

BEFORE THE
PUBLIC SERVICE COMMISSION OF WISCONSIN

Application for a Certificate of Public
Convenience and Necessity of Grant County Docket No. 9804-CE-100
Solar, LLC to Construct a Solar Electric
Generation Facility, to be Located in Grant
County, Wisconsin

REBUTTAL TESTIMONY OF MICHAEL J. VICKERMAN
ON BEHALF OF RENEW WISCONSIN

Q. Please state your name and business address

A. My name is Michael J. Vickerman, and my business address is 214 N. Hamilton
St. Madison, WI 53703.

Q. By whom are you employed, and in what capacity?

A. I am Policy Director for RENEW Wisconsin (RENEW).

Q. On whose behalf are you testifying?

A. I am testifying on behalf of RENEW.

Q. Please describe your educational background.

A. I have a Bachelors of Arts degree in History and Art History from the University
of Wisconsin.

Q. Please describe your work experience.

1 A. I began working for RENEW Wisconsin in October 1991 as its Advance Plan 6
2 intervention manager. I became RENEW's Executive Director in 1994, and
3 served in that capacity until 2012. Since then, I have been RENEW's Policy
4 Director. My work with RENEW today focuses on renewable energy policy
5 development at the regulatory, legislative, and municipal level. My professional
6 qualifications are further summarized in Ex.-RENEW-Vickerman-1.

7
8 **Q. Please describe RENEW.**

9 A. RENEW is a domestic, nonprofit corporation headquartered in Madison that
10 works to advance the renewable energy goals adopted by the State of Wisconsin
11 over the years. Since its founding in 1991, RENEW has worked to increase access
12 to and development of renewable energy sources in Wisconsin to power homes,
13 businesses, and vehicles. To that end, RENEW formulates and advocates for
14 policies and programs to create and expand the use of solar power, wind power,
15 renewable natural gas, local hydropower, geothermal energy, and electric
16 vehicles.

17
18 **Q. Have you testified in a construction case proceeding before the Public Service
19 Commission involving a solar generation facility?**

20 A. Yes. I submitted testimony in the Wood County Solar Farm proceeding (9803-
21 CE-100), the Point Beach Solar Farm proceeding (9802-CE-100), and the Two
22 Creeks Solar Farm proceeding (9696-CE-100).

23

1 **Q. What is the purpose of your testimony in this proceeding?**

2 A. The purpose of my rebuttal testimony is to respond to the direct testimony
3 submitted by several witnesses affiliated with Grant County Intervenors relating
4 to extreme weather events and the siting of solar farms in areas where severe or
5 violent weather may pose a concern. Their testimony opens the door to a broader
6 consideration of violent weather events such as derechos and their relationship to
7 climate change mitigation strategies such as solar electric generation. I will also
8 respond to the suggestion in the direct testimony of Brianna Eisentrout-Frear and
9 Henry Frear that more regulation is needed for siting large-scale solar generating
10 facilities. I will also discuss the “heat island effect” raised in the testimony
11 submitted by Grant County Intervenors.

12
13 **Q. Have you prepared any exhibits with your rebuttal testimony?**

14 A. Yes. Besides Ex.-RENEW-Vickerman-1 referenced above, I am sponsoring an
15 additional six exhibits for the Commission’s consideration:

16 Ex.-RENEW-Vickerman-2 is a table listing the largest grid-connected
17 solar generating plants in Wisconsin;

18 Ex.-RENEW-Vickerman-3, the Foreword to the report issued by the
19 Governor’s Task Force on Climate Change in December 2020;

20 Ex.-RENEW-Vickerman-4, a Wikipedia entry titled “August 2020
21 Midwest derecho”;

1 Ex.-RENEW-Vickerman-5, a blog post, dated May 15, 2017, from the
2 National Renewable Energy Laboratory assessing the ability of solar
3 panels to withstand extreme and punishing weather events;
4 Ex.-RENEW-Vickerman-6, Recommendation No. 13 from the report
5 issued by the Governor’s Task Force on Climate Change in December
6 2020; and
7 Ex.-RENEW-Vickerman-7, RENEW rebuttal testimony in 9803-CE-100,
8 the Wood County solar farm proceeding, addressing heat island effects
9 from solar farms.

10
11 **Q. Several of the Grant County Intervenors have expressed concern over the**
12 **risks posed by siting a solar farm in an area known to experience severe**
13 **weather events. To the best of your knowledge, have there been any reports**
14 **of weather-related damage either sustained by or caused by solar farms in**
15 **southwest Wisconsin?**

16 There are a number of one-to-five megawatt ground-mount solar arrays
17 operating within a 50-mile area surrounding Platteville. These include two
18 installations in Grant County, one near Mount Hope, placed in service in 2017,
19 and one in Fennimore, placed in service in 2019. These projects correspond to
20 numbers 5 and 21 in Ex.-RENEW-Vickerman-2. There are two Alliant-owned
21 solar arrays in the Dubuque area, both placed in service in 2017. There are as well
22 a number of ground-mount solar installations serving individual customers in the

1 area, such as the Village of Galena in Illinois and the Village of Dickeyville in
2 Grant County.

3 I have not come across any reports of weather-related damage occurring to
4 the solar arrays identified above. As well, I have not come across reports of
5 weather-related damage to other small solar farms owned by Engie or BluEarth
6 Renewables located in southwest Wisconsin.

7
8 **Q. Are the examples of severe or violent weather cited by Grant County**
9 **Intervenors more prevalent in Grant County than in other areas in**
10 **Wisconsin?**

11 A. The evidence gleaned from my research indicates that no area in Wisconsin is
12 immune from severe weather events such as tornadoes, straight-line winds,
13 flooding rains, and extreme temperatures. As indicated in a Milwaukee Journal-
14 Sentinel article¹ cataloging 10 extreme weather events of the previous decade,
15 volatile or extreme weather can occur anywhere in the state. Today, one can find
16 solar farms operating in areas that were buffeted by severe weather events
17 occurring in 2018, 2019, and this year. One close to Madison is the Middleton
18 Morey Field solar installation owned by Madison Gas and Electric. That five-
19 megawatt installation stands on ground that had been inundated from a storm
20 depositing more than 11 inches of rain over a 24-hour period in August 2018.

21 The December 2020 report issued by the Governor’s Task Force on
22 Climate Changes reinforces the finding that weather-related effects of climate

¹ “Top 10 Wisconsin weather events in previous decade,” Meg Jones, Milwaukee Journal Sentinel, January 9, 2020.

1 change endanger the social, environmental, social and economic fabric of
2 Wisconsin as well as everywhere else. As expressed in the report’s Foreword,
3 “The effects of climate change transect all sectors, geographies, and people.” The
4 Foreword was authored by Task Force member Kristofer Kanto, an Enterprise
5 Risk Management Senior Analyst for American Family Insurance (Ex.-RENEW-
6 Vickerman-3). The full report can be access from the State of Wisconsin’s web
7 site.

8 In making the case for statewide action, the report acknowledges the
9 global nature of climate change, both in terms of its causes and its effects. No one
10 region or county in Wisconsin appears to be more at risk than any other county or
11 region in Wisconsin.

12

13 **Q. Is there anything unique about solar farms that would increase the**
14 **probability of damage to neighboring properties in the event of violent**
15 **weather?**

16 A. The conclusion I draw from my research is that solar farms do not introduce a
17 new dimension of risk to neighboring properties. I periodically research the
18 internet looking for instances of weather-related damage to solar farms in the
19 Midwest. To date, I have not encountered any reports of solar farms damaged by
20 severe or violent weather, such as the uniquely destructive Midwest derecho of
21 August 2020, nor of any collateral damage caused by damaged solar farms. The
22 August 2020 derecho, which has its own Wikipedia page (Ex.-RENEW-
23 Vickerman-4 [highlighting added]), wrought significant destruction and

1 devastation to homes, farms, croplands, vehicles, and utility infrastructure. By
2 October 2020, it had become the costliest thunderstorm in U.S. history, with
3 damage estimates averaging \$7.5 billion. One utility infrastructure CEO in Iowa
4 memorably described the derecho as “equivalent to a 40-mile-wide tornado that
5 rolled over a 100-mile swath of the state.” Though damage to power lines was
6 extensive, resulting in extended outages for 300,000 customers in Iowa and
7 Illinois, it appears that the solar generating infrastructure in the storm’s path
8 emerged unscathed. There is simply no mention anywhere in that Wikipedia
9 entry, or in any other article or account of the August 2020 derecho, of damage
10 either caused by or sustained by solar or wind generating plants.

11 The modules going into today’s solar farms are durable and resilient. As
12 noted in a National Renewable Energy Laboratory (NREL) blog entry posted on
13 May 15, 2017 (Ex.-RENEW-Vickerman-5), a violent hailstorm passed through
14 the Denver area the previous week, damaging rooftops and vehicles in its path.
15 Yet only one of the 3,000 panels deployed at the NREL campus in Golden
16 suffered any damage from the storm. According to Dr. Charlie Gay, the author of
17 this blog post, one of NREL’s many initiatives is to develop “standardized
18 industry quality tests to assure that solar panels on the market can survive the
19 harsh environmental conditions to which they are directly exposed. This includes
20 not only how panels react to mechanical stress, such as hail or being walked on,
21 but also high and low temperatures, humidity, solar ultraviolet radiation, and even
22 the electrical stress that the panels apply to themselves when operating in high-
23 voltage systems.”

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Q. As a source of electricity that does not emit carbon dioxide or other greenhouse gases during its operation, wouldn't a solar farm such as the Grant County Solar project actually reduce the atmospheric fuel that feeds severe weather events such as violent storms?

A. It certainly would. Solar farms generate electricity without releasing any harmful gases or other compounds into the atmosphere or ground. Moreover, they are powered by a fuel source—sunshine—that is freely and widely available, and can be accessed without paying for its use. This arrangement results in a low power production cost, which is an advantage from the standpoint of system dispatch. The low cost of utility-scale solar enables grid operators to dispatch their output ahead of other power sources that have higher production costs, such as fossil generators. Indeed, solar generation at the scale of the proposed Grant County solar farm enables Wisconsin electric utilities to develop timetables for retiring fossil fuel power plants, and to execute them. For example, Alliant Energy's Wisconsin affiliate (Wisconsin Power and Light) announced² in July 2020 a commitment to retire all of its coal-fired generating units by the year 2040. This is a key component of the utility's commitment to become carbon neutral by 2050. To reach its goal, Wisconsin Power and Light will need to acquire new, non-CO₂-emitting generating capacity to replace fossil power stations scheduled for retirement, such as its 380 MW Edgewater 5 plant set to close permanently in 2022. Interestingly, this shift toward carbon-free sources began more than five

² "Alliant aims for carbon-neutral electricity, says plans will save billions for ratepayers," Chris Hubbuch, Wisconsin State Journal, July 22, 2020.

1 years ago in Grant County, when Wisconsin Power and Light in 2015
2 permanently closed its Nelson Dewey coal-fired power station in Cassville and
3 demolished the plant two years later.

4 Approval of the Grant County Solar project would align well with one of
5 the principal recommendations in the December 2020 report issued by the
6 Governor’s Task Force on Climate Change, specifically the one titled “Set utility
7 carbon reduction goals” (Recommendation No. 13). This recommendation calls
8 for the establishment of net carbon emissions goals in the power sector. The
9 recommendation specifies an interim goal of 60% reduction below 2005 levels by
10 2030, and a 100% reduction by 2050. The report also notes that “[m]ost emissions
11 reductions are expected to come from utility-scale renewable energy projects with
12 utility resource procurement or replacement reflecting the current demand
13 economics-based utility regulatory structure.”

14

15 **Q. In their direct testimony (page 6), Brianna Eisentrout Frear and Henry**
16 **Frear express concerns over the siting of renewable energy facilities, and**
17 **suggest that more regulation is needed at the state and local level. Do you**
18 **agree with their views here?**

19 A. It is our belief that under PSC Chapter 111.53, the Commission has both the
20 statutory authority and the in-house expertise to impose specific siting-related
21 conditions as warranted by the particularities in this case. The Commission’s
22 conditioning powers are an essential part of the agency’s review authority under
23 the CPCN statute (PSC 111.53), and they apply with equal force to all electric

1 generation projects irrespective of the energy source used. However, this review
2 authority only applies to generating facilities with a proposed capacity of 100
3 MW or above. The Commission does not have siting authority over solar farms
4 under 100 MW. While the preponderance of solar farm generating capacity will
5 be sized at a scale triggering Commission review authority, developers will
6 pursue solar farms smaller than 100 MW as well. As an example, three of the six
7 solar farms that Wisconsin Power and Light seeks to acquire in Docket 6680-CE-
8 182 are under the 100 MW threshold, and are subject to local government review.
9 The Commission has no authority to become involved in the siting of these three
10 projects. Therefore, to ensure uniformity and consistency in the siting of solar
11 farms both larger than and smaller than 100 MW, legislation would be required to
12 (1) create the regulatory authority that would apply to both categories of solar
13 farms, and (2) delegate such authority to a particular state body. Such legislation
14 would require a finding that solar electric generating facilities have unique
15 attributes that would warrant rules specific to that resource. At this time, RENEW
16 is not aware of any legislative interest in the creation of a statewide rule to
17 address the siting of solar energy systems.

18

19 **Q. Several witnesses affiliated with Grant County Intervenors raise the issue of**
20 **heat island effects from solar farms. What is your view of this issue?**

21 A. In the Wood County Solar Farm proceeding (9803-CE-100), I submitted
22 testimony (PSC REF# 398264) (Ex.-RENEW-Vickerman-6) addressing a
23 suggestion from a PSC Staff witness that the Commission's decision could

1 include an order point requiring the applicant to conduct a heat island study. The
2 Commission is likely to decide on the application in January 2021, which would
3 include consideration of this issue. We remain agnostic on the question of
4 whether such a study is needed, but are opposed to requiring a particular project
5 developer to conduct a heat island study. Requiring one developer to conduct such
6 a study sets up the possibility of allocating the full cost of that analysis to a
7 particular subset of ratepayers, namely the customers served by the utility that
8 acquires the solar farm with this particular order point. If the Commission
9 believes that the state's electric power sector as a whole could benefit from this
10 analysis, then it should take steps to ensure that the cost of conducting such
11 analysis is allocated across utility boundaries, and not be limited to the customers
12 of the utility or utilities owning the generating facility. It seems unlikely that there
13 would be multiple iterations of a heat island analysis. While the Commission may
14 see value in additional advancing research in this area, we don't believe that it
15 should be undertaken in the context of an individual CPCN proceeding.

16

17 **Q. Does this complete your rebuttal testimony?**

18 A. Yes, it does.