Sizing Up the Siting Picture for Solar Power

No relation

Energy Fair Workshop June 23, 2023 Michael Vickerman RENEW Wisconsin





Siting Windpower in Wisconsin: The View From the Minefield

Michael Vickerman RENEW Wisconsin Wisconsin Wind Working Group May 2011

www.RENEWwisconsin.org

An Unhappy Neighbor





Hundreds of US localities restrict renewables siting, with 293 projects currently contested: Columbia report

"Local opposition to renewable energy facilities is widespread and growing," according to the report.

Published June 5, 2023



Wind turbines stand behind a solar power park on October 30, 2013 near Werder, Germany. Sean Gallup via Getty Images

Inside Climate News

Pulitzer Prize-winning, nonpartisan repo biggest crisis facing our planet.

Clean Energy

The Choice for Rural Officials: Oppose Solar Power or Face Revolt

In a largely one-sided debate in Williamsport, Ohio, local elected officials have found it makes sense to fall in line.

By Dan Gearino y September 30, 2022



Opponents of solar power on farmland crowd into the boardroom of the Pickaway County Board of Commissioners in Circleville, Ohio on Aug. 23. They were there to watch a reporter interview the commissioners about solar power. Chris Weaver is seated on the lower left. Credit: Dan Gearino



Outline of Presentation

- > Intro to Wisconsin's power plant permitting landscape
 - > Who applies which laws to which facilities
 - > Public interest considerations
 - > Degree of local involvement
- > How developers approach project development
- > Solar build-out results to date
- > Focus on Koshkonong solar/storage project (Dane County)
- > Does solar development threaten agriculture in WI?
- > What can developers do to minimize future siting conflicts?



Key Resources for Supply-Side Build-Out

1.Solar Energy (of all sizes and configurations)
2.Wind Energy (in-state and out-of-state)
3.Transmission Capacity (regional backbone)
4.Battery Energy Storage Systems (BESS)





RENEW WISCONSIN ENERGY SUMMIT SIZING UP THE CLEAN ENERGY TRANSFORMATION THURSDAY, JANUARY 26, 2023 • MADISON, WI

WHO PERMITS WHAT?

Power plants > 100 MW – CPCN

Utility applicants: **State** (PSC) Siting and need

Power plants > 100 MW – CPCN Nonutility applicants: **State (**PSC**)** Siting only

CPCN Certificate of Public Convenience + Necessity

CA Certificate of Authority

CUP Conditional Use Permit

Power plants < 100 MW - CUPs Utility + nonutility applicants: Local govt. Siting only

Power plants < 100 MW - CA Utility applicants: **State** (PSC) Need only

Power plants > 100 MW - CA Utility applicants: State (PSC) Need only

Siting permits and the public interest

To issue either a Certificate of Public Convenience and Necessity or a Certificate of Authority, the Public Service Commission (PSC) <u>must</u> find that the project is consistent with the public interest, as defined in state law (Chapter 196).

On the other hand, conditional use permits issued by local governments are not subject to the public interest standards enumerated in Chapter 196.



What are the public interest standards considered by the PSC?

- Project is superior to alternatives
- Project won't unreasonably interfere with orderly land use and development
- Project won't cause individual hardships
- Project will promote system reliability
- Project will comply with all safety standards
- Project won't cause undue adverse impact on the environment
- Project won't cause undue adverse impact on public health and welfare
- Project is consistent with Energy Priorities Law



Foundational laws specific to renewables

1993	Energy Priorities Law 1993 Act 414	Landowner access to renewable energy Preference for noncombustible renewables
2003	Utility Local Aids 2003 Act 31	Renewable energy bonus payments to host communities
2009	Wind Siting Law 2009 Act 40	Sets siting standards for local review of wind projects (PSC 128), superseding local ordinances





Important metrics specific to renewables



Average hub height of wind turbines (2021)	308 feet
Average rotor diameter of wind turbines (2021)	427 feet
Total height of average turbine (2021)	520 feet
https://www.energy.gov/eere/articles/wind-turbines-bigger-better. (08-2022)	



1 MW of solar capacity covers approx. 7 acres of land

1 MW of solar capacity generates approx. 2,000 MWh/yr





RENEW WISCONSIN ENERGY SUMMIT SIZING UP THE CLEAN ENERGY TRANSFORMATION THURSDAY, JANUARY 26, 2023 • MADISON, WI





Red Barn Wind Farm to Begin Serving MGE Customers

Madison Gas and Electric (MGE) is adding another renewable energy resource with the Red Barn Wind Farm in southwest Wisconsin. Five other wind farms, located in Wisconsin and Iowa, already serve MGE electric customers with cost-effective, carbon-free energy. Under our Energy 2030 framework, MGE is continuing to grow our use of renewables to meet our community's energy needs.

Growing our use of renewable energy is one of our strategies for reducing carbon emissions at least 80% by 2030 and for achieving net-zero carbon electricity by 2050. In addition to our wind farms, MGE customers also are served by solar arrays and soon will be served by additional solar projects paired with battery storage to maximize benefits to our customers. By 2030, every MGE electric customer will have 80% fewer carbon emissions from their electric use simply by being an MGE customer.

About Red Barn Wind Farm

- o 28 wind turbines near Montfort in Grant County
- o MGE to own 9.1 megawatts (MW) of the 92-MW wind farm
- MGE's 10% share of the project to power about 4,000 households

MGE has been working for decades to advance wind power to help serve MGE customers. Our wind farms keep energy dollars in our region while creating an economic opportunity for host farmers and communities. In addition, wind power in our energy mix helps to reduce the impact of the price of fuel used to generate electricity.

Learn more about MGE's wind farms.

Power your house, condo or apartment with more clean energy

Our optional Green Power Tomorrow (GPT) program gives residential and business customers the option to power 100% of their electric use with energy from wind and solar farms. At a penny more per kilowatt-hour than our standard rate, GPT is an easy, flexible and affordable way to show your support for clean energy. Learn more about Green Power Tomorrow.

Rosiere Wind Farm Wisconsin 0 - Two Creeks Solar Saratoga Wind Farm Top of Iowa Wind Farm Forward Energy Center Minnesota 4 4 Dane County Airport Solar Koshkonong Solar Energy Center Shared Solar Morey Field Solar Hermsdorf Solar Fields Darien Solar Energy Center Red Barn Wind Farm Paris Solar-Battery Park Badger Hollow Solar Farm O'Brien Solar Fields Complete In progress Proposed (

Since announcing our Energy 2030 framework in November 2015, we have developed projects that we expect will increase our owned renewable capacity by more than nine times when completed.

This table illustrates the progress Wisconsin utilities are making towards achieving their 2030 CO2 reduction goals. Some utilities still have a long way to go. The numbers are derived from announced generation additions and retirements.

Table 2-4

Projected Carbon Dioxide Reductions by 2028

Provider	2020 Emissions (Million tons)	2020 CO₂ Reduction	Projected 2028 Emissions (Million tons)	2028 CO₂ Reduction	2030 CO₂ Reduction Goal
Northern States Power Company-Wisconsin (Xcel)	1.8	56%	0.9	78%	80%
Madison Gas and Electric Company	2.5	26%	1.0	70%	80%
Wisconsin Power and Light Company (Alliant)	6.4	27%	3.3	62%	50%
Wisconsin Electric Power Company (We Energies)	12.9	46%	10.6	55%	80%
Wisconsin Public Service Corporation	6.5	46%	5.8	51%	80%
WPPI Energy	2.4	44%	2.3	46%	N/A
Dairyland Power Company	3.8	15%	3.2	29%	N/A
Manitowoc Public Utilities	0.2	0%	0.2	0%	N/A
All Providers	36.5	40%	27.3	45%	



APPENDIX B (Chapter 2)



This bar chart visualizes the numbers appearing in the previous slide. WPL plans to cut its CO2 emissions nearly in half by 2028.





It was only four years ago that Wisconsin's first utility-scale solar projects cleared the PSC review process

Journal Sentinel I FRIDAY, APRIL 12, 2019 I 12A

2 giant solar projects approved

Business

State will produce 5 times as much power from sun

Guy Boulton

Milwaukee Journal Sentinel USA TODAY NETWORK - WISCONSIN

Wisconsin will produce five times as much power from the sun, by one estimate, with the addition of two solar projects approved Thursday "It is a landmark day for solar energy in Wisconsin," Tyler Huebner, executive director of Renew Wisconsin, said in a statement.

PSC Commissioner Mike Huebsch, while supporting the projects, raised concerned about how future solar pro-

watts.

The commission denied a request by WPS and MG&E to allow cost overruns of up to 10% on the projects.

The Citizens Utility Board opposed the request.

"We were concerned about the risk to customers from these projects and wanted some kind of protection," said

UTILITY-SCALE SOLAR A NEW PHENOMENON

Solar category	Operating		Solar category	Operating		
	Capacity			Capacity		
	(in MW)			(in MW)		
Rooftop PV systems (1 kW – 15 MW)	52		Rooftop PV systems (1 kW – 15 MW)	150		
Offsite distributed arrays (500 kW -> 20 MW	28		Offsite distributed arrays (500 kW -> 20 MW	152		
Utility-scale projects (>20 MW)	0		Utility-scale projects (>20 MW)	650		

As of 1/1/2023



As of 1/1/2018

What land characteristics would a solar developer in Wisconsin look for ?

- Flat (gentle slopes are OK)
- Open (cropland, pasture, few trees)
- Large parcels, if available
- No presence of endangered species
- Away from wetlands and floodplains
- Few neighbors

- Proximity to robust transmission infrastructure for injection

The lack of a cost-effective <u>interconnection point</u> is the #1 reason solar developers

Saratoga Solar Project



Immediately adjacent to the Wood County Solar Farm, located west of this diagonal ->



150 MW Solar + 52.5 MW BESS

Approved 5/2023





Do local governments have a say over projects larger than 100 MW?

YES. In the vast majority of solar power plants approved by the PSC, developers and affected local governments negotiated and entered into **Joint Development Agreements** (JDAs). The terms are binding on the parties. Examples of JDAs are available at a number of construction case docket sites (e.g., Portage Solar, 9810-CE-100, Elk Creek Solar 9819-CE-100, etc.)



What do Joint Development Agreements between project developers and local govts. typically cover?



Hermsdorf Farm, Madison Gas and Electric Placed in service 4/2022 8 MW

- Construction impacts
 - Roads
 - Drainage
- Setbacks
- Fencing
- Revenue payments
- Decommissioning



How much solar power capacity has the PSC approved via CPCNs?





Two Creeks Solar Park Manitowoc County 150 MW Placed in service 10/2020







Wood County Solar Approved 1/2021 Placed in service 9/2022 150 MW Between 2019 and today, the PSC has approved:

- 16 solar plants
- 2,950 megawatts (MW)
- 5,900,000 MWh/yr
- 8% of WI electric sales

On a footprint of ~21,000 acres



Putting 21,000 acres in perspective

Clark County Forest134,000 acresLake Winnebago132,000 acresLake Petenwell23,000 acres

County forests were created to rescue lands left abandoned by cut-and-run logging and failed homesteads of the late 1800's and early 1900's.



Pictured above is Lake Petenwell, a man-made lake on the Wisconsin River created in the late 1940s. The lake backs up behind the Petenwell hydro facility, which has a capacity of 20 MW. Lake Petenwell stretches between Adams and Juneau counties.



IMPORTANT TAKEAWAY: The repurposing of land in Wisconsin for other uses is a very old story that is ongoing.



How much solar power capacity has been approved by local governments?



Bear Creek, Alliant-WPL Placed in service 9/2022 50 MW As of 6/2022, local governments have approved Alliant's applications to construct:

- 8 solar plants
- 589 MW
- 1,200,000 MWh/yr
- 1.7% of WI electric sales

On a footprint of **4,200** total acres



Where are we in terms of the solar build-out underway (as of 6/2023)?

- 6 utility-owned plants online
- 11 utility-owned plants under construction
- 7 utility-scale plants permitted
- 3 utility-scale plants under review

650 MW

1,189 MW (2023/4 completion)

1,450 MW (2025/6 completion)

700 MW (2026/7 completion)

All 27 solar plants would be 50 MW or larger





The coming solar wave

Orange circles = Permitted projects

Green circles = Projects under construction

Red pins = Projects under PSC review



Utility-scale battery storage is coming to town (starting in 2025)

*	Paris	110 MW	$\star \star$
*	Darien	75 MW	\mathbf{x}
*	Koshkonong	165 MW	$\star \star$
*	Wood County	75 MW	
*	Grant County	100 MW	
*	Portage	137 MW	×
*	Saratoga	52 MW	X
*	High Noon	165 MW	\mathbf{X}
*	Edgewater	99 MW	

We Energies, WPS, MGE and Alliant have committed to acquire 878 MW of battery energy storage, with much of the capacity paired with solar projects.



Have any of these solar projects been challenged in court?

One. Koshkonong Solar Energy Center in Dane County

Oral arguments begin in Koshkonong lawsuit brought by Christiana

Will Cioci wcioci@apg-wi.com Mar 15, 2023 Updated Mar 22, 2023



Lawsuit over Koshkonong is attracting the attention of renewable energy critics like Robert Bryce.

BRYCE	JOURNALIST PUBLIC SPEAKER	Books	 Podcast 	Speaking	Videos	Articles
		Renewable R	eiect	ion D	atak	base

About the database

Management theorist W. Edwards Deming famously said "in God we trust. All others must bring data." This database is an attempt to do that: to quantify the number of restrictions or rejections of solar and wind projects or so. The database is not perfect. It may slightly understate, or overstate, the number of rejections and restrictions. It is the product of an effort I began in 2015 and have sustained since then --- all on my own time and n restriction that's not in the database, please use the submission page and if the data checks out, I will add it. Thanks.





Note: Koshkonong would cover between 3-4 sq. miles, not 7 sq. miles as claimed by Bryce.

Wisconsin Town Fights Big Solar (And Climate **Corporatism**)

Chicago-based Invenergy wants to cover about seven square miles of the tiny town of Christiana with solar panels. The town and local residents are suing to stop it.

APR 26, 2023

♥ 77 Q 33







Roxann Engelstad, John Barnes, and Town Chairman Mark A. Cook, at the Christiana Town Hall, April 25, 2023.



Two views of solar generation on farmland





The proposed 2,400-acre solar energy center has sparked opposition from area residents and the village of Cambridge, which wants some of the land for housing.

JOHN HART, STATE JOURNAL

Hinchley's Dairy Farm Cambridge, WI

"The decision to transition a sizable portion of their family's farm pastures and grain fields to thousand of solar panels was not an easy one for Duane and Tina Hinchley.

"The couple owns Hinchley's Dairy Farm in Cambridge, which is located 20 miles east of Madison.

"A 995-acre chunk of the dairy farm acreage is slated to become part of the sprawling \$649 million Koshkonong Solar Energy Project."





At a glance

Dairy farmers: Duane, Tina and Anna Hinchley

Farm name: Hinchley's Dairy Farm, Cambridge Wisconsin

No. of cows milked: 245

No. of acres farmed: 2,500

Website or Facebook page: dairyfarmtours.com and facebook.com -- search for "Hinchleys Dairy Farm Tours"

Organizations: Duane Hinchley serves on the Dairy Farmers of America Council. He also serves on the board of United Cooperative and of the Woodstock Progressive Milk Producers. He's vice-president of United Ethanol, and the town of Christiana Plan Commission. Tina Hinchley serves as vice-president of the Wisconsin Farmers Union board. Anna Hinchley is a delegate in Dairy Farmers of America and is active in the Young Farmer Program for the Wisconsin Farmers Union. All are members of the Wisconsin Farm Bureau Federation.



Duane and Tina Hinchley own Hinchley Dairy Farm, near Cambridge "In the end, we see this as our best opportunity to preserve our family's farming culture for decades"

--Duane Hinchley, in the Koshkonong proceeding



What are the specific harms cited by opponents to large-scale solar + BESS?

- Industrial development viewshed impact
- Farmland destruction
- Lower property values
- Risk of fire (from batteries)
- Wildlife impacts
- Pollution (!?)



What's really going on here? (Hint: it's not about energy policy)

- Jealousy/resentment from not being able to directly reap economic benefits from a project lease
- Fear factor created by changes to their immediate environment imposed by "the outside world"
- Serious cultural differences between farmers who must earn a living from the land they own and exurbanite neighbors who think they're gullible bumpkins



BENEFITS OF CLIMATE-SMART AGRICULTURE

Holds carbon in the soil, reducing greenhouse gas emissions

Improves soil health and fertility

Minimizes soil erosion and nutrient runoff

Improves the quality of surrounding bodies of water

Helps buffer farms from severe weather events

Revitalizes rural economies and rural prosperity



Blue Prairie Solar, near Black River Falls

Prairie-like vegetation mixed with solar arrays provide ecological benefits to rural areas. Perennial grasses and other plants can support pollinators, birds, reptiles, wildlife and livestock.



Suggestions for minimizing conflicts

- Establish a local presence with office hours
- Cultivate relationships with friendly nonprofits
- Partner with rural communications specialists
- Commit to channeling revenues to the local school district (school districts are not covered under the Utility Local Aids Law)
- Celebrate project completions with the community and workforce





Ribbon-cutting, Wood County Solar, Nekoosa, September 2022

Sizing Up the Solar Siting Picture

- Local opposition is very much a hit-or-miss affair
- Developers benefit from not having to demonstrate need for power plants
- Though arduous and data-intensive, state regulatory review process is predictable and manageable
- As known quantities, utilities will fare better with local siting review than out-of-state developers
- Little appetite at the legislature for changes to Power Plant Siting Law







QUESTIONS?

MICHAEL VICKERMAN, RENEW WISCONSIN

SIZING UP THE SOLAR SITING PICTURE JUNE 23, 2023

