Sizing Up the Siting Picture for Solar Power

Energy Fair Workshop
June 23, 2023
Michael Vickerman
RENEW Wisconsin

No relation
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

By Diana DiGangi
Reporter

Inside Climate News

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
September 30, 2022

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

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)
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

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

---

**CPCN** Certificate of Public Convenience + Necessity
**CA** Certificate of Authority
**CUP** Conditional Use Permit
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) must 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

<table>
<thead>
<tr>
<th>Year</th>
<th>Act/Title</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1993</td>
<td>Energy Priorities Law 1993 Act 414</td>
<td>Landowner access to renewable energy Preference for noncombustible renewables</td>
</tr>
<tr>
<td>2003</td>
<td>Utility Local Aids 2003 Act 31</td>
<td>Renewable energy bonus payments to host communities</td>
</tr>
<tr>
<td>2009</td>
<td>Wind Siting Law 2009 Act 40</td>
<td>Sets siting standards for local review of wind projects (PSC 128), superseding local ordinances</td>
</tr>
</tbody>
</table>
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
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

- 28 wind turbines near Montfort in Grant County
- 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.

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.

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.

published: Feb 27, 2023
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

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

<table>
<thead>
<tr>
<th>Solar category</th>
<th>Operating Capacity (in MW)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Rooftop PV systems</strong></td>
<td></td>
</tr>
<tr>
<td>(1 kW – 15 MW)</td>
<td>52</td>
</tr>
<tr>
<td><strong>Offsite distributed arrays</strong></td>
<td></td>
</tr>
<tr>
<td>(500 kW -&gt; 20 MW)</td>
<td>28</td>
</tr>
<tr>
<td><strong>Utility-scale projects</strong></td>
<td></td>
</tr>
<tr>
<td>(&gt;20 MW)</td>
<td>0</td>
</tr>
</tbody>
</table>

**As of 1/1/2018**

<table>
<thead>
<tr>
<th>Solar category</th>
<th>Operating Capacity (in MW)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Rooftop PV systems</strong></td>
<td></td>
</tr>
<tr>
<td>(1 kW – 15 MW)</td>
<td>150</td>
</tr>
<tr>
<td><strong>Offsite distributed arrays</strong></td>
<td></td>
</tr>
<tr>
<td>(500 kW -&gt; 20 MW)</td>
<td>152</td>
</tr>
<tr>
<td><strong>Utility-scale projects</strong></td>
<td></td>
</tr>
<tr>
<td>(&gt;20 MW)</td>
<td>650</td>
</tr>
</tbody>
</table>

**As of 1/1/2023**
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 **interconnection point** is the #1 reason solar developers will reject a particular parcel of land.
Immediately adjacent to the Wood County Solar Farm, located west of this diagonal ->

150 MW Solar + 52.5 MW BESS
Approved 5/2023
**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?

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

Hermsdorf Farm, Madison Gas and Electric
Placed in service 4/2022
8 MW
How much solar power capacity has the PSC approved via CPCNs?

Two Creeks Solar Park
Manitowoc County
150 MW
Placed in service 10/2020
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 Forest 134,000 acres
Lake Winnebago 132,000 acres
Lake Petenwell 23,000 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?

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

Bear Creek, Alliant-WPL
Placed in service 9/2022
50 MW
Where are we in terms of the solar build-out underway (as of 6/2023)?

<table>
<thead>
<tr>
<th>Description</th>
<th>Capacity</th>
<th>Completion Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>6 utility-owned plants online</td>
<td>650 MW</td>
<td></td>
</tr>
<tr>
<td>11 utility-owned plants under construction</td>
<td>1,189 MW</td>
<td>2023/4 completion</td>
</tr>
<tr>
<td>7 utility-scale plants permitted</td>
<td>1,450 MW</td>
<td>2025/6 completion</td>
</tr>
<tr>
<td>3 utility-scale plants under review</td>
<td>700 MW</td>
<td>2026/7 completion</td>
</tr>
</tbody>
</table>

All 27 solar plants would be 50 MW or larger
Orange circles = Permitted projects
Green circles = Projects under construction
Red pins = Projects under PSC review

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

- Paris 110 MW
- Darien 75 MW
- Koshkonong 165 MW
- Wood County 75 MW
- Grant County 100 MW
- Portage 137 MW
- Saratoga 52 MW
- High Noon 165 MW
- 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
Lawsuit over Koshkonong is attracting the attention of renewable energy critics like Robert Bryce.

Note: Koshkonong would cover between 3-4 sq. miles, not 7 sq. miles as claimed by Bryce.
Two views of solar generation on farmland
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.”

Hinchley’s Dairy Farm
Cambridge, WI

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.
“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

Duane and Tina Hinchley own Hinchley Dairy Farm, near Cambridge
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
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.

Blue Prairie Solar, near Black River Falls
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