Wisconsin Community Perspectives on Large-Scale Solar and Wind Development

Renewable Energy Siting & Engagement for Tomorrow (RESET)

Engaging Wisconsin Communities in Renewable Energy

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Extension
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County Advisory Teams

In Green, Taylor, and Vernon County, advisory teams were identified to help guide the RESET community engagement process. The Advisory Teams provided local expert guidance on community, economic, and environmental issues that should be considered throughout the Renewable Energy Siting & Engagement for Tomorrow (RESET) process. To see the list of community comments or the names of Advisory Team members, reference the RESET County Reports.

UW-Madison Division of Extension

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Glossary

Agrivoltaics

The practice of combining solar photovoltaic energy production with agricultural activities, such as grazing livestock or growing crops under and around solar panels. Also referred to as dual use.

Battery Energy Storage System (BESS)

A system that stores electricity in batteries for later use. For example, BESS can store solar electricity generated during the day to be used at night.

Certificate of Public Convenience and Necessity (CPCN)

A permit issued by the Public Service Commission of Wisconsin for energy projects 100 megawatts or larger, confirming the project serves the public interest.

Community Benefit Agreement (CBA)

A legally binding agreement between a developer and a community coalition that ensures specific benefits such as jobs, funds, and/or environmental protections as part of a project.

Decommissioning

The process of removing infrastructure and restoring land to its original condition at the end of a solar or wind project's life.

Dual use

Designing solar sites to support additional uses beyond energy generation, such as grazing, forage production, or pollinator habitat. Also referred to as agrivoltaics when the additional use is agricultural.

Financial assurance

A financial guarantee (such as a bond, escrow, or letter of credit) that is required from developers to ensure funds will be available for decommissioning and site restoration at the end of a project's life.

Good Neighbor Agreement

An agreement between a solar or wind project developer and adjacent landowners to mitigate impacts such as visual changes, noise, or property value concerns.

International Fire Code (IFC)

IFC is the model global standard for fire safety, including solar and battery energy storage systems (BESS).

Joint Development Agreement (JDA)

A contract between a developer and local government outlining developer commitments such as road use and repairs, local hiring, and community investments.

Large-scale solar

Large-scale solar projects can also be referred to as utility-scale projects. In this report large-scale solar projects are projects at least one megawatt (MW) in size.

Life Cycle Analysis (LCA)

An assessment of the environmental impacts of a product throughout its lifespan, from raw material extraction to manufacturing, operation, and disposal.

Megawatt (MW)

A megawatt is a unit of electrical power. One MW is equal to 1,000 kilowatts (kW), which is the unit of electricity used for residential utility bills.

Midcontinent Independent System Operator (MISO)

The regional transmission organization that manages electricity flow and reliability across fifteen states, including Wisconsin.

Net metering

A billing arrangement that can allow utility customers with on-site solar installations to receive some type of credit for electricity they send to the grid. This agreement depends on the utility.

Public Service Commission of Wisconsin (PSC)

The Public Service Commission of Wisconsin regulates utilities and approves large-scale energy projects.

RESET: Renewable Energy Siting & Engagement for Tomorrow

RESET is a Wisconsin program supporting community engagement for renewable energy siting. RESET is funded by an award from the U.S. Department of Energy.

Utility aid

Annual payments from the Wisconsin Department of Revenue to counties and municipalities hosting tax-exempt utility property, $5000/MW/year for renewable energy generators and $1000/MW/year for BESS. 2025 WI Act.[1] Some utility aid is also available for many large-scale solar projects between 1 MW and 50 MW.

[1] 2025 WI Act 163. docs.legis.wisconsin.gov/2025/related/acts/163

Section 1: Introduction and Executive Summary

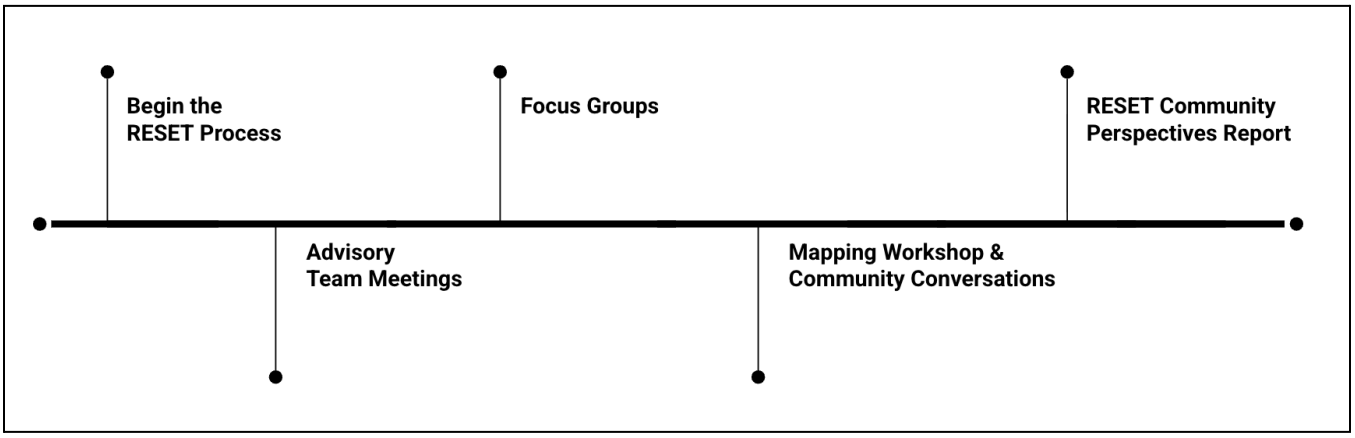
Purpose & Process

The Renewable Energy Siting & Engagement for Tomorrow (RESET) program helps Wisconsin communities prepare and plan for large-scale renewable energy and energy storage projects. RESET aims to empower local communities, provide educational resources, and support collaboration to address the impacts of renewable energy on land, water, wildlife, people, and the local economy. RESET is funded by the Department of Energy, and there was no financial cost to the counties to participate in this process.

The RESET Process

Community Engagement

The RESET engagement process focused on gathering community perspectives through an advisory team, focus groups, and community conversations. The Advisory Teams were a multi-sector group of leaders, and focus groups included farmers, business leaders, conservation leaders, and local government. At the community conversations after a short educational presentation on large-scale solar from UW-Madison Extension experts, participants categorized benefits, questions, and concerns by documenting their perspectives on post-its and categorizing them based on benefits, concerns, and questions. All community members in the pilot counties were invited to join in the community conversations through a number of channels, including radio announcements, flyers, social media and local newsletters.



1,021 comments were gathered across 22 engagement sessions in three communities. Red post-its were concerns, blue were benefits, and yellow were questions.

+	–	?
279	**376**	**366**

Benefits **Concerns** **Questions**

Themes

Community member comments from the pilot counties and other renewable energy engagement were sorted into the themes identified below. These themes inform the content of this report.
For a complete list of comments, see the individual county reports for Vernon, Taylor, and Green County on RESET's reports page.

Electricity and Large-Scale Solar and Wind

- Grid, Transmission, Battery Storage
- Energy Mix, Transition to Energy Independence
- Cost Savings and Equity

Law, Policy, and Planning

- Regulations, Legal Framework, Local Control
- Siting and Planning Process
- Education and Public Participation
- Developer Transparency, Accountability

Economics

- Impacts on Landowners, Farmers, Businesses, and Local Government
- Utility Aid and Property Taxes
- Profit distribution

Environment

- Soil, Water, Wildlife, and Air
- Construction Best Management Practices
- Life Cycle Analysis

Land Use

- Loss of Farmland, Alternative Locations
- Visual Landscape and Tourism
- Dual Use (Agrivoltaics)

Health and Safety

- Emergency Response, Fires, Toxins, Stray Voltage

Decommissioning / End of Life

- Land Restoration, Recycling and Disposal
- Costs, Financial Assurances, Regulations

Leverage Points

Wisconsin law places limits on local control of utility-scale renewable energy. The Public Service Commission of Wisconsin (PSC) has siting authority for projects that are 100 megawatts (MW) in size or larger. Local jurisdictions are responsible for permitting projects under 100 MW, and may only regulate based on public health and safety concerns, may not apply more stringent standards than those set out in state law, or the requirements may not significantly increase the cost of electricity generation. However, communities do have tools they can use to influence large scale projects. Here are some ways individuals and communities can get involved with large-scale solar and wind project siting. For more information on these tools see Section 9, Leverage Points.

Ordinances (under 100 MW)

- Counties, cities, villages, and towns can adopt a zoning ordinance addressing large-scale solar and wind energy that is aligned with Wisconsin Statute § 66.0401(1m) Regulation relating to solar and wind energy systems. A zoning ordinance can include conditional use permit application requirements for large-scale solar projects such as describing screening, setback, and vegetation management plans; construction best management practices (BMPs); Emergency Management Services/fire access; and appropriate financial assurances for decommissioning. By law, conditional use permit requirements must be supported by substantial evidence.
- Communities may adopt a permitting ordinance under their general police powers, separate from zoning, to require developers to submit and comply with plans addressing construction best management practices (BMPs), including measures for soil and water protection, traffic management, monitoring, vegetation management, and other reasonable environmental safeguards, provided such requirements are clear, non-arbitrary, and consistent with applicable state law.

Plans

- Counties and Towns can update their comprehensive plans to address renewable energy development goals and concerns.
- The Public Service Commission will consider planned residential and commercial development documented in a comprehensive plan that is adopted before a project application is submitted. Developers look at comprehensive plans as they are planning renewable energy projects.

Contracts

- Landowners can negotiate for provisions in the leases they sign with solar developers. For example, leases can stipulate that specified agricultural uses will be allowed.
- Individuals who own land adjacent to the project may be able to negotiate contracts with the developer to address concerns. These are typically called Good Neighbor Agreements.
- Local governments can negotiate contracts with developers to address a variety of concerns. These contracts are typically called Joint Development Agreements (JDAs) but sometimes go by other names. JDAs can be used to address items such as providing monetary compensation for road impacts, requiring local or union hiring, community investments, and coordination with local Emergency Management Services on emergency response training, especially for battery energy storage systems (BESS). Payment for this training can be included as part of a Joint Development Agreement. Local governments can convene a working group that includes County and Town officials, along with farmers and local leaders, to draft issues to address in Joint Development Agreements with future projects.

Decommissioning

- For projects under 100 MW, communities can require decommissioning plans, recycling commitments where feasible, and financial guarantees for decommissioning costs as part of a conditional use permit.

- For projects over 100 MW, communities can negotiate decommissioning assurances as part of a JDA. For examples of Joint Development Agreements for solar energy facilities that included decommissioning standards refer to Solar Contracts Worksheet (Row 9), and refer to Land+Water's page on Solar Contracts.

Section 2: Introduction to Electricity and Large-Scale Solar and Wind

This section includes:

- An introduction to how the electrical grid works,
- An explanation of large-scale solar's current footprint in Wisconsin,
- Information about wind energy and battery storage, and
- Resources to learn more.

How does the electrical grid work in Wisconsin?

Wisconsin's electricity system is operated by the Midcontinent Independent System Operator (MISO). MISO (pronounced "MY-so") manages the electrical grid and high-voltage transmission for more than 40 million customers across 15 states (see Figure 2-1).

MISO's core role in the regional electric grid is to make sure that customers have a consistent supply of electricity at an affordable cost. Electricity flow is managed on a second-by-second basis, while planning for projected electricity needs requires planning decades into the future. MISO coordinates between utilities and other stakeholders, and is managed through state and federal regulations.[2]

Figure 2-1: MISO territory

Where does Wisconsin's electricity come from?

Wisconsin's electricity mix includes natural gas, coal, nuclear power, hydro, wind, and solar. As Figure 2-2 shows, the supply mix has shifted over time.[3] In 2024, natural gas produced 40% of Wisconsin's electricity, coal provided 32% (down from 61% in 2014), and nuclear provided 15%. Renewable resources (solar, wind, and hydro power) provided 12% of Wisconsin's electricity.[4]

[2] Great Plains Institute, MISO 101 Primer: Part 1, Introduction to MISO, 2022, https://betterenergy.org/wp-content/uploads/2023/06/MISO-101-Part-1-Intro-to-MISO.pdf.
[3] Wisconsin Energy Institute, 2024 Was the Dawn of Wisconsin's Solar Era, but There Are Clouds on the Horizon, April 1, 2025, https://energy.wisc.edu/news/2024-was-dawn-wisconsins-solar-era-there-are-clouds-horizon.
[4] U.S. Energy Information Administration, Wisconsin State Energy Profile, December 2025, https://www.eia.gov/state/print.php?sid=WI.

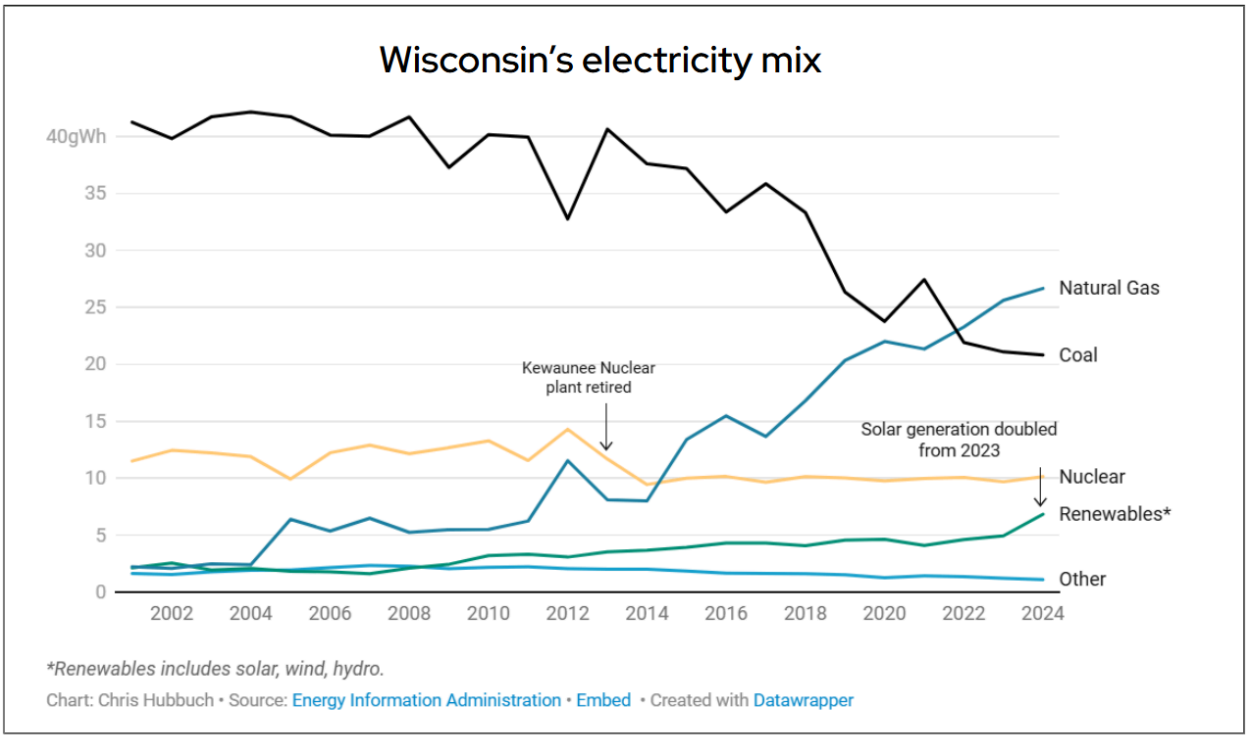


Figure 2-2: Wisconsin's changing electricity sources

Do large-scale solar and wind make sense in Wisconsin?

Large-scale projects, also referred to as utility-scale, are any project at least one megawatt (MW) in size. One megawatt is the same as 1,000 kilowatts (kW), and will power more than 100 Wisconsin homes.

There are already dozens of large-scale solar projects approved in Wisconsin, totaling more than 3,300 megawatts.[5] There are also a number of large-scale wind projects, and dozens more wind and solar projects that are in the permitting process.

People often wonder whether solar makes sense in Wisconsin because of seasonality. Although Wisconsin winters reduce solar's annual production, the costs of wind and solar are lower than any other type of electricity generation. The levelized cost of energy (LCOE) is a cost comparison of different energy generation technologies published annually by Lazard. Their 2025 report states that "renewables remain the most cost-competitive form of new-build generation on an unsubsidized basis."[6]

The LCOE does not include tax subsidies or other incentives, but does include the total lifetime costs of building, operating, and decommissioning a power plant. Key components include construction, operation and maintenance costs of managing the facility, financing costs, and the fuel costs (if applicable). Because wind and solar do not have fuel input costs, they remain the lowest cost of electricity.

How does battery storage impact solar or wind projects?

[5] Solar Energy Industries Association (SEIA), Wisconsin Solar State Spotlight, December 2025, https://seia.org/state-solar-policy/wisconsin-solar/.
[6] Lazard, Lazard's Levelized Cost of Energy+ (LCOE+), December 2025, https://www.lazard.com/research-insights/levelized-cost-of-energyplus-lcoeplus/.

Battery energy storage systems (BESS) can complement renewable energy sources like wind and solar by improving when and how energy is used. With solar, excess energy generated during the day can be stored and used later during peak evening demand. With wind, storage helps reduce fluctuations by capturing energy when winds are strong and releasing it when they are not. Combining multiple renewable sources with BESS allows energy to be stored and used more reliably, similar to traditional power generation.

Could large-scale solar and wind projects increase Wisconsin's energy independence?

Wisconsin currently consumes almost six times as much energy as the state produces, and spends more than $1.2 billion annually buying fossil fuels from out of state to power our electrical grid.[7] Based on consumer usage trends in 2025, modeling indicates the state will require up to 60 gigawatts (60,000 MW) of new electricity generating capacity by 2050.[8] As existing energy generating plants are retired, Wisconsin will need new sources of electricity generation to avoid utility rate increases and rolling blackouts. Although Wisconsin does not have commercial fossil fuel reserves, it does have renewable resources like sunshine and wind. Large-scale solar can help meet in-state electricity needs and reduce reliance on imported fuels.

Where does the electricity that's generated go?

Electricity generated by any type of power plant enters the electric utility grid. It becomes part of MISO's overall supply that serves homes and businesses across 15 states. Managing base loads and peak demand means that, depending on the grid's supply and demand at a given moment, your electricity might come from the closest source or a plant hundreds of miles away.

Could large-scale solar and wind reduce grid outages in the area?

Large-scale solar alone won't result in fewer outages because solar power depends on sunlight. However, if solar or wind projects are combined with battery energy storage systems (BESS), they can improve resilience by providing immediate additional backup power during grid disturbances.

Could large-scale solar projects reduce local electricity bills?

A large-scale project does not change local electricity costs. The power generated is sold into the regional electrical grid. However, from a supply and demand perspective, having more electricity supplied to the grid from low-cost sources such as solar, wind, and natural gas will keep prices lower than if additional energy is not added to the supply or if more expensive energy sources are used.

Want to learn more? Check out these resources.

- To learn more about Wisconsin energy use see U.S. Energy Information Administration Wisconsin State Energy Profile.
- There were some questions about how the county might encourage local commercial and residential solar energy production. The RESET project is focused on energy produced for utilities, but the Wisconsin Local Government Greening the Grid Playbook created by the Great Plains Institute provides guidance on supporting renewable energy for local consumption.

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[7] U.S. Energy Information Administration, State Energy Price and Expenditure Estimates 1970 Through 2023, Table E14, June 2025, https://www.eia.gov/state/seds/archive/seper2023.pdf.

[8] Clean Wisconsin, RENEW Wisconsin, Evolved Energy Research, Wisconsin's Roadmap to Net Zero by 2050, 2025, https://www.cleanwisconsin.org/our-climate/wisconsins-roadmap-to-net-zero.

- Focus on Energy also has resources to help individuals, businesses, and communities served by participating utilities increase energy efficiency and install solar panels.

Section 3: Laws, Policy, and Planning

This section includes:

- Summary of state regulations for siting utility-scale solar projects,
- Siting authority for projects below and above 100 megawatts,
- Ordinance guidance for local governments,
- Joint Development Agreements, and
- Resources to learn more about laws, policy, and planning.

Wisconsin State Regulations: Laws, Policy, and Planning

Wisconsin law specifies how local jurisdictions and state agencies can and cannot regulate renewable energy. Project size determines whether local or state government handles the permitting process. Wisconsin law also provides utility aid payments to local jurisdictions for most large-scale renewable energy projects. See Section 4, Economics, for information about utility aid.

Wisconsin siting authority for wind and solar projects

Local governments (counties, cities, villages, or towns) are responsible for permitting large-scale renewable energy projects under 100 megawatts. The Public Service Commission of Wisconsin has siting authority for any energy projects that are 100 megawatts or larger.

Wisconsin Statute § 66.0401(1m): Authority to restrict systems limited places limits on what requirements local governments can impose for large-scale projects of any size:

> "No political subdivision may place any restriction, either directly or in effect, on the installation or use of a solar energy system … or a wind energy system, unless the restriction satisfies one of the following conditions:
>
> (a) Serves to preserve or protect the public health or safety.
> (b) Does not significantly increase the cost of the system or significantly decrease its efficiency.
> (c) Allows for an alternative system of comparable cost and efficiency."

In addition, under Wisconsin Statute § 66.0401(4)(f)1: Regulation relating to solar and wind energy systems, local procedure, local ordinances specifying large-scale renewable energy permit requirements cannot be more restrictive than the regulations the Public Service Commission of Wisconsin (PSC) has developed for wind energy. The PSC's regulations are set forth in PSC Chapter 128: Wind Energy Systems, and include provisions addressing permit application requirements, emergency response planning, noise, and decommissioning plans and financial assurances.

Local permitting for projects between 1-100 megawatts

What can your community regulate, and where are the boundaries? To learn more about what state law does and does not allow local governments to regulate, read UW-Madison Extension's Solar Regulation Guidance for Wisconsin Counties, Cities, Villages, and Towns. If your community is interested in developing a Conditional Use Permit for large-scale solar applications, the Model Solar Zoning Ordinance provides adaptable language based on state regulations. Using the Model Solar Ordinance: A Guide for Wisconsin Communities is a webinar that

covers these two resources. Wisconsin Land+Water has also developed a number of fact sheets[9] about Wisconsin's regulatory landscape and local government's role in siting renewable energy projects.

State permitting for wind and solar projects that are 100 megawatts or larger

The Public Service Commission of Wisconsin (PSC) has siting authority for any energy-generating project that is 100 megawatts or larger. These projects must apply to the PSC for a Certificate of Public Convenience and Necessity (CPCN), based on Wisconsin Statute § 197.491(3d): Certificate of Public Convenience and Necessity. When determining whether to issue a CPCN, the PSC weighs the following factors: whether the project meets public energy needs; consideration of alternative locations and energy sources; economic, engineering, safety, reliability, and environmental impacts; and ensuring the project does not cause undue harm to ecosystems, public health, historical sites, or unreasonably interfere with land use and development plans. You can read about the Application Filing Requirements (AFRs) for all Electric Power Plant Construction Projects on the PSC's website,[10] including for wind and solar. The AFRs describe all the information that must be included in a CPCN application to the Public Service Commission of Wisconsin for energy projects 100 MW or larger. The PSC is required to complete all project reviews within one year of receiving a completed application, and most project reviews take between 6-12 months.

Wisconsin regulates wind energy projects under Chapter PSC 128 of the administrative code, which lays out statewide standards for how wind turbines can be sited and operated. These rules cover things like setbacks from homes and property lines, noise limits, shadow flicker, interference issues, and decommissioning. One of the main purposes of PSC 128 is to create consistency across the state - local governments can't pass wind ordinances that are more restrictive than PSC 128 unless they can prove there is a clear scientific or technical reason for it. The rule sets a maximum noise limit of 50 dBA (weighted decibels) at the nearest occupied building, caps shadow flicker at 20 hours per year for non-participating homes, and requires developers to provide detailed plans for siting, operations, and eventual removal of the turbines. PSC 128 is meant to balance community concerns with the state's renewable energy goals by giving everyone a clear, uniform framework to work within.

How does siting work for stand-alone battery energy storage system (BESS) projects?

Increasingly solar and wind projects will include battery energy storage systems (BESS) either co-located with solar or wind generation or sited as a stand-alone project. As with wind and solar, siting of utility-scale BESS projects under 100 MW is regulated by local governments, and BESS projects that are 100 MW or greater are sited by the PSC. The PSC has developed additional application filing requirements for energy storage systems.[11]

[9] Wisconsin Land and Water, Renewable Energy, December 2025, https://wisconsinlandwater.org/members-hub/conservation-resources/climate-resilience/renewable.
[10] Public Service Commission of Wisconsin, PSC Energy Filing Requirements, accessed March 18, 2026, https://psc.wi.gov/Pages/ServiceType/Energy/FilingRequirements.aspx.
[11] Public Service Commission of Wisconsin, Application Filing Requirements Energy Storage Projects, 2026, https://psc.wi.gov/Documents/AFR/AFR_EnergyStorage.pdf.

How can members of the public be involved in the PSC siting process?

There are multiple opportunities to get involved in the siting review process. Local government, organizations, and individuals can read the notification letter and project application, attend public information meetings and any PSC scoping meetings, submit comments to the PSC, review and comment on environmental reports, and speak at PSC public hearings.

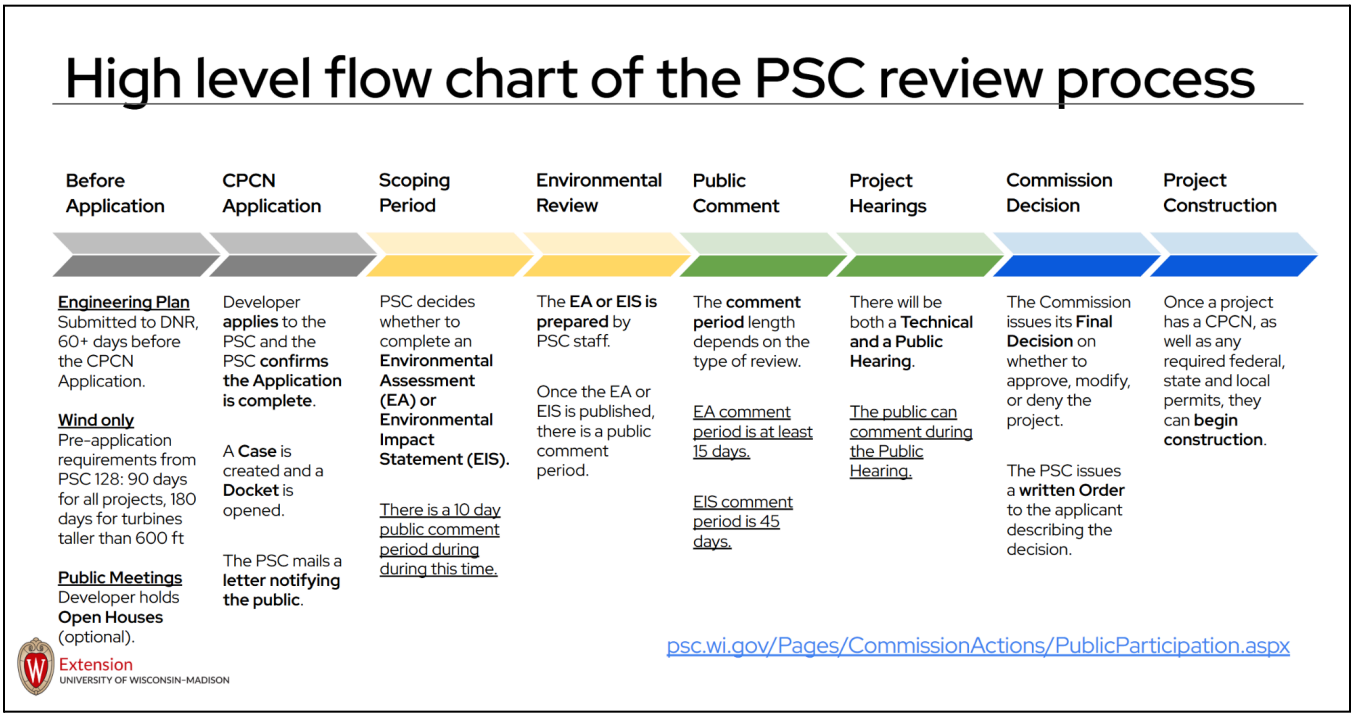

Figure 3-1 shows the steps the PSC follows to assess a Certificate of Public Convenience and Necessity application and where the public can submit comments.

There are multiple opportunities for public comment on any PSC reviewed energy generation project. See the Siting Process page on the RESET website for more information.

There is a scoping comment period of at least 10 days on all new large-scale solar projects while the PSC determines whether an Environmental Assessment is sufficient or an Environmental Impact Statement is required.

If an Environmental Assessment is deemed sufficient for project review, PSC and DNR staff will develop an EA that describes the impacts of the project. Once the PSC makes that initial decision about whether an EIS is needed, there will be a 15-day public comment period and the public can submit comments about the PSC's decision and the project's environmental impacts. PSC staff will review those comments and decide on any changes to the EA or need for a full EIS.

If an EIS is required for project review, a draft EIS will be published with a public comment period of at least 45 days. These comments will be entered into the record for consideration by the PSC commissioners. Public comments can be submitted by mail, online, or in person.

If you give public testimony, be clear about who you are, how you are connected to the case, your perspective and why you feel that way, and suggest a reasonable alternative if possible. See the PSC's page on participating

in the siting process, including requirements of a public comment and suggestions for making effective comments.[12]

What does it mean to be an intervenor in a PSC siting review process?

An intervenor is a formal party to the proceeding, and as such gets to participate in a case by submitting evidence in the form of environmental scoping or review comments, pre-filed testimony and exhibits, or testimony at technical hearings. Being an intervenor is not necessary in order to participate in public hearing and comment periods. If a municipality wants to be part of the technical hearing as well, they can as an intervenor. To intervene in a CPCN process comes with a number of rights and responsibilities. The time and financial commitment required to be an intervenor vary widely depending on the scale of the intervention's goals. More information on the process of becoming an intervenor and the associated responsibilities can be found on the PSC website.

How can comprehensive planning influence siting?

In the case of projects that are 100 MW or larger, the Public Service Commission of Wisconsin will consider local environmental, safety, and planning concerns that are set forth in comprehensive plans or ordinances, including areas identified for residential or commercial development. The comprehensive plan can also help solar and wind developers understand and address community priorities and concerns as they consider where and how to site projects.

Planning documents that are published before the project application is submitted are more likely to influence the developer's plans and the PSC. See Wisconsin Statute § 196.491(3): Certificate of public convenience and necessity[13] for more guidance.

What are Joint Development Agreements, and how can they address project concerns?

Joint Development Agreements (JDAs) are contracts that local governments negotiate with solar developers. These contracts may allow the community and solar developer to address community concerns that cannot be regulated through ordinances, either because the project is 100 MW in size or greater, or because the concerns go beyond the health, safety, and environmental provisions allowed by Wisconsin statute. These agreements can have different names, including Local Operating Agreement (LOAs) or Memorandum of Understanding (MOUs), but there is no legal distinction between these terms. If a project spans multiple jurisdictions it may be helpful for counties, towns, and villages to coordinate on contract negotiations, both to increase negotiating power and to save on costs for professional services.

Contracts may cover a wide range of topics including road use and repair, setbacks, noise restrictions, and decommissioning procedures, as well as financial assurances from the project owner. Funding can be secured to offset costs related to the renewable energy project, such as road repair, emergency services training, and other costs. Often contracts also secure conservation and environmental commitments related to land, water and wildlife.

People who oppose a solar proposal may not like the idea of signing an "agreement" with a project developer. It can be called a "contract" instead and accomplish the same things. Signing a Joint Development Agreement

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[12] Public Service Commission of Wisconsin, PSC Public Participation, accessed December 5, 2025, https://psc.wi.gov/Pages/CommissionActions/PublicParticipation.aspx.

[13] Wisconsin State Legislature. Wisconsin Statute 196.491(3): Certificate of Public Convenience and Necessity. Accessed November 1, 2025. https://docs.legis.wisconsin.gov/statutes/statutes/196/491/3.

(LOA, MOU) does not make the solar or wind project happen or not happen. Instead, it sets standards that need to be met by the developer and local governments if the project goes forward.

See Land + Water's research on solar contracts with developers,[14] developed by University of Wisconsin - Stevens Point's Center for Land Use Education (CLUE), for an in-depth look at existing agreements and best practices in Wisconsin.

Laws, Policy and Planning Leverage Points Tools for individuals and local government	Person / Landowner	Local Government
Pass an Ordinance		
Local jurisdictions with zoning authority can pass a zoning ordinance about renewable energy siting for projects under 100 megawatts that sets out certain requirements for a conditional use permit. Review Solar Regulation Guidance for Wisconsin Counties, Cities, Villages, and Towns, Model Solar Zoning Ordinance, and Chapter PSC 128: Wind Energy Systems to avoid creating legal issues for local governments. Jurisdictions with zoning authority can pass an ordinance that addresses common concerns, including reasonable permitting fees, and financial assurances for the construction and decommissioning phases of the project. Local jurisdictions without zoning authority can adopt a permitting ordinance to require developers to submit and comply with plans, provided such requirements are clear, non-arbitrary, and consistent with applicable state law.		?
Update the Comprehensive Plan		
Local jurisdictions can update their comprehensive plan to include information about preferred renewable energy siting locations and planned development that will be considered by the PSC.		?
Participate in the PSC siting review		
Participate in the PSC siting process as a member of the public.	?	?
Participate in the PSC siting process as an intervenor. See the PSC's How Construction Projects Are Approved: Power Plant Review Process	?	?
Developer Contract Negotiations		

[14] Wisconsin Land and Water, Solar Contracts Between Local Governments and Solar Developers, accessed April 24, 2026, https://wisconsinlandwater.org/members-hub/conservation-resources/climate-resilience/renewable/development-agreements.

The county may negotiate a Joint Development Agreement with provisions such as: ● Prioritizing local contractors for construction, vegetation management, and maintenance, ● Financial assurances for decommissioning, ● Funding to offset costs related to the renewable energy project, such as road repair, emergency services training, and other costs listed above, and ● A commitment to maintain utility aid payments if the state law changes.		•
Landowners can work with a knowledgeable attorney to negotiate a lease that optimizes financial benefits and addresses other concerns.	•	
Neighboring property owners may be able to negotiate Good Neighbor Agreements with the developer for visual screening, a payment, or other ways to address impacts.	•	

Want to learn more? Check out these resources.

Local Government Role in Siting Projects

- For information about the County Role in Siting Renewable Energy Projects, visit Wisconsin Land+Water's renewable energy page which has multiple fact sheets about local regulation, and information about Wisconsin's statutes.
- For information about what local jurisdictions can include in ordinances see UW-Madison Extension's Solar Regulation Guidance for Wisconsin Counties, Cities, Villages, and Towns, and the Model Solar Zoning Ordinance.

Electric Utility Resources

- PSC Interactive Service Area Maps shows service territories for electric utilities and other utilities.
- Wisconsin Electric Service Territories lists all electric service territories in Wisconsin.

Overview of the Permitting Processes

- Power Plant Review Process is an overview of the power plant review process, including a timeline.
- Overview of the PSC and DNR Permitting Process for Large Electric Generating Facilities
- Application Filing Requirements (AFRs) for all Electric Power Plant Construction Projects from the PSC.

Participating in the siting process

- The PSC's page on Public Participation in the siting process.
- Learn What to Expect at a PSC Public Hearing includes who will be in attendance and tips for speaking.
- Requirements for Public Comments describes the requirements for submitting testimony
- How to Prepare Effective Public Testimony or Public Comment offers specific suggestions.

Wisconsin Department of Natural Resources (DNR) links

- Wisconsin DNR Best Management Practices (BMPs) for Solar Energy Projects
- Wisconsin DNR Best Management Practices (BMPs) For Land-based Wind Energy Projects & Wildlife
    - Visit the Office of Energy Projects | Wisconsin DNR page, and select the appropriate tab and then to the document. dnr.wisconsin.gov/topic/Sectors/Energy.html
- DNR interactive siting map for wind identifies areas where placement of turbines may have significant adverse effects on bat and migratory bird populations.

Battery Energy Storage System (BESS) Resources

- Building a Resilient Power Future with Battery Energy Storage Systems, Center for Rural Affairs
- Battery Energy Storage Systems, American Planning Association
- Planning & Zoning for Battery Energy Storage Systems, Graham Sustainability Institute, University of Michigan
- New York State Battery Energy Storage System Guidebook, NYSERDA
- Battery Energy Storage Systems FAQ, NYSERDA

Section 4: Economics

This section includes:

- Economic impacts to local landowners, farmers, governments, and businesses,
- Information about state utility aid payments to the local governments of host communities, and
- Resources to learn more.

Economic Impacts to Landowners and Farmers

Economic impacts on landowners from solar developments depend on whether their land is included in the solar project or adjacent to it, and whether the land is residential or agricultural. During RESET's community engagement, Wisconsin residents noted there is a strong benefit of guaranteed annual income for the landowners, but they also shared concerns about the potential for landowners to sign contracts that could leave them exposed to risk, about what happens to non-participating property values, and about whether solar development may drive up land prices and make it harder for farmers to access farmland.

What should a landowner consider before signing a land lease for solar or wind?

Before a solar or wind project can be constructed, the developer must secure land to construct the project. Large-scale solar and wind projects often lease land from rural landowners and farmers. Before signing a lease, landowners may be able to negotiate for provisions that provide them protection or address concerns. After the lease is signed, it is unlikely that the project developer or operator will be willing or able to agree to new conditions.

Land leasing for energy projects can provide guaranteed income, and there are important items to consider when negotiating with a project developer. Questions include who is the developer and what is their track record, agreement length, what are payments during the permitting, construction, and operational phases, and many others. Landowners considering a lease agreement should make sure that all agreements made are documented, as verbal assurances are not enforceable. The lease should state that all responsibilities and rights will transfer to a new site operator and landowner.

UW-Madison Extension offers a guide for landowners considering leasing their land for solar projects, Learn about Solar Land Leasing Contracts, along with a companion worksheet to help document important information when meeting with developers, including common contract terms, payment structures, land use considerations, and project responsibilities.[15] Navigating Solar Land Leases for Wisconsin Landowners is a webinar on these documents. These documents are not substitutes for hiring legal counsel. Visit go.wisc.edu/solarguide for more resources on solar land leasing.

What are average annual payments for solar land leasing?

Solar lease rental payments are typically much higher than income from agricultural use, so landowners who sign a lease usually benefit financially. Solar leases typically last 25-35 years, and sometimes include escalating lease payments for inflation. Most leases include a non-disclosure clause, so exact rates are not public. However, based on conversations Extension specialists have had with landowners in 2025, annual rents in Wisconsin range from about $500 to over $1,500 per acre, depending on factors such as proximity to substations and transmission lines. In contrast, the average rental rate for agricultural use in Wisconsin was $158/acre in 2024

[15] UW-Madison Extension, "Learn about Solar Land Leasing Contracts," 2025, go.wisc.edu/solarguide.

and $183/acre in 2025.[16] Typically developers offer lower lease rates for the period when the project is in the planning and permitting stage, and the higher payments do not start until construction begins or until the project is operational.

What happens to agricultural and residential property values?

A 2025 scholarly study found that agricultural land values close to solar fields increased by an average of 19.4% compared to land values further away.[17] Farmers who rent land to grow crops or spread manure may lose farmland access and face higher rental or purchase costs for nearby farmland.

The same study found that residential properties located next to large-scale solar projects may have a temporary decline in property value. On average residential property values within a half mile of large-scale solar developments in the U.S. declined by 7.2% for up to eight years after construction of the solar facility. These declines were greatest in the northeastern US and highly variable in the Midwest, with some properties near solar sites increasing in value while others decreased.[18]

Non-participating property owners who are immediately adjacent to a solar field and have concerns about impacts to property values may be able to negotiate Good Neighbor Agreements.

What is a Good Neighbor Agreement?

Good Neighbor Agreements (GNAs) are contracts with the developer to compensate non-participating neighbors. A GNA could include vegetative screenings so the neighbor's view shed is not impacted, set-backs from the property line of panels or electrical equipment, or monetary benefits. A leasing landowner can ask the developer to negotiate a GNA with neighbors in order to reduce conflict if one is benefitting financially and the other feels inconvenienced by the land use change.

Economic Impacts to Businesses

Because economic conditions vary by region, there is not widely applicable information on how solar development may help or harm the broader business community in their county.

Economic Impacts to Local Government

How are taxes impacted by large-scale energy projects?

For most large-scale energy projects in Wisconsin, local governments receive utility aid instead of property taxes. The Wisconsin Department of Revenue distributes payment to each county and municipality that hosts tax-exempt utility property, based on the amount of energy generating capacity within each jurisdiction. For all renewable energy projects larger than 50 MW, as well as any project larger than 1 MW owned by a public utility, the total payments are $5,000 per megawatt per year, divided between local hosting governments. For example, a 100 MW project would generate $500,000 annually for the host communities. Payments start the year after

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[16] UW-Madison Extension, "Wisconsin Agricultural Land Prices 2024," Farm Management, 2025, https://farms.extension.wisc.edu/articles/wisconsin-agricultural-land-prices/; Economic Research Service, USDA, "Land Use, Land Value & Tenure - Farmland Value | Economic Research Service," 2025, https://www.ers.usda.gov/topics/farm-economy/land-use-land-value-tenure/farmland-value.

[17] Chenyang Hu et al, "Impact of Large-Scale Solar on Property Values in the United States: Diverse Effects and Causal Mechanisms," Proceedings of the National Academy of Sciences of the United States of America, June 9, 2025, https://www.pnas.org/doi/10.1073/pnas.2418414122. Salma Elmallah et al., "Shedding Light on Large-Scale Solar Impacts: An Analysis of Property Values and Proximity to Photovoltaics across Six U.S. States," Energy Policy 175 (April 2023): 113425, https://doi.org/10.1016/j.enpol.2023.113425.

[18] Ibid.

the project is operational, and continue for the life of the facility.[19] For more information see Local Property Tax Impacts of Large-Scale Wind and Solar Projects.

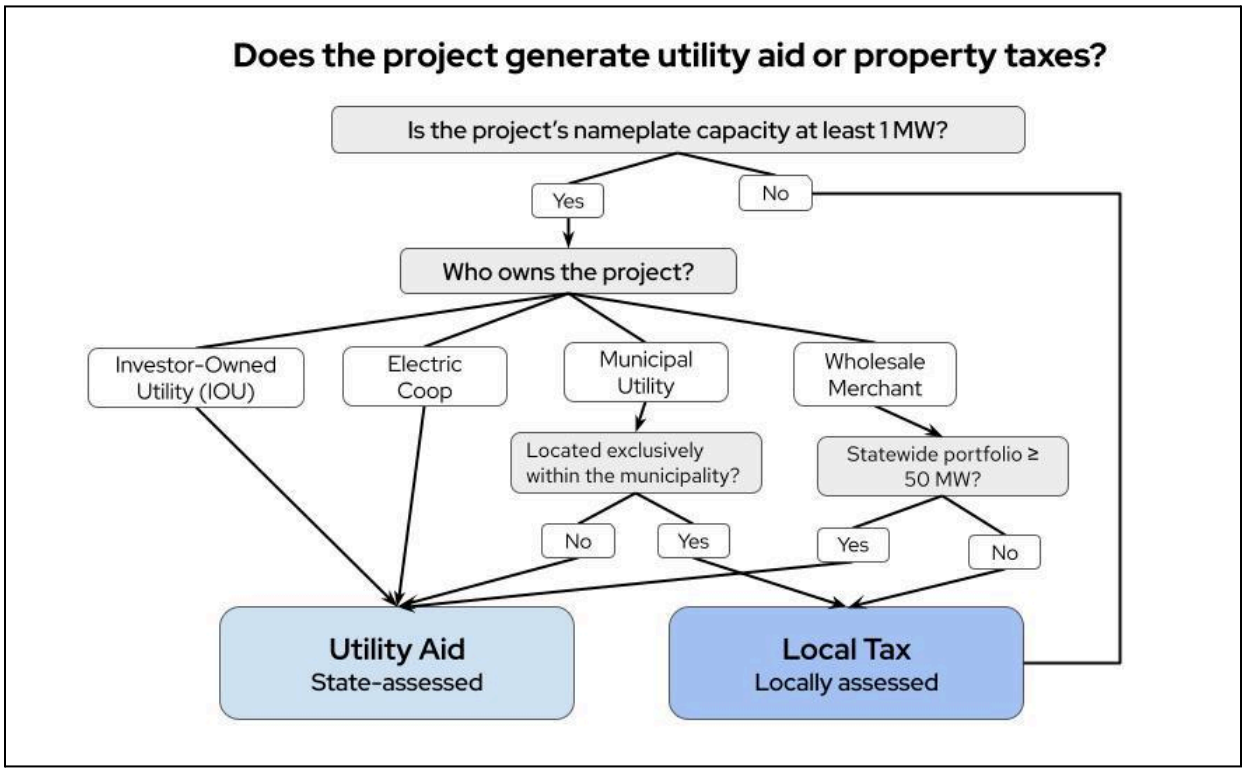

Figure 4-1: Does the project generate utility aid or property taxes?

What are possible costs to local governments?

Dealing with any large-scale development takes time and financial resources. Here is a list of some of the common items local governments might consider when planning for proposed projects:

Staff time and administrative resources

- For permitting processes (especially for projects under 100 MW that require local approval)
- Managing community engagement and addressing resident concerns throughout planning and construction
- For monitoring permit compliance

Infrastructure impacts

- Repairing or upgrading roads damaged by heavy construction traffic
- Possible wear on bridges or culverts requiring reinforcement or replacement

Legal and negotiation expenses

- Fees for attorneys and professional negotiators for developer agreements
- Drafting and reviewing contracts, easements, and compliance documents

Specialized professional services

- Engineering, environmental, and/or financial consultants to evaluate project impacts and agreements

[19] Graham Sustainability Institute, University of Michigan, Local Property Tax Impacts of Large-Scale Wind and Solar Projects, 2025, https://graham.umich.edu/project/renewable-energy-tax-impacts.

- Additional planning or zoning expertise for complex siting issues

Fiscal impacts on schools

- Loss of school district revenue from property taxes is usually addressed by the state school aid formula
- Utility aid carveouts could be used to compensate for any remaining shortfall

Other indirect or unforeseen costs

- Emergency services readiness (such as fire or EMS) for new infrastructure
- Potential costs related to decommissioning, oversight, or long-term land use changes

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Economic Leverage Points Tools for individuals and local government	Person / Landowner	Local Government
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Want to learn more? Check out these resources.

- Learn about Solar Land Leasing Contracts, UW-Madison Extension, offers a guide for landowners considering leasing their land, and a companion worksheet to help document important information when meeting with developers.
- Finding a Wisconsin Farm Lawyer, UW-Extension
- County Role in Siting Renewable Energy Projects, Wisconsin Land+Water, has several fact sheets about local authority in large-scale project siting.
- Wisconsin Policy Brief Local Property Tax Impacts of Large-Scale Wind and Solar Projects was created by the University of Michigan's Graham Institute and the Center for EmPowering Communities to help communities understand how large-scale wind and solar projects impact local property taxes and budgets.
- Utility Aid Payments for Wind and Solar Frequently Asked Questions, Clean Wisconsin
- Badger Hollow Solar Joint Development Agreement established a "Lost Revenue Program" to replace lost property tax revenue where payments will be increased annually by 2 percent.

  Solar-Contracts-Worksheet and the row labeled *Replacement of lost tax revenue to school districts and technical colleges* to see examples of negotiated agreements for payments to schools from lost property tax revenue.

Section 5: Environment

This section includes:

- Information on life cycle impacts of utility-scale solar and wind projects,
- Information on soil, water, and wildlife impacts of large-scale solar and wind projects, and
- Potential leverage points, and resources to learn more about the environment.

Wind and Solar Project Life Cycle Analysis

A life cycle analysis (LCA) evaluates the total environmental impact of an action such as solar or wind electricity generation. This analysis includes impacts from raw material mining, manufacturing, electricity generation, disposal, and recycling.

Are solar and wind net-positive or negative for the environment?

Based on a 2024 National Renewable Energy Laboratory report on utility-scale solar projects, the energy payback time (EPBT) of a solar project in Wisconsin would be roughly 0.6 years, and the carbon payback time (CPBT) would be roughly one year. This means that within the first year of operation, a solar panel generates an equal amount of energy as was used to mine materials, manufacture its components, transport it, and install it. After this payback period, all remaining energy generation is effectively net-positive.

When accounting for manufacturing and end of life disposal included, solar's total greenhouse gas emissions remain lower than nearly every other energy source, including nuclear and hydropower. During their life cycle, utility-scale solar PV systems in the U.S. generate electricity with 95% fewer greenhouse gas emissions compared to coal and roughly 90% fewer emissions than natural gas. Manufacturing energy use has fallen at least 30% due to efficiency improvements, and solar panels produce 25-35 times more energy than they consume over their lifetimes.[20] Wind performs even better than solar on life cycle analysis.[21]

Soils

How will solar projects affect soil health?

The greatest negative impacts on soil health typically occur during construction. As with any construction project, heavy equipment and soil disturbance risk compacting soils and increasing erosion.[22] There may also be negative effects on soil health at the end of the project life, as decommissioning is expected to require use of heavy equipment and soil disturbance to remove racking systems and other structures. Solar developers should work with construction contractors to keep grading and topsoil movement to a minimum. See the Wisconsin DNR's Office of Energy Projects website and navigate to the "Solar" tab to find the Best Management Practices for Solar Energy Projects for additional ways to minimize soil damage during construction.

Vegetation management is critical to restoring and maintaining soil health both during construction and site operation. Once construction is done, perennial vegetation offers multiple soil health benefits compared to annual crops because the plants protect the soil surface all year long and their living roots support soil biology

[20] National Renewable Energy Lab (NREL), An Updated Life Cycle Assessment of Utility-Scale Solar Photovoltaic Systems Installed in the United States. (2024), https://docs.nrel.gov/docs/fy24osti/87372.pdf.
[21] Science Feedback, Wind Turbines and Solar Panels Are Lower-Emissions than Fossil Fuels Overall, November 28, 2024. https://science.feedback.org/wind-turbines-solar-panels-lower-emissions-than-fossil-fuels-overall/.
[22] Great Plains Institute, Best Practices: Photovoltaic Stormwater Management Research and Testing (PV-SMaRT) (2023), https://www.nrel.gov/solar/market-research-analysis/pv-smart.

and structure year-round. The DNR's Office of Energy Projects website under the "Solar" tab contains Best Management Practices for Solar Energy Projects, which also offers guidance for vegetation establishment.

Habitat and Wildlife

What happens to existing habitat when a solar project is built?

The impact depends on the state of the land before construction. In previously cultivated areas, like crop fields, habitat can improve if native vegetation is added after construction of the solar facility. Careful siting and site management can help protect local wildlife, and designated areas of critical value for wildlife can be avoided when possible. The Nature Conservancy provides several tools to help inform these decisions. Its interactive Site Renewables Right map shows known critical wildlife areas to help support decisions around site planning.[23] The Wisconsin Renewable Opportunity Explorer, allows decision-makers to explore solar and wind opportunities and potential impacts, including community, environmental considerations, and development considerations.

Do solar farms disrupt wildlife movement or block animals like deer from passing through?

Projects can be designed to minimize disruption to wildlife movement by using measures such as permeable fencing and wildlife corridors. Permeable fencing allows small animals to pass under the fence, and corridors are unfenced spaces between areas of panels that allow larger animals to pass through.

How do solar projects impact pollinators and biodiversity?

Wisconsin's native pollinator populations have been declining, and large-scale solar projects offer an opportunity to restore habitat and promote growth by planting native vegetation.[24] Establishing perennial native plants under and between solar panels can improve habitat quality for pollinators in the Midwest by up to 300% compared to traditional row cropland. In addition, when pollinator-friendly vegetation is used, crops such as soybeans and cranberries can see higher yields and improved quality up to one mile beyond the solar site due to increased pollinator activity. When native and pollinator-friendly seed mixes are planted below and between solar panels, they also create stable habitats that support other insects, birds and other small wildlife, especially if mowing or grazing is timed to avoid disturbing nesting birds.[25]

How can researchers measure whether a solar site is supporting biodiversity?

Researchers and agencies can use tools such as pollinator scorecards[26] and pollinator counts to track the quality of the habitat over time. This tracking can help communities quantify the responses of native plants and animals when solar panels are introduced to the land, allowing for necessary adjustments.

How do wind projects affect wildlife?

Wind turbines can affect birds and bats through collision risk, habitat displacement, and disruption of movement corridors.

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[23] The Nature Conservancy,"Site Renewables Right: A Clean and Green Energy Future, July 9, 2024, https://www.nature.org/en-us/what-we-do/our-priorities/tackle-climate-change/climate-change-stories/site-wind-right/.
[24] Wisconsin Department of Natural Resources, Saving Wisconsin's Native Pollinators, accessed January 12, 2026, https://dnr.wisconsin.gov/topic/endangeredresources/pollinators
[25] Clean Wisconsin, Local Environmental Benefits of Solar Farming in Wisconsin, April 3, 2025, https://www.cleanwisconsin.org/local-environmental-benefits-of-solar-farming-in-wisconsin/.
[26] UW-Madison, Wisconsin Solar Pollinator Program, accessed January 5, 2026, https://pollinators.wisc.edu/pollinator-resources/solar/.

Birds, especially migrating species, raptors, and waterfowl, can collide with turbine blades, as well as with other infrastructure such as towers or transmission lines. The DNR best management practices for Land-based Wind Energy Projects recommend ways to reduce the above impacts, such as adjusting turbine location and height, rotor-swept area, and lighting; minimizing overhead wiring; and using bird flight diverters when necessary. The DNR identifies important bird areas, migratory concentration sites, and flyway corridors where turbines should be avoided to protect species navigating between roosting, feeding, and nesting habitats.[27]

Bats are one of the most vulnerable species to wind development, both from direct mortality and from habitat disruption. Bats are frequently struck by turbine blades, and rapid air pressure changes associated with rotating blades can also cause fatal internal injuries. The DNR Best Management Practices for Land-based Wind Energy Projects links to a map of areas to avoid when siting wind projects, and recommends avoiding bat priority areas such as hibernacula and maternity roosts. In addition, the Broad Incidental Take Permit/ Authorization for Wisconsin cave bats calls for "curtailing" turbine blades at low wind speeds during critical times, especially in proximity to hibernacula and priority roosts. Curtailing means rotating the blades so they move more slowly. This practice of curtailing blades at low wind speeds from April to September can reduce bat fatalities by more than a third, but it can also occasionally reduce electricity production.[28]

Water

How will solar projects affect water runoff and groundwater recharge?

Construction increases risk of runoff due to soil disturbance and heavy equipment compacting surface soils. Consult the Wisconsin DNR's Office of Energy Projects website under the "Solar" tab for Best Management Practices for Solar Energy Projects[29] or the Great Plains Institute's Photovoltaic Stormwater Management Research and Testing (PV-SMaRT) project[30] for best practices during construction. Projects should keep stormwater management measures in place until the site's vegetation is fully established.

Even after construction is completed, the hard surfaces of the solar panels mean that instead of rain falling evenly across the site there are areas of concentrated water hitting the soil surface below the panel edges. This changed precipitation pattern increases the risk of rainfall running off the site. However, if the site has good perennial vegetative cover such as native pollinator species or perennial forages for sheep, then the vegetated areas between the panels are expected to absorb any runoff.[31] UW-Madison is currently conducting research on the hydrological impacts of a solar array. The Wisconsin Geological and Natural History Survey is also conducting a decade-long groundwater study at the Portage Solar site to track changes in nitrate, ions, metals, and pesticides before, during, and after construction

If the land was in row crops that did not use cover crops before the solar development, then replacing those crops with perennial groundcover, especially native deep-rooted species, can reduce the likelihood of runoff and erosion, particularly between October and May.

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[27] Michael D. Whitby et al., A Decade of Curtailment Studies Demonstrates a Consistent and Effective Strategy to Reduce Bat Fatalities at Wind Turbines in North America, January 2024, https://docs.nlr.gov/docs/fy24osti/88381.pdf.
[28] Ibid.
[29] Wisconsin Department of Natural Resources, Wisconsin DNR Best Management Practices (BMPs) for Solar Energy Projects, 2025, https://dnr.wisconsin.gov/sites/default/files/topic/Sectors/Solar_BMPs_FINAL_November_2025.pdf
[30] Great Plains Institute, Best Practices: Photovoltaic Stormwater Management Research and Testing (PV-SMaRT) (2023), https://www.nrel.gov/solar/market-research-analysis/pv-smart.
[31] Chesapeake Bay Scientific and Technical Advisory Committee (STAC), Best Management Practices to Minimize Impacts of Solar Farms on Landscape Hydrology and Water Quality, January 2024, https://www.chesapeake.org/stac/wp-content/uploads/2024/01/FINAL_Report_Solar-Development_24_001-2.pdf.

Solar developers should check the site for the presence of tile and other drainage infrastructure, avoid damage to those structures, and repair them when necessary as outlined in Chapter PSC 128: Wind Energy Systems: Decommissioning (PSC 128.19) and the PSC's Solar Energy Projects Application Filing Requirements.

How will solar projects affect water quality?

The greatest risks to water quality from solar development occur during construction and decommissioning. During those phases there is a risk of erosion due to soil disturbance that can negatively affect surface water resources.

If solar development occurs on land that was previously in row crops, and if the site is planted with diverse perennial vegetation, then solar projects will likely improve water quality once construction is done. These water quality improvements are due to two factors. First, in contrast to when it was producing row crops, the land is no longer at risk for erosion in winter and early spring because it is covered in year-round vegetation. Second, some of the fertilizers and pesticides typically applied to row crops get into the surface and groundwater.[32] Once they are established, pollinator plantings and diverse pasture mixes generally do not require additional fertilizer or pesticide applications.

Intact solar panels do not leach chemicals, and they are designed to withstand most severe weather, including moderate hail.[33] Even when panels are damaged or cracked, the exposure point concentrations are still "several orders of magnitude below USEPA health screening values for soil, air, and groundwater."[34] Most modern panels also pass federal "leachate" Toxic Characteristic Leaching Procedure (TCLP) tests, meaning they are not classified as hazardous waste at the end of their lifespan.[35]

Environmental Leverage Points Tools for individuals and local government	Person / Landowner	Local Government
Comprehensive Plans		
Recommend that renewable energy development protect biodiversity by: ● Prioritizing previously cultivated lands rather than natural areas for solar projects, ● Identifying critical wildlife areas and migration routes and recommending permeable fencing and wildlife corridors to allow wildlife movement at solar projects, and not siting wind turbines in critical areas for bird and bat movement,		•

[32] Joel Stokdyk et al., "Sources and Risk Factors for Nitrate, Pathogens, and Fecal Contamination of Private Wells in Rural Southwestern Wisconsin, USA," Water Research 275 (May 2025): 123202, https://doi.org/10.1016/j.watres.2025.123202. R. Shepard, "Nitrogen and Phosphorus Management on Wisconsin Farms: Lessons Learned for Agricultural Water Quality Programs," Journal of Soil and Water Conservation 55, no. 1 (2000): 63–68, https://doi.org/10.1080/00224561.2000.12457310.
[33] North Carolina State Extension Publications, Health and Safety Impacts of Solar Photovoltaics (2026), https://cms.carolinas-dash.org/wp-content/uploads/2026/02/Health-Safety-Impacts-of-Solar-PV-Carolinas-DASH-March-2026.pdf.
[34] International Energy Agency, Human Health Risk Assessment Methods for PV Part 2 – Breakage Risks (IEA PVPS, 2019), https://iea-pvps.org/key-topics/iea-pvps-t12-15_human-health-risk-assessment-methods-for-pv-part-2/.
[35] North Carolina State Extension Publications, Health and Safety Impacts of Solar Photovoltaics (2026), https://cms.carolinas-dash.org/wp-content/uploads/2026/02/Health-Safety-Impacts-of-Solar-PV-Carolinas-DASH-March-2026.pdf.

• Planting native perennial vegetation to increase biodiversity and protect soil and water in solar projects, and • Following the DNR's Best Management Practices for Solar Energy Projects (look under the "Solar" tab) and Best Management Practices for Land-based Wind Energy Projects & Wildlife.		
Conditional use permits for projects under 100 MW		
• Require construction best management practices such as avoiding soil disturbance and use of heavy equipment when soils are wet, minimizing grading and other movement of topsoil, and monitoring compaction,[36] • Require or recommend perennial vegetation ground cover, including deep-rooted native perennial plants which offer the greatest biodiversity and soil health benefits between panel arrays and, if needed, shade-tolerant vegetation under panels where native prairie species are unlikely to thrive, • Require fencing that allows wildlife movement, in accordance with the DNR's Best Management Practices for Solar Energy Projects (look under the "Solar" tab), and • Require siting and management of wind turbines in accordance with DNR BMPs.		•

Want to learn more? Check out these resources.

Best Management Practices, Wildlife, Soil, Water, Life Cycle Assessment

- Best Management Practices (BMPs) for Solar Energy Projects (look under the "Solar" tab), Wisconsin Department of Natural Resources
- Wisconsin DNR Best Management Practices (BMPs) for Land-based Wind Energy Projects & Wildlife includes an online interactive map that identifies areas where placement of turbines may have significant adverse effects on bat and migratory bird population
- Principles of Low Impact Solar Siting and Design by The Nature Conservancy
- The Nature Conservancy Site Renewables Right Interactive Mapping Tool provides spatial information on key wildlife and conservation values that can inform siting discussions
- Energy Siting: Resources for Preliminary Siting Assessment, Renewable Energy Wildlife Institute (REWI), discusses wildlife considerations around large-scale siting
- Soil Health in Solar Development, Center for Rural Affairs
- Solar Soil Health Guide, American Farmland Trust
- Photovoltaic Stormwater Management Research and Testing (PV-SMaRT), Great Plains Institute
- An Updated Life Cycle Assessment of Utility-Scale Solar Photovoltaic Systems Installed in the United States, Natural Renewable Energy Laboratory

[36] Great Plains Institute, Best Practices: Photovoltaic Stormwater Management Research and Testing (PV-SMaRT) (2023), https://betterenergy.org/wp-content/uploads/2023/01/PV-SMaRT-Best-Practice.pdf.

Section 6: Land Use

This section includes:

- Land use and visual implications of large-scale solar development,
- Information about the potential for dual use of large-scale solar projects,
- Potential leverage points, and resources to learn more about land use.

Why not put solar on buildings, parking lots, or brownfields?

Utility-scale renewable energy projects are mostly built on farmland because it offers large parcels that are easy to connect, affordable, and ready to build.

Solar projects on buildings, parking lots, and brownfields are all viable and important for energy independence and grid resilience. However they are not able to replace utility-scale energy generation facilities because of the acreage required to generate the energy needed. Some limitations to the alternative sites are outlined below.

Buildings

Rooftop solar is an important component of sustainable electricity production, and can provide cost savings as well as environmental benefits. However, in most cases rooftop solar produces just enough electricity to meet the building's own needs, not large amounts for the wider grid. Commercial rooftop solar is usually tied to a customer's utility meter and managed through net-metering programs. Net metering policies vary by utility, and you can learn more about net metering in Wisconsin on the Public Service Commission of Wisconsin's website.[37]

Parking lots

Solar panels in parking lots are called solar car parks, and they create dual use opportunities for parking lots. There are benefits to the shade from sun or shielding from snow provided by the panels, as well as an opportunity to locate generation closer to demand and EV charging infrastructure. However, they are significantly more expensive than both rooftop and ground-mounted systems because they require extensive steel structures to elevate and support panels, concrete foundations, additional safety features for vehicle traffic, and considerations for snow loads, plowing, and maintenance. These added costs make solar car parks one of the most expensive forms of solar per kilowatt installed.

Brownfields and degraded lands

Solar on degraded lands such as closed landfills, mines, or brownfields can provide an opportunity to generate power and economic benefit from a site that is not suited for other types of land use. New York and other states have successfully developed 1-5 MW projects on degraded land, but very few exceed this size, in part because most brownfields do not occupy much acreage. In addition, these sites often require special engineering, such as ballasted racking or protective soil caps, which increases costs. Developers may also face additional permitting and environmental regulations, and these projects often need incentives or financial support to be economically viable.[38]

While these sites are valuable for community-scale solar projects, they cannot replace the land area required for utility-scale generation.

[37] Public Service Commission of Wisconsin, PSC Customer-Owned Electrical Generation: Net Metering, accessed January 6, 2026, https://psc.wi.gov/Pages/ForConsumers/MoreResources/CustomerOwnedGeneration.aspx.

[38] Center for the New Energy Economy, Brownfields to Brightfields: State Policy Models to Facilitate the Reuse of Degraded Lands for Renewable Energy, October 2024, https://hdl.handle.net/10217/240102.

Farmland

Why are large-scale solar and wind projects usually built on agricultural land?

Large-scale solar projects are most efficient and profitable on large parcels of flat land with deep soils and no trees or buildings, which means they often are sited on farmland. Large-scale wind projects also need large parcels of land to site multiple turbines with setback requirements from roads and adjacent properties.

Will solar development affect our food supply?

The Center for Land Use Education – UW Stevens Point estimated that for Wisconsin to meet its goal of net zero carbon emissions for electricity production will take between 240,000 and 340,000 acres of land for solar generation, which is roughly 3% of the land currently in field crops.[39] In comparison, Wisconsin currently grows more than 1 million acres of corn for ethanol.[40]

Wetlands

Wetlands are generally not preferred for solar projects because the soil disturbance from installing the project in a wetland setting is likely to be particularly damaging to soil and water quality. In addition, construction and vegetation management are likely to be more expensive in a wetland setting. Significant portions of Wisconsin's wetland have already been converted to agricultural and other uses. This has led to many wetlands considered a protected habitat type by the DNR and would require additional DNR permits to build in wetlands or waterways.[41]

Visual Landscape

How can visual impacts be minimized?

There are ways to reduce changes to the viewshed. Developers often plant trees and shrubs around solar projects to reduce visibility of the project from neighboring properties. Evergreen trees can block views of the panels even in winter, and a mix of native evergreen and flowering trees and shrubs can provide habitat for wildlife as well as screening the solar facility. Other practices that can improve the aesthetics of solar facilities include planting the site with native flowering plants, sheep grazing, placing unattractive equipment such as inverters in the center of the site, and minimizing areas of bare soil such as roads and staging areas.

Dual Use Solar: Agrivoltaics and Pollinator Plantings

Large-scale solar projects have the possibility of supporting additional beneficial uses during the life of the solar installation. These other uses are usually either certain agricultural uses or establishment of diverse native species that support beneficial insects such as native bees and butterflies, as well as other small animals. In general, this strategy is called dual use, and when the second land use is agricultural it is also called "agrivoltaics" - a combination of agriculture and solar photovoltaics.

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[39] Center for Land Use Education, UW-Stevens Point, Utility-Scale Solar Suitability Modeling, 2022, https://storymaps.arcgis.com/stories/532f59d04047449d920c068f99bb9d2b.
[40] Clean Wisconsin, Corn Ethanol vs. Solar Land Use Comparison, March 2023, https://www.cleanwisconsin.org/corn-ethanol-vs-solar-land-use-comparison/.
[41] Office of Energy Projects | Wisconsin DNR, accessed April 16, 2026, https://dnr.wisconsin.gov/topic/Sectors/Energy.html.

What types of agrivoltaics work in Wisconsin?

There are agrivoltaics projects that integrate solar power generation with a wide range of crops, from vegetables to grains to livestock.[42] The type of agrivoltaics with the best financial viability in Wisconsin is sheep grazing.[43]

Sheep grazing, also known as solar grazing, has the following advantages to developers:

- Sheep are small enough that they do not damage the panels, and can easily graze under them,
- The vegetation they graze protects the soil year-round, unlike annual crops such as vegetables or grains,
- The grazing keeps the vegetation low so it does not shade the panels or interfere with airflow,
- As a result, the farmer can get paid by the solar operator for managing the vegetation,
- The panels can provide shade for the sheep in hot weather, and
- Solar sites have good perimeter fences that will keep the sheep in and may help keep out predators.[44]

In 2024 the US imported 73% of the lamb consumed, so there is potential for increased domestic production.[45]

Production of alfalfa and other forages on agrivoltaic sites is likely to be both economically and technically feasible, and would integrate well with the existing dairy sector in Wisconsin. There is ongoing research to assess the potential for cattle to graze under and between solar panels, frequently called, "cattlevoltaics." Some of the challenges to scaling cattlevoltaics from a technical standpoint includes raising the panels high enough to avoid animal interaction and the economic feasibility of constructing systems to accommodate large livestock like cattle. All forms of agrivoltaics practice requires planning and accommodation on the part of both solar site operators and farmers, such as the use of small equipment.[46]

Pollinator plantings

Many solar project operators plant a diverse mix of native grasses and flowering plants to hold the soil in place and provide environmental benefits. While the seed is more expensive and is likely to require more management than turf grass for the first few years, the additional costs are not prohibitive, and the ecological benefits are significant.[47]

While these plantings are not an agricultural crop, the pollinators and other beneficial insects supported by diverse native vegetation can benefit nearby agricultural crops.[48]

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[42] National Renewable Energy Lab (NREL), The 5 Cs of Agrivoltaic Success Factors in the United States: Lessons From the InSPIRE Research Study, August 2022, www.agrisolarclearinghouse.org/the-5-cs-of-agrivoltaic-success-factors-in-the-united-states-lessons-from-the-inspire-research-study.
[43] Institute for Energy Economics and Financial Analysis, Agrivoltaics: An Economic Option for Farmers and Rural Development, November 2025, https://ieefa.org/resources/agrivoltaics-economic-option-farmers-and-rural-development
[44] UW-Madison Extension, Solar Grazing Checklist, 2026, https://go.wisc.edu/solargrazing.
[45] American Sheep Industry Association, Overview of Lamb and Mutton Imports, March 2025, https://www.sheepusa.org/wp-content/uploads/2025/03/ASI-Trade-One-Pager-on-Lamb-and-Mutton-Imports-final.pdf.
[46] Ohio State University Extension, Farm Energy Management | Energize Ohio, accessed December 1, 2025, https://energizeohio.osu.edu/farm-energy-management.
[47] Wisconsin Department of Natural Resources, Wisconsin DNR Best Management Practices (BMPs) for Solar Energy Projects, Office of Energy Projects, 2025, https://dnr.wisconsin.gov/topic/Sectors/Energy.html.
[48] Environmental Science & Technology, Examining the Potential for Agricultural Benefits from Pollinator Habitat at Solar Facilities in the United States, 2018, https://pubs.acs.org/doi/10.1021/acs.est.8b00020.

Land Use Leverage Points

Tools for individuals and local government

	Person / Landowner	Local Government
Alternative Locations		
Identify areas in the comprehensive plan, such as closed landfills and mines, that the community would like to prioritize for renewable energy generation.		•
Agrivoltaics or Pollinator Plantings (dual use)		
Include provisions in the lease allowing agrivoltaics and/or requiring maintenance of key agricultural infrastructure such as wells.	•	
Include language in your comprehensive plan encouraging dual use of solar sites or following DNR best management practices for vegetation on solar sites.		•
Include a provision allowing dual use in Joint Development Agreements (JDAs).		•
Require following DNR best management practices for vegetation in an ordinance or as part of conditional use permits for projects under 100MW. See the Wisconsin Department of Natural Resources' Office of Energy Projects website and look under the "Solar" tab for Best Management Practices (BMPs) for Solar Energy Projects, pages 6-7.		•
Require consideration of agrivoltaics in an ordinance as part of conditional use permits for projects under 100MW. See the Model Solar Zoning Ordinance for possible language.		•
Visual Impacts		
Negotiate practices with developers to minimize visual impacts as part of contracts, including JDAs, Good Neighbor Agreements, and individual landowner leases.	•	•
The comprehensive plan can recommend screening and siting practices to reduce visual impacts from energy facilities.		•

Want to learn more? Check out these resources.

Agrivoltaics and Pollinator Plantings (dual use)

- Solar Grazing Checklist for Farmers and Solar Site Managers, UW-Madison Extension
- Solar Grazing Best Management Practices, American Solar Grazing Association
- Agrivoltaics, Center for Rural Affairs

- Agrivoltaics: An economic option for farmers and rural development, Institute for Energy Economics and Financial Analysis
- Pollinator Habitat Aligned with Solar Energy (PHASE) Toolkits and implementation manuals
- Honey Bee Health Coalition Guidelines for Developing Pollinator-Friendly Utility-Scale Solar Projects

Alternative sites

- Community Planning for Solar: Conducting a Solar Resource and Infrastructure Assessment, pages 38-42, UMass Amherst Clean Energy Extension
- Developing Solutions for Brownfield Renewable Energy in Michigan, University of Michigan
- Brownfields to Brightfields: State Policy Models to Facilitate the Reuse of Degraded Lands for Renewable Energy, Colorado State University Center for the New Energy Economy

Section 7: Decommissioning

This section includes:

- Information about the physical and financial aspects of solar and wind project decommissioning, and
- Decommissioning leverage points, and resources to learn more about best practices.

What happens at the end of a large-scale solar project's life?

Most land-leasing agreements for large-scale solar projects run 25–35 years, often with an optional 10-year extension. When the contract ends, two outcomes are possible, repowering or decommissioning. Repowering means replacing solar panels while reusing existing infrastructure such as racking and cabling. Decommissioning involves removing equipment and restoring the site for agriculture or other uses. Estimated decommissioning costs range from $21,700 to $56,300 per megawatt, though costs may change over time depending on labor, recycling availability, and inflation.[49]

When submitting a project application to the PSC, applicants for solar energy projects are asked to describe how the facility will be decommissioned at the end of its lifespan, expected timelines and actions required to perform decommissioning, and whether participating landowners could ever be deemed responsible for decommissioning costs in any situation. (See "State permitting for projects 100 megawatts or larger" for more information.)

Who is responsible for decommissioning?

Wind energy rules in PSC 128.19: Decommissioning[50] require wind developers to remove infrastructure and restore land for farming. While written for wind systems, these standards are often used as a reference for solar projects as well. Although Wisconsin law does not explicitly name responsible parties for solar projects, responsibility generally falls to the developer or site operator. The PSC requires a decommissioning plan in their Solar Application Filing Requirements, and communities often include decommissioning standards in their Joint Development Agreements.

Can solar panels and equipment be recycled?

Because most solar facilities are still within their operating life, large-scale decommissioning is only beginning to occur in the United States. While recycling has historically been more expensive than landfilling, costs are declining. Parts like aluminum frames, wiring, and clean glass can be easily recycled. Specialized recycling facilities are required for silver, copper, or silicon wafers. Although solar panels contain small quantities of potentially hazardous components including lead, cadmium, or other metals,[51] most solar panels pass federal tests and are not classified as hazardous waste at the end of their lifespan.[52]

[49] Center For Rural Affairs, Decommissioning Solar Energy Systems Resource Guide, June 2022, https://www.cfra.org/decommissioning-solar-energy-systems.
[50] Wisconsin State Legislature, Wisconsin Statute 196.378(4g)(b): Wind Energy Systems, accessed November 1, 2025, https://docs.legis.wisconsin.gov/document/statutes/196.378(4g)(b).
[51] Center For Rural Affairs, Decommissioning Solar Energy Systems Resource Guide, June 2022, https://www.cfra.org/decommissioning-solar-energy-systems.
[52] North Carolina State Extension Publications, Health and Safety Impacts of Solar Photovoltaics (2026), https://cms.carolinas-dash.org/wp-content/uploads/2026/02/Health-Safety-Impacts-of-Solar-PV-Carolinas-DASH-March-2026.pdf.

The Department of Natural Resources has a guidance document Managing Used Solar Panels and Components.[53] The US Environmental Protection Agency has information about Solar Panel Recycling,[54] and the Solar Energy Industries Association has an informational hub SolarRecycle.org[55] with information on topics like expanding recycling, material recovery, and manufacturer take-back options.

Can the land be farmed again after a project is decommissioned?

Applications for projects larger than 100 megawatts are required to submit plans to minimize the impact on the long-term agricultural potential of the site, including practices to minimize damage to soils and tile drainage, and plans to restore the site.[56]

Are there financial protections if the project owner goes bankrupt?

For wind energy systems, PSC 128.19(3)(b) allows local governments to require bonds, escrow accounts, or letters of credit to ensure decommissioning funds are available. Communities often apply the same approach to solar projects and this has often been done through a Joint Development Agreement or is described in the project's application.

For projects under 100 MW, local governments can require a plan for decommissioning and financial assurance for utility-scale renewable projects through ordinances or permitting as part of a conditional use permit (CUP).

A complete decommissioning plan typically includes:

- How equipment will be dismantled and removed,
- How materials will be reused, recycled, or disposed,
- How land will be restored to preconstruction condition,
- Estimated decommissioning costs,
- If financial assurance is provided, and how, and
- Transfer of decommissioning obligations to any new project owner.

Types of financial assurance:

- Letter of credit,
- Performance bond,
- Escrow account, or
- Other approved mechanisms.

It is important to specify within the ordinance that the decommissioning plan and responsibility must be transferred to any new owner of the project. The only exception is that public utilities regulated by the PSC are not required to provide separate financial assurance.

For solar projects 100 MW or larger, developers must meet the PSC's Solar Energy Projects Application Filing Requirements,[57] which include:

- Demonstrating how land will be restored to agricultural use,
- Describing equipment removal and material disposal, and

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[53] Wisconsin Department of Natural Resources, Managing Used Solar Panels and Components: Guidance for Solar Panel Collection, Storage, Transportation, Recycling and Disposal (WA-2038), 2024, https://dnr.wisconsin.gov/topic/Waste/HWResources.html.
[54] US EPA, Solar Panel Recycling, Guidance (OMB), August 23, 2021, https://www.epa.gov/hw/solar-panel-recycling.
[55] Solar Energy Industries Association (SEIA), Circular Economy, SEIA, accessed January 6, 2026, https://seia.org/initiatives/circular-economy/.
[56] Public Service Commission of Wisconsin and the Wisconsin Department of Natural Resources, Solar Energy Projects Application Filing Requirements, 2022, https://psc.wi.gov/SiteAssets/2022SolarPowerAFR.pdf.
[57] Public Service Commission of Wisconsin and the Wisconsin Department of Natural Resources, Solar Energy Projects Application Filing Requirements, 2022, https://psc.wi.gov/SiteAssets/2022SolarPowerAFR.pdf.

- Providing decommissioning cost estimates.

Local jurisdictions may also negotiate Joint Development Agreements, which can include financial assurance provisions. For examples of Joint Development Agreements for solar energy facilities that included decommissioning standards refer to Solar Contracts Worksheet (Row 9), and refer to Land+Water's page on Solar Contracts.

Landowners

Landowners who lease their land for solar projects of any size may include decommissioning and land restoration requirements directly in their lease agreements. This can include specified restoration standards, required financial protections, and transferrable obligations if the project is sold.

Decommissioning Leverage Points Tools for individuals and local government	Person / Landowner	Local Government
Under 100 MW		
Require a plan for decommissioning and appropriate financial assurance from developers to cover project decommissioning costs as part of conditional use permits. Note: Financial assurance can be in the form of bonds, letters of credit, or escrow accounts (Chapter PSC 128.19(3)(b): Wind Energy Systems)		•
Communities may require developers to follow Wisconsin DNR guidance on recycling and disposal standards for solar equipment as part of conditional use permits for large-scale renewable energy projects under 100 MW.		•
100 MW and Larger		
Local jurisdictions may negotiate Joint Development Agreements with developers that include financial assurance provisions for decommissioning.		•
Any Project		
Negotiate land lease provisions to: • Require restoration of soils and drainage tile • Guarantee decommissioning • Set timelines by which decommissioning funds must be secured • Specify financial protections if the project is sold or the developer goes bankrupt Note: Learn about Solar Land Leasing Contracts for additional guidance.	•	

Want to learn more? Check out these resources.

- Managing Used Solar Panels and Components: Guidance on testing, hazardous waste rules, collection, transport, storage, and disposal, Wisconsin Department of Natural Resources
- Chapter PSC 128: Wind Energy Systems: Decommissioning (PSC 128.19), Wisconsin State Legislature
- Decommissioning Solar Energy Systems Resource Guide from the Center for Rural Affairs
- Decommissioning Wind Energy Systems Resource Guide from the Center for Rural Affairs
- Recycling Wind Energy Systems in the United States Part 1: Providing a Baseline for America's Wind Energy Recycling Infrastructure for Wind Turbines and Systems, U.S. Department of Energy
- Wind Energy End-of-Service Guide, U.S. Department of Energy
- Fact Sheet: Decommissioning Wind and Solar Energy Systems from the Center for Rural Affairs
- Town of Lyndon Decommissioning Plan includes decommissioning steps and financial assurances
- Solar Energy Technologies Office Photovoltaics End-of-Life Action Plan. U.S. Department of Energy, Office of Energy Efficiency & Renewable Technology, March 2022.
- The US Environmental Protection Agency has information about Solar Panel Recycling
- National Laboratory of the Rockies Research Papers
    - Best Practices at the End of the Photovoltaic System Performance Period
    - Solar Photovoltaic Module Recycling: A survey of U.S. Policies and Initiatives
    - A Circular Economy for Solar Photovoltaic System Materials

Section 8: Health & Safety

This section includes:

- Health and safety information about large-scale solar projects and battery energy storage systems (BESS),
- Federal regulations around fires and toxins, and
- Potential leverage points, and resources to learn more about health and safety.

Fires

What are the fire risks and regulations with photovoltaic (PV) solar panels?

Solar panel fires are rare. Most fire concerns stem from electrical components like wiring, connectors, and inverters, rather than the panels themselves. Codes and regulations can help manage these risks through design and installation standards.

Wisconsin follows NFPA 70, also known as the National Electrical Code (NEC).[58] The NEC protects people and property from electrical hazards through proper inspection and installation. Sections 690 and 691 outline the requirements for the safe design and installation of PV systems.

How can local emergency responders prepare for solar (PV) related fires?

Firefighters can prepare by completing solar-specific trainings like Solar PV Safety from the International Association of Fire Fighters,[59] which uses online simulations to teach crews how to handle PV-related incidents.

Local governments can also negotiate with developers during the permitting process for additional emergency services training and equipment.

What are the fire risks and regulations with battery energy storage systems (BESS) ?

While the PSC regulations refer to Energy Storage Systems (ESS) more broadly, this section focuses specifically on Battery Energy Storage Systems (BESS). While the risk is low, battery energy storage systems (BESS) pose a higher risk than solar panels. This is why BESS are subject to stricter standards for design and maintenance. The primary concern is thermal runaway, which occurs when a battery cell generates uncontrollable heat. Modern codes require specific gaps between battery units to prevent a fire in one cell from spreading to others.

The Energy Storage in Local Zoning Ordinances report includes an overview of codes and standards

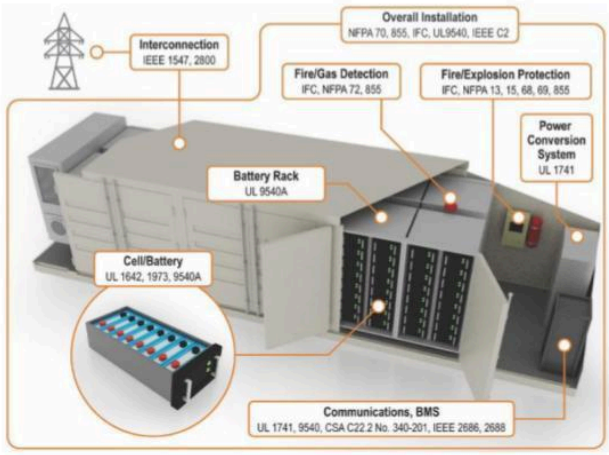

Figure 8-1: Overview of Codes and Standards for Battery Energy Storage Systems

[58] National Fire Protection Association, NFPA 70, National Electrical Code (NEC) (2026), 2026, https://www.nfpa.org/product/nfpa-70-national-electrical-code-nec/p0070code.
[59] Solar PV Safety Training, April 6, 2020, https://www.iaff.org/solar-pv-safety/.

that apply to BESS projects, as well as a survey of local zoning ordinances (Figure 8-1).[60]

The current Wisconsin legislation follows the 2021 International Fire Code (IFC), which includes references to NFPA 855,[61] the standard for installation and fire suppression in energy storage. As part of the permitting and approval process, developers are usually responsible for showing how their projects will adhere to these standards. Because battery energy storage is a relatively new practice, local jurisdictions may choose to adopt the 2026 update of NFPA 855, which is more comprehensive than earlier versions. The PSC published Application Filing Requirements (AFRs) for energy storage systems,[62] including battery storage systems over specified cost thresholds.

How can local emergency responders prepare for BESS-related fires?

Wisconsin does not currently mandate BESS-specific training statewide. However, NFPA 855 recommends that local departments:

- Coordinate emergency operation plans with developers,
- Conduct pre-incident planning to understand shutdown procedures,
- Develop strategies to mitigate harm to personnel and prevent total system loss, and
- Focus fire strategies on containment rather than suppression.

Toxins

What toxic materials are in solar panels, and are they a health risk?

Solar panels do not pose meaningful toxicity risks to human health. The lead in crystalline silicon modules (the majority of solar panels in production) is less than 0.1%, and the cadmium and tellurium in Cadmium telluride modules is also less than 0.1%.[63]

In addition to being small amounts, solar panels have an annual breakage rate of ~0.04%. When panels are damaged or cracked, the exposure point concentrations are still “several orders of magnitude below USEPA health screening values for soil, air, and groundwater.”[64] Most modern panels also pass federal "leachate" Toxic Characteristic Leaching Procedure (TCLP) tests, meaning they are not classified as hazardous waste at the end of their lifespan.[65] Studies have also shown that typical solar panels also do not pose a PFAS risk.[66]

What toxins are in batteries, and are they a health risk?

Lithium-ion batteries can release a wide range of hazardous materials into the air if a fire occurs, similar to other residential or commercial fires. Strict adherence to fire safety codes like UL 9540 (the testing standard for BESS)

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[60] Pacific Northwest National Laboratory, Energy Storage in Local Zoning Ordinances, Pacific Northwest National Laboratory, November 2023, https://www.pnnl.gov/publications/energy-storage-local-zoning-ordinances.
[61] National Fire Protection Association, NFPA 855: Standard for the Installation of Stationary Energy Storage Systems, 2026, https://www.nfpa.org/codes-and-standards/nfpa-855-standard-development/855.
[62] Public Service Commission of Wisconsin, PSC Energy Filing Requirements, accessed August 17, 2026, https://psc.wi.gov/Pages/ServiceType/Energy/FilingRequirements.aspx.
[63] National Renewable Energy Laboratory (NREL), Unfounded Concerns about Photovoltaic Module Toxicity and Waste Are Slowing Decarbonization, Nature Physics 19, no. 10 (2023): 1376–78, https://doi.org/10.1038/s41567-023-02230-0.
[64] International Energy Agency, Human Health Risk Assessment Methods for PV Part 2 – Breakage Risks (IEA PVPS, 2019), https://iea-pvps.org/key-topics/iea-pvps-t12-15_human-health-risk-assessment-methods-for-pv-part-2/.
[65] North Carolina State Extension Publications, Health and Safety Impacts of Solar Photovoltaics (2026), https://cms.carolinas-dash.org/wp-content/uploads/2026/02/Health-Safety-Impacts-of-Solar-PV-Carolinas-DASH-March-2026.pdf.
[66] Preeti Nain and Annick Anctil, “Do Solar Panels Contain PFAS?,” MRS Energy & Sustainability, April 2026, https://link.springer.com/article/10.1557/s43581-026-00156-7.

is the best way to prevent these chemical releases. For more information about BESS fires, see NYSERDA's Battery Energy Storage Systems FAQ.[67]

Stray Voltage

Is stray voltage a concern, and how is it prevented?

Stray voltage is a low-level electrical discharge from grounded metal objects. The Public Service Commission of Wisconsin (PSC) has a stray voltage testing protocol, and they require developers of projects 100 MW or larger to "discuss any plans to conduct stray voltage testing pre- and post-construction" in their Solar Energy Projects Application Filing Requirements. While stray voltage can affect livestock, solar projects do not create stray voltage when correctly constructed. NEC 690 is the wiring and grounding standard that is designed to eliminate this risk.

Extreme Weather Events

Does extreme weather damage solar panels, and who pays for repairs?

Solar panels are built and tested to withstand major weather events including storms, hail, and snow. Hail damage is the largest extreme weather risk and cost to plant operators, and a combination of thinner panel designs and more extreme weather events are increasing the annual damage rates.[68]
The equipment owner is usually financially responsible for repairs and carries insurance for these risks. Landowners should ensure their lease agreements clearly state that they are not liable for weather damage to the system, and include any site cleanup requirements.

Health and Safety Leverage Points Tools for individuals and local government	Person / Landowner	Local Government
Toxins		
Require battery systems to be NFPA 855 compliant to prevent fires and chemical leaks as part of a conditional use permit. Consider adopting the 2026 version.		•
Emergency response training		
Coordinate with local Emergency Management Services on emergency response training, especially for battery energy storage systems (BESS). Payment for this training can be included as part of a Joint Development Agreement.		•

[67] NYSERDA, Battery Energy Storage System-FAQ, 2025, https://www.nyserda.ny.gov/-/media/Project/Nyserda/Files/Programs/Clean-Energy-Siting/Battery-Energy-Storage-System-FAQ.pdf.
[68] kWh Analytics, Solar Risk Assessment (2024), https://kwhanalytics.com/wp-content/uploads/2025/02/Solar-Risk-Assessment-2024-1.pdf.

Want to learn more? Check out these resources.

Fires

- The Alliant Energy Battery Energy Storage System Wood County Solar Project provides breakdown information of what Alliant Energy did to ensure safety for their BESS in Wood County.
- NC Clean Energy Technology Center Health and Safety Impacts of Solar Photovoltaics 2026 is a general source on the health and safety impacts of solar projects.
- Assessment of Potential Impacts of Fires at BESS Facilities, Clean Power

Toxins

- NREL Unfounded concerns about photovoltaic module toxicity and waste compares waste generated by PV to other energy sources.

Stray Voltage

- The PSC's website has information about stray voltage, including Wisconsin's policies, procedures, and testing protocol.

Extreme Weather Events

- Severe Weather Resilience Solar PV System Design

  The USDOE provides a guide on how to best prepare for severe weather, and includes an interactive National Risk Index map to determine the highest weather risks associated with the construction site. From there, the website recommends technical specifications to include in contracts and solicitations.
- NRL Preparing Solar Photovoltaic Systems Against Storms Factsheet

  A storm-preparation checklist that aims to increase the chances that solar PVs will be able to survive major storms.

Section 9: Leverage Points

This section includes:

- A summary of types of action local governments, individuals, and groups can take to engage with large scale renewable energy siting.

As covered in previous sections of the report, residents have identified many potential benefits and costs associated with large scale solar energy. This section will discuss possible leverage points, or ways communities and individuals may be able to influence the siting and design of large-scale renewable energy projects so they better align with community values and needs, maximize benefits, and minimize negative impacts.

Before seeking to pass regulations or negotiate with a developer, it is important for a community to have a good understanding of local questions, concerns, and goals for renewable energy. This report summarizes the input received from Vernon, Taylor, and Green County residents and leaders during the community engagement process conducted in 2025-2026, and the full list of comments can be found in each county report.

This input provides a good starting point for action that local government or individuals might take regarding siting of large-scale solar projects.

These actions fall into four categories:

- providing comments during the Public Service Commission of Wisconsin (PSC) review process for projects 100 MW or greater;
- passing an ordinance outlining requirements for a conditional use permit for utility-scale solar projects up to 100 MW;
- updating the comprehensive plan to identify areas slated for residential or commercial development, areas of critical habitat, and areas suitable for solar or wind development; and
- negotiating contracts with solar or wind developers, including land leases and Joint Development Agreements or other memoranda of understanding.

Section 3, Laws, Policy, and Planning, outlines the process and considerations for providing comments to the PSC. Ordinances, comprehensive plans, and contracts are discussed below.

Ordinances

Under Wisconsin Statute § 66.0401: Regulation relating to solar and wind energy systems, local governments (counties, towns, cities and villages) may not place any restriction on the installation or use of solar or wind energy systems unless the restriction:

- serves to preserve or protect public health or safety,
- does not significantly increase system cost or efficiency, or
- allows for an alternative system of comparable cost and efficiency.

Thus, local governments may not prohibit solar projects.[69] See Solar Regulation Guidance for Wisconsin Counties, Cities, Villages, and Towns[70] for more information on what can and cannot be legally included in a local ordinance.

[69] Wisconsin State Legislature, Wisconsin Statute 66.0401: Regulation Relating to Solar and Wind Energy Systems, accessed November 1, 2025, https://docs.legis.wisconsin.gov/statutes/statutes/66/iv/0401.

[70] UW-Madison Extension. 2026. Solar Regulation Guidance for Wisconsin Counties, Cities, Villages, and Towns. https://economicdevelopment.extension.wisc.edu/reset/local-government-actions/.

However, counties, cities, villages, and towns can adopt a zoning ordinance addressing large-scale solar energy that is aligned with Wisconsin Statute Section § 66.0401(1m). A zoning ordinance can include conditional use permit application requirements for large-scale solar projects such as describing construction best management practices (BMPs), traffic plans, monitoring, screening, setback, and vegetation management plans; Emergency Management Services and fire department access; and appropriate financial assurances for decommissioning. By law, conditional use permit requirements must be supported by substantial evidence.

Many counties and towns do not currently have county zoning. If the county chooses to adopt zoning under Wis. Stat. § 59.69, it can regulate certain renewable-energy projects under 100 MW through a zoning or permitting ordinance, including conditional use permits, but only within the limits of Wis. Stat. §§ 66.0401 and 66.0403. Projects 100 MW or larger are sited exclusively by the Public Service Commission, and county zoning cannot approve, deny, or condition them.
If a county does not adopt zoning, towns may independently adopt zoning after town electors authorize village powers, but towns are still subject to the same state law limits. Cities and villages possess independent zoning authority by statute and are not subject to county zoning ordinances. However, they too must comply with the limits noted above. UW-Extension's Model Solar Zoning Ordinance offers example language local governments may draw from for guidance. The model ordinance is written to comply with state statutes and relevant court decisions and does not expand local regulatory authority beyond those limits.

Comprehensive Plans

The Public Service Commission of Wisconsin will consider local environmental, safety, and planning concerns that are set forth in comprehensive plans or ordinances, including areas identified for residential or commercial development. The comprehensive plan can also help solar and wind developers understand and address community priorities and concerns as they consider where and how to site projects.

Planning documents that are published before the project application is submitted are more likely to influence the developer's plans and the PSC. See Wisconsin Statute § 196.491(3): Certificate of public convenience and necessity[71] for more guidance.

Additional Contracts

While the ability of a community to regulate utility scale renewable energy is limited by Wisconsin state law, local government, community organizations, and landowners can negotiate with renewable energy developers before their projects are permitted for special provisions that address local concerns. Developers may be willing to accommodate reasonable requests to build good will in the community or simply in order to gain access to land.

What kind of contracts exist around large-scale solar projects?

Landowners, including farmers, can negotiate special provisions in land leases with developers.

Local governments can negotiate directly with a solar developer for a contract in which the developer agrees to meet specific standards, providing greater certainty for the local governments and developers about how the project will unfold if built. See "What are Joint Development Agreements" below.

Nonprofit and other community organizations may be able to negotiate Community Benefit Agreements (CBAs) with renewable energy developers.

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[71] Wisconsin State Legislature. Wisconsin Statute 196.491(3): Certificate of Public Convenience and Necessity. Accessed November 1, 2025. https://docs.legis.wisconsin.gov/statutes/statutes/196/491/3.

What should a landowner consider before signing a land lease for solar or wind?

Before a solar or wind project can be constructed, the developer must secure the land. Large-scale solar and wind projects often lease land from rural landowners and farmers. Before signing a lease, landowners may be able to negotiate for provisions that provide them protection or address concerns. After the lease is signed it is unlikely that the project developer or operator will be willing or able to agree to new conditions.

Land leasing for energy projects can provide guaranteed income, but there are important items to consider when negotiating with a project developer. Questions include who is the developer and what is their track record, agreement length, what are payments during the permitting, construction, and operational phases, and many others. Make sure all agreements are documented in the lease.

UW-Madison Extension offers a guide for landowners considering leasing their land for solar projects, Learn about Solar Land Leasing Contracts, along with a companion worksheet to help document important information when meeting with developers.[72] These documents are not substitutes for hiring legal counsel.

What is a Good Neighbor Agreement, and why is it important?

Good Neighbor Agreements can be requested by landowners participating in leasing to compensate non-participating neighbors. These could include vegetative screenings so the neighbor's view shed is not impacted, set-backs from the property line of panels or electrical equipment, or monetary benefits. This can help neighbors avoid conflict if one is benefitting financially and the other feels inconvenienced by the land use change.

What are Joint Development Agreements?

Joint Development Agreements (JDAs) are contracts that local governments negotiate with solar developers. These contracts may allow the community and solar developer to address community concerns that cannot be regulated through ordinances, either because the project is 100 MW in size or greater, or because the concerns go beyond the health, safety, and environmental provisions allowed by Wisconsin statute. These agreements can have different names, including Local Operating Agreement (LOAs) or Memorandum of Understanding (MOUs), but there is no legal distinction between these terms. If a project spans multiple jurisdictions it may be helpful for counties, towns, and villages to coordinate on contract negotiations, both to increase negotiating power and to save on costs for professional services.

Contracts may cover a wide range of topics including road use and repair, setbacks, noise restrictions, and decommissioning procedures, as well as financial assurances from the project owner. Often contracts also secure conservation and environmental commitments related to land, water and wildlife.

People who oppose a solar proposal may not like the idea of signing an "agreement" with a project developer. It can be called a "contract" instead and accomplish the same things. Signing a contract or agreement does not make the solar or wind project happen or not happen. It does set standards that need to be met by the developer and local governments if the project goes forward.

See Land + Water's research on solar contracts with developers,[73] developed by University of Wisconsin - Stevens Point's Center for Land Use Education (CLUE), for an in-depth look at existing agreements and best practices in Wisconsin.

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[72] UW-Madison Extension, "Learn about Solar Land Leasing Contracts," 2025, https://go.wisc.edu/solarguide.

[73] Wisconsin Land and Water, Solar Contracts Between Local Governments and Solar Developers, accessed April 24, 2026, https://wisconsinlandwater.org/members-hub/conservation-resources/climate-resilience/renewable/development-agreements.

Want to learn more? Check out these resources.

- Supporting Community-Centered Solar Development: A Guide to Hosting Community Conversations About Large-Scale Solar Development, University of Michigan's Graham Sustainability Institute, has a template for how communities can host their own conversations and identify priorities.
- Site Renewables Right, The Nature Conservancy, is a mapping tool that can help communities identify areas suitable for renewable energy, as well as areas to avoid for environmental or other reasons.
- Learn about Solar Land Leasing Contracts, UW-Madison Extension, offers a guide for landowners considering leasing their land, and a companion worksheet to help document important information when meeting with developers.
- Empowering Rural Development through Community Benefit Agreements, Center for Rural Affairs.

Section 10: Conclusion

Wisconsin resident's participation in the RESET process lays the foundation for proactive, community-driven planning for large-scale renewable energy development. Through interviews, focus groups, and community conversations, residents identified both benefits and concerns about renewable energy and its long-term impacts on land use, economics, and community character. These discussions revealed clear priorities: protecting farmland, ensuring transparency in contracts, addressing decommissioning responsibilities, and clarifying zoning authority guidance.

The engagement process underscored that successful renewable energy siting requires more than technical feasibility. It requires clear communication and alignment with local values. By incorporating community feedback into ordinances, comprehensive plans, and developer agreements, Wisconsin counties can set expectations for best practices in construction, operation, and end-of-life management. Leveraging tools such as Joint Development Agreements, vegetation standards, and financial assurance for decommissioning, will help balance economic opportunity with environmental stewardship.

As Wisconsin continues to experience an energy transition, continued collaboration among local governments, landowners, developers, and residents will be essential. This report provides a roadmap for informed decision-making and community engagement, which are critical steps toward a sustainable energy landscape.