [reference to existing noise ordinance].

ii. For Medium Principal-Use SES, the sound pressure level of all SES components and ancillary equipment shall not exceed a noise level of ______ [e.g., 45–55] dBA (Leq (1-hour)) at the nearest ______ [e.g., property line of an adjoining non-participating property; or, outer wall of the nearest dwelling located on a non-participating property]. Decibel modeling shall use the A-weighted scale with applicable standards from the American National Standards Institute.

iii. Large Principal-Use SES: ______. [For a Workable path, see Table 3 on Pages 24-25 to inform options. For CREO or MPSC paths, delete this provision.]

e. Lighting: A Principal-Use SES shall implement dark sky-friendly lighting. Light fixtures shall have full cut-off, downlit shielding and be placed to keep light on-site and glare away from adjacent properties, bodies of water, and adjacent roadways. Flashing or intermittent lights are prohibited.

f. Screening/Landscaping: A Principal-Use SES shall follow the screening and/or landscaping standards for the zoning district of the project site. Screening shall be maintained throughout the life of the facility including replacing dead vegetation within ______ [e.g., 12] months or at the earliest feasible time of year dependent on the weather. Any screening and landscaping shall be placed outside the perimeter fencing. Screening is not subject to setbacks.

i. In districts that call for screening or landscaping along rear or side property lines, these shall only be required where an adjoining non-participating property has a dwelling or community building.

Commentary on Sound: In communities with an existing noise ordinance, applying the current noise regulations to small principal-use SES may be the most reasonable and consistent approach. If your jurisdiction does not have a noise ordinance, you may choose to omit this provision or consider adapting language from medium principal-use SES regulations. However, be aware that such provisions might be cost-prohibitive for smaller systems, particularly if the community-wide noise ordinance applies to property lines rather than individual dwellings. When considering noise levels for medium and large principal-use SES, a community should determine the appropriate decibel amount and whether the noise levels will be measured from a property line or a dwelling. The zoning language above provides different options. To review how sound standards for large SES compare across different zoning pathways, see Table 3 on Pages 24-25. Note that PA 233 measures sound from the "outer wall" of a dwelling unit, a location that is not common in most zoning ordinances and that requires relatively complex modeling methodology (see also the MPSC's approach in the MPSC Application Filing Instructions and Procedures). Instead, it is more common to regulate sound at the property line, though doing so may be more restrictive for projects where there is no existing dwelling unit on a neighboring property.

Commentary on Lighting: The first sentence is consistent with the language in PA 233, Section 226(8)(a)(v). The subsequent sentences provide more detail, which may or may not be workable.

Commentary on Screening: Zoning requirements may impact the ability for the land to be returned to its original use. For example, required berming, substantial vegetative screening, or on-site stormwater detention/retention (which may be regulated by the Drain Commissioner, for example) may need to be removed or altered in order to return the land to its previous use. In considering whether to reduce, waive, or expand vegetation and screening standards, communities should take landowner considerations relating to reuse into account. For large SES, see Table 3 on Pages 24-25 on how screening requirements compare between zoning pathways.

ii. The ______ [e.g., Zoning Administrator or Planning Commission] may reduce or waive screening requirements provided that any such adjustment is in keeping with the intent of the Ordinance and is appropriately documented (e.g., abutting participating properties; existing vegetation).

iii. For Principal-Use SES that are a Special Land Use: When current zoning district screening and landscaping standards are determined to be inadequate based on a legitimate community purpose consistent with local government planning documents, the ______ [e.g., Zoning Administrator or Planning Commission] may require substitute screening consisting of non-invasive deciduous trees planted ______ [e.g., 30] feet on center, and non-invasive evergreen trees planted ______ [e.g., 15] feet on center along non-participating property lines with a dwelling or community building.

g. **Land Clearing:** Land grading or clearing shall be limited to what is minimally necessary for the installation and operation of the system and to ensure sufficient all-season access to the solar resource given the topography of the land. Topsoil distributed during site preparation (grading) on the property shall be retained on-site.

h. **Ground Cover:**

i. Small and Medium Principal-Use SES shall include the installation of ground cover vegetation maintained for the duration of operation until the site is decommissioned. The applicant shall include a ground cover vegetation and management plan as part of the site plan. Vegetation establishment must include control of invasive plant species [and noxious weeds, if local regulation applies]. The following standards apply:

1. Sites bound by a Farmland Development Rights Agreement must adhere to state laws and policies applicable to enrolled land.
2. Ground cover at sites not enrolled must use one or more of the following:
   a. **Ecovoltaics:** Solar sites shall include pollinator habitat, designed to meet a score of 76 or more on the Michigan Pollinator Habitat Planning Scorecard for Solar Sites. Alternatively, solar sites may utilize conservation cover, designed in consultation with the County Conservation District or other conservation organizations that focus on restoring native plants, grasses, and prairie with the aim of protecting specific species (e.g., bird habitat) or providing specific ecosystem services (e.g., carbon sequestration, soil health).
   b. **Agrivoltaics:** Solar sites that have been intentionally planned and designed with agricultural producers and/or experts to achieve integrated and simultaneous production of both solar energy and marketable agricultural products throughout the life of the solar project. Agricultural products and activities may happen on land beneath and/or between rows of solar panels and can include crop production, grazing, or animal husbandry. Agricultural activities should commence as soon as agronomically feasible and optimal for the agricultural producer after the commercial solar operation date and continue until decommissioning. Pollinator habitat and apiaries (honey production) are excluded from the definition of agrivoltaics unless they are a temporary transition to another agricultural product.
3. Land predominantly covered by an existing impervious surface or that is included in a brownfield plan adopted under the Brownfield Redevelopment Financing Act, PA 381 of 1996, as amended, is exempt from ground cover requirements. These sites must comply with the on-site stormwater requirements of the ______ [e.g., local government ordinance, County Drain Commissioner].

ii. Large Principal-Use SES: ______. [For a Workable path, see Table 3 on Pages 24-25 to inform options. For CREO or MPSC paths, delete this provision.]

Commentary on Ground Cover: See Table 3 on Pages 24-25 to compare ground cover standards for large SES across different zoning pathways.

i. Lot Area: A Principal-Use SES shall not be subject to minimum or maximum lot area requirements.

j. Lot Coverage: A Principal-Use SES shall not be included when calculating compliance with maximum lot coverage or impervious surface standards for the district.

k. Access Drives: Access drives shall be maintained to enable year-round emergency vehicle access. Access drives shall be designed to minimize the extent of soil disturbance, water runoff, and soil compaction on the premises. The use of geotextile fabrics and gravel placed on the surface of the existing soil for the construction of temporary drives during the construction of the SES is permitted, provided that the geotextile fabrics and gravel are removed once the SES is in operation.

l. Environmental Impacts: Medium and Large Principal-Use SES applications shall consider and address impacts to the environment and natural resources, including, but not limited to, sensitive habitats and waterways, wetlands and floodplains, wildlife corridors, parks, historic and cultural sites, and threatened or endangered species.

m. Stormwater Management: Medium and Large Principal-Use SES applications shall consider and address impacts to drainage after consultation with the ______ [e.g., local government stormwater official, County Drain Commissioner].

n. Wiring: SES wiring ______ [may/shall] be placed underground to the extent feasible.

o. Signage: Any signage shall meet the requirements in ______ [reference to district or sign type standard of local government ordinance].

p. Repair and Repowering: In addition to repairing or replacing SES components to maintain the system, a Principal-Use SES may at any time be repowered within the existing project footprint without the need to apply for a new zoning permit or to amend the special use permit.

   i. A proposal to change the project footprint of an existing SES shall be considered a new application, subject to the ordinance standards at the time of the request.

q. Decommissioning: A Decommissioning Plan is required for any Principal-Use SES at the time of application.

   i. Prior to the start of construction, that is the on-site delivery of any component of an SES delivered to the site but not including land improvements or site preparation, the Principal-Use SES owner shall enter into a decommissioning agreement, including demonstration of the financial assurance. Every year, the Principal-Use SES owner must submit to the Zoning Administrator proof that the financial assurance requirements are satisfied along with a summary of the power generated for the preceding twelve (12) month period. If any portion of the project is bound by a Farmland Development Rights Agreement and a financial surety is held by the State, the SES owner must submit proof of that surety.

   ii. An update of the Decommissioning Plan, including a review of the amount of the financial security based on inflation and the current removal costs [not to include salvage value], shall be completed every ______ [e.g., 5] years for the duration of commercial operations or when there is a change of ownership, and shall require approval by the ______ [legislative body]. The amount shall be calculated by a mutually agreed-upon third party with expertise in decommissioning, hired by the

Commentary on Lot Coverage: One of the reasons to exempt SES from maximum lot coverage or impervious surface standards is that there are practical challenges to measuring the overall footprint of principal-use systems, since they may include tilting panels and access drives. Communities that choose not to include this exemption must decide which elements of an SES count/do not count toward lot coverage and make clear how lot coverage should be calculated for co-located systems. If the community's intent through lot coverage regulation is to minimize a development's impervious surface area, these concerns are addressed both through the ground cover and stormwater management plan requirements in this sample ordinance.

SES owner. If any portion of the project is bound by a Farmland Development Rights Agreement and a financial surety is held by the State, the owner ______ [may/shall] deduct this portion from the financial security held by the ______ [township, city, village, county].

iii. A Principal-Use SES owner may at any time:

1. Proceed with the approved Decommissioning Plan and remove the system after prior notification of the Zoning Administrator, or
2. Amend the Decommissioning Plan with ______ [legislative body] approval and proceed according to the revised plan.

iv. A Principal-Use SES that has not produced electrical energy for ______ [e.g., 12] consecutive months shall prompt an abandonment hearing. Decommissioning a Principal-Use SES, in accordance with an approved Decommissioning Plan, must be completed within ______ [e.g., 18 months] after abandonment and must commence in a manner to minimize soil compaction, for example, when the soil is dry, when there is ground cover established, and/or with the use of portable pads for equipment.

4. Application Requirements: Principal-Use SES are not subject to site plan requirements in ______ [reference to the section in your zoning ordinance that includes general site plan requirements] but are instead subject to the following:

a. Site Layout and Context: A site plan at a scale and format that allows details to be clear and legible (e.g., as separate maps, or by showing some areas at a larger scale), showing:

i. The location of all solar arrays, the width of arrays and distance between arrays plus total height and height to the lowest edge above grade;

ii. The location of existing structures on a participating property;

iii. The location of existing dwellings, primary structures, parks, and recreation areas on non-participating properties within ______ [e.g., 600-1,000] feet of the property boundary;

iv. Participating and non-participating property lines;

v. Setbacks;

Commentary on Decommissioning: This zoning language on decommissioning differs from the requirements of PA 233 for decommissioning large SES facilities permitted by the MPSC. The most significant differences depend on how the blanks in Sections (ii) and (iv) are filled. For example, the financial assurance amount for MPSC-permitted projects is determined after deducting salvage value (ii). Also, a jurisdiction may specify scenarios triggering decommissioning, such as abandonment (iv), or opt for shorter time frames, both of which could impose greater burdens on developers. Additionally, PA 233 requires that financial assurances for large SES facilities be posted in increments staggering over time. If your jurisdiction has policies for abandonment in other land uses, consider applying them to SES. If no such policies exist, consult with your municipal attorney. See Table 3 on Pages 24-25 on how decommissioning standards compare across zoning pathways.

Local governments should also consider how to handle the financial assurance for the portion of the project that is on land that is bound by a Farmland Development Rights Agreement (PA 116). PA 230 requires that the state hold financial sureties for decommissioning the SES, and the sample language above suggests that this portion be deducted from the financial surety held by the local government. However, the local government should have a mechanism to ensure that the financial surety is still being held by the State. For example, if the land is released from PA 116 due to the owner's death, the financial surety may be released, and so the financial surety to the local government should increase. The sample language requires the developer to show annually that the decommissioning sureties held by the local government and the State are in keeping with the decommissioning agreement.

- **vi.** Ancillary structures and electric equipment, utility connections, and buried or above-ground wiring;
- **vii.** Permanent access drives;
- **viii.** Details of proposed fencing and signage;
- **ix.** Light fixture detail and a placement photometric plan;
- **x.** Name, address, and contact information of proposed or potential system installer and the owner and/or operator;
- **xi.** Elevation contours of existing terrain and and final grading;
- **xii.** Erosion and sedimentation construction plan.

b. Pre-development Sound Modeling Study: A study including sound isolines extending from the sound resource(s) to all [property lines and] dwellings on non-participating properties within ______ [e.g., 1,000] feet of the property boundary. A Pre-development Sound Modeling Study is not required for Small Principal-Use SES.

c. Landscaping and Screening Plan: Plans for ground cover and screening/landscaping establishment and management. If applicable, a copy of the Michigan Pollinator Habitat Planning Scorecard for Solar Sites should be included.

d. Land Clearing and/or Grading Plan: A preliminary plan showing proposed clearing and/or land grading as required for the installation and operation of the system.

e. Environmental Impact Analysis: An environmental impact analysis prepared by a third-party qualified professional is required for Medium and Large Principal-Use SES at the time of application to identify and assess any expected direct impacts of the proposed energy facility on the environment and natural resources, including, but not limited to, sensitive habitats and waterways, wetlands and floodplains, wildlife corridors, parks, historic and cultural sites, and threatened or endangered species. The analysis shall identify all appropriate measures to minimize, eliminate, or mitigate adverse impacts identified and show those measures on the site plan, where applicable.

f. Complaint Resolution Plan: The plan shall be presented to the planning commission and approved prior to approval of a special land use permit. The plan will describe how the developer receives, responds, and resolves complaints that may arise from the operation of the SES. The plan will describe how mediation or arbitration is used to resolve complaints if needed. The plan shall include appropriate timelines for response and other detailed information (such as forms and contact information). As a condition of filing a complaint, a landowner must allow the ______ [local government] staff or designated agents and SES owner or agents on the subject property for further investigation. A Complaint Resolution Plan is not required for Small Principal-Use SES.

Commentary on Pre-development Sound Modeling Study: Jurisdictions with noise ordinances that apply broadly beyond SES often include sound limits measured from property lines. In jurisdictions without such ordinances, the bracketed text regarding property lines can be omitted. The MPSC has provided guidelines for modeling sound at the "outer wall" of a dwelling on a non-participating property. If this is the measuring location that you chose, you may want to reference that methodology in your ordinance. This methodology does not apply to other measuring locations, such as the property line. See MPSC Application Filing Instructions and Procedures, Attachment D.

g. Stormwater Management Assessment: A stormwater management assessment prepared by a third-party qualified professional is required for Medium and Large Principal-Use SES prior to approval of a special land use permit. The assessment shall ______ [See commentary box below]. The assessment shall describe measures to minimize, mitigate, and repair any drainage impacts and show those measures on the site plan, where applicable. Percolation tests or site-specific soil information shall be provided to demonstrate infiltration on-site without the use of engineered solutions. The Zoning Administrator or Planning Commission may require a stormwater management assessment for a Small Principal Use SES.

h. Decommissioning Plan:

i. For a Small Principal-Use SES, a decommissioning plan should include a description of which above-grade and below-grade improvements will be removed, retained, or restored for viable reuse of the property consistent with the zoning district.

ii. For a Medium Principal-Use SES, a decommissioning plan should include:

1. A narrative description of the activities to be accomplished for removing the SES from service, including who will perform that activity and at what point in time, for complete physical removal of all SES components, structures, equipment, security barriers, and transmission lines from the site;
2. A description of which above-grade and below-grade improvements will be removed, retained, or restored for viable reuse of the property consistent with the zoning district;
3. The projected decommissioning costs for SES removal (not to include salvage value in current dollars), soil stabilization, and site restoration, minus the amount of the surety bond posted with the State of Michigan for decommissioning of panels installed on land bound by a Farmland Development Rights Agreement, and how said estimate was determined by a mutually agreed-upon third party with expertise in decommissioning, hired by the applicant;
4. The method of ensuring that funds totaling ______ [e.g., 100–125 percent] of the projected cost will be available for site decommissioning, stabilization, and restoration (in the form of surety bond, irrevocable letter of credit, cash deposit);
5. The method by which the decommissioning cost will be re-evaluated every ______ [e.g., 5] years, for the duration of commercial operations, or when there is a change of ownership. The amount shall be calculated by a mutually agreed-upon third party with expertise in decommissioning, hired by the SES owner.

iii. For a Large Principal-Use SES: ______. [For a Workable path, see Table 3 on Pages 24-25 to inform options. For CREO or MPSC paths, delete this provision.]

Commentary on Stormwater Management Assessment: Local governments should consider filling in the blank with one of the two following options:

1. be prepared in consultation with ______ [e.g., local government stormwater official, County Drain Commissioner].
2. take into account the proposed layout of the SES and how the spacing, row separation, and slope affect stormwater infiltration, including calculations for a ______ [e.g., 100 or 500]-year rain event (storm).

ZONING FEES AND ESCROW POLICY

The local resolutions governing permit fees and review costs should be updated to include SES upon adoption of a zoning amendment regulating the use. The Michigan Zoning Enabling Act authorizes the legislative body to adopt reasonable fees for zoning permits.[97] The permit fee amount must be set by the legislative body to cover the anticipated actual cost of the application review and not more.

To encourage the adoption of solar energy, some communities waive or reduce zoning fees for some types of systems. Within the SolSmart certification program, for example, communities can earn points toward certification by waiving or exempting fees for residential solar permit applications.

For large utility-scale SES, though, a community might consider using escrow funds deposited by the applicant to recover the expense of hiring outside reviewers, such as an attorney, engineer, or planning consultant. An escrow policy provides a mechanism for the community to anticipate the costs associated with reviewing a complex application. Prior to requiring escrow funds for a zoning application review, the legislative body must first adopt an escrow policy by resolution.[98,99] Among other things, an escrow policy establishes administrative guidelines for spending, replenishing the escrow below a certain balance, and returning remaining funds.

Some communities require a performance guarantee for small and large principal-use SES for the cost of grading and on-site ground cover establishment in the form of a bond, letter of credit, or establishment of an escrow account. The rationale is that if a site is cleared of vegetation and graded, but the project is not completed, there is a financial guarantee that the site will be stabilized. Such a provision may be redundant with Soil Erosion and Sedimentation Control (SESC) bonding requirements for projects larger than one acre.

There is some dispute about whether or not developers of principal-use SES need to obtain building, electrical, or mechanical permits under the Michigan State Construction Code. Communities should consult with their municipal attorney in that regard.

97 Michigan Legislature. (2006). Michigan Zoning Enabling Act, PA 110 of 2006, MCL 125.3406. https://www.legislature.mi.gov/Laws/MCL?objectName=mcl-act-110-of-2006

98 Forner v. Allendale Charter Township: Michigan Court of Appeals, 2019 Mich. App. LEXIS 576, 2019 WL 1302094 (March 21, 2019, Decided), Unpublished Opinion No. 339072. https://www.michbar.org/file/opinions/appeals/2019/032119/70094.pdf

99 Michigan Legislature. (1947). Charter Township Act, PA 359 of 1947. https://legislature.mi.gov/Laws/MCL?objectName=MCL-ACT-359-OF-1947; and Revised Statutes of 1846. https://legislature.mi.gov/Laws/MCL?objectName=MCL-R-S-1846-41-1-16

OTHER PERMIT PROCESSES

In addition to zoning approval, developers may need to get a number of other permits. The planning commission may serve in a coordinating role to ensure additional required permits are obtained. For example, the application may include mitigation measures to minimize potential impacts on the natural environment, including but not limited to wetlands and other fragile ecosystems, historical sites, and cultural sites. Solar energy developments may require permits from other agencies, including:

- Department of Environment, Great Lakes, and Energy (EGLE) if the project affects waters of the state, such as wetlands, streams, or rivers.[100]
- U.S. Fish and Wildlife Service (USFWS) for the Endangered Species Act or migratory flyways.[101]
- Federal Aviation Administration (FAA) for projects on or within the vicinity of an airport with air traffic control personnel, if applicable.[102]
- Municipal or County Soil Erosion Permitting Agency if the project is one or more acres in size or is within 500 feet of a lake or stream.[103]
- County Drain Commissioner, if applicable.
- Assessor or Zoning Administrator for land division approval if leasing less than 40 acres or the equivalent for more than one year.[104]
- Building Department for required building, electrical, and mechanical permits, to the extent applicable.[105]
- Local Airport Zoning, for projects within 10 miles of a local airport.[106,107]

100 Michigan Legislature. (1994). Parts 301 and 303 of the Natural Resources and Environmental Protection Act, PA 451 of 1994. https://legislature.mi.gov/Laws/MCL?objectName=MCL-451-1994-III-1-INLAND-WATERS

101 Federal laws administered by the USFWS: Endangered Species Act (ESA); Bald and Golden Eagle Protection Act (BGEPA); Fish and Wildlife Coordination Act (FWCA). https://www.fws.gov/page/energy-permits-policies-and-authorities

102 Part 77 (Airspace Review) of Title 14 of the Code of Federal Regulations. https://www.federalregister.gov/documents/2021/05/11/2021-09862/federal-aviation-administration-policy-review-of-solar-energy-system-projects-on-federally-obligated

103 Soil Erosion and Sedimentation Control Program (SESC). https://www.michigan.gov/egle/about/organization/water-resources/soil-erosion/sesc-overview

104 Michigan Legislature. (1967). Michigan Land Division Act, PA 288 of 1967, definition of "Division"—MCL 560.102(d). https://www.legislature.mi.gov/Laws/MCL?objectName=mcl-560-102

105 There is some dispute about whether developers of principal-use SES need to pull building, electrical, or mechanical permits under the Michigan State Construction Code. If the project is owned by a regulated utility, then local building and electrical permits may not be required, but projects are instead regulated by the MPSC. See Stille-Derossett-Hale Single State Construction Code Act, PA 230 of 1972, MCL 125.1502a(1)(bb). https://legislature.mi.gov/Laws/MCL?objectName=MCL-125-1502A; and 2015 Michigan Building Code, 1.105.2.3 Public Service Agencies. https://www.michigan.gov/en/lara/bureau-list/bcc/rules-acts/codes/code-books.

106 Michigan Legislature. (1950). Airport Zoning Act, PA 23 of 1950. https://www.legislature.mi.gov/Laws/MCL?objectName=mcl-Act-23-of-1950-Ex-Sess-

107 Michigan Legislature. (2006). Michigan Zoning Enabling Act, PA 110 of 2006, MCL 125.3203. https://www.legislature.mi.gov/Laws/MCL?objectName=mcl-125-3203

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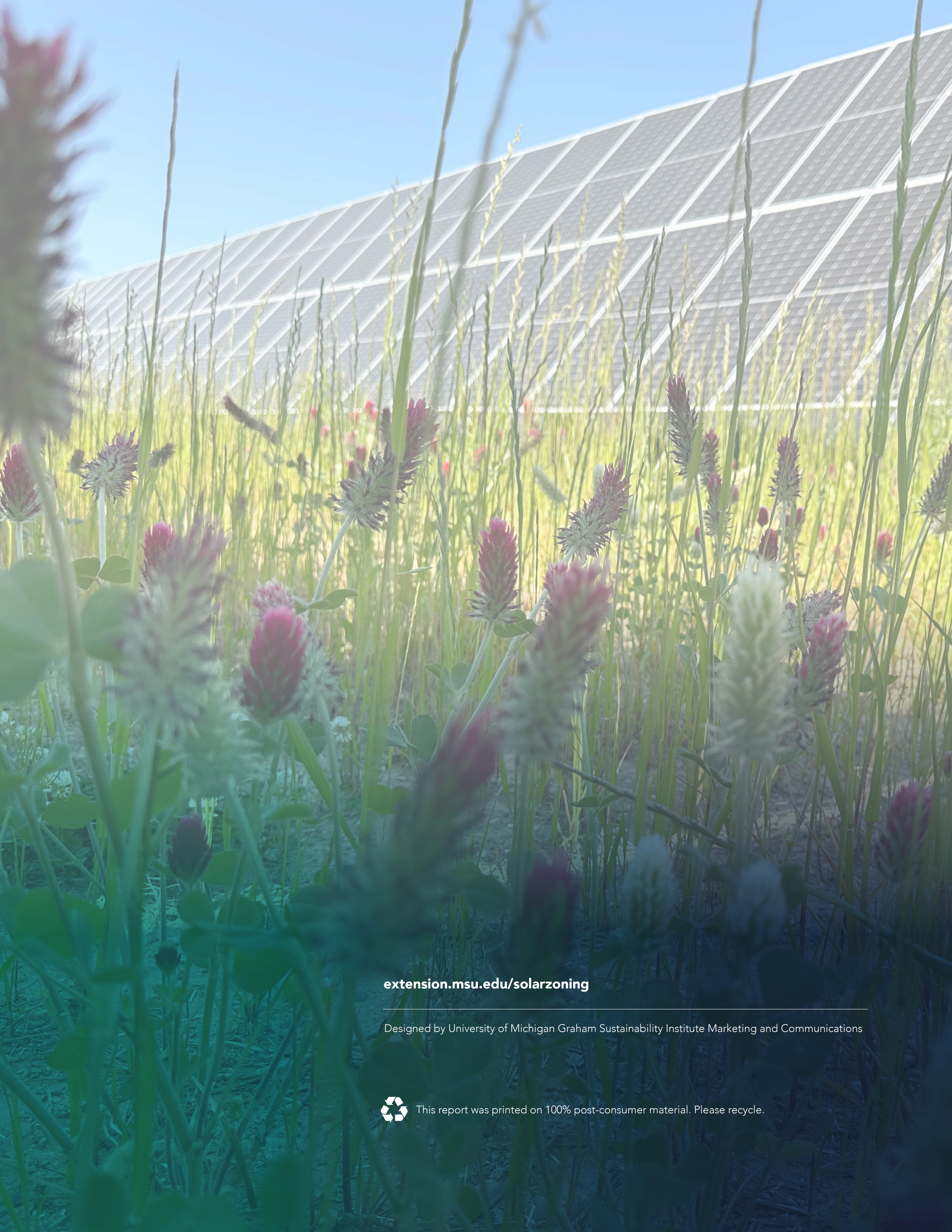
MICHIGAN DEPARTMENT OF ENVIRONMENT, GREAT LAKES, AND ENERGY

The Michigan Department of Environment, Great Lakes, and Energy (EGLE) protects Michigan's environment and public health by managing air, water, land, and energy resources.

More information on how communities can plan for, regulate, and reduce barriers to SES is available through numerous Michigan agencies, universities, and organizations. Additional resources on solar energy, renewable energy, energy storage, and planning and zoning in Michigan are available from the Center for EmPowering Communities, MSU Extension, and the Michigan Department of Environment, Great Lakes, and Energy.



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