

BEFORE THE
PUBLIC SERVICE COMMISSION OF WISCONSIN

Application of Northern States Power Company-Wisconsin
for Approval of Parallel Generation
Tariff Modifications and Avoided Costs

Docket No. 4220-TE-109

**DIRECT TESTIMONY OF MICHAEL VICKERMAN
ON BEHALF OF RENEW WISCONSIN**

1 **I. INTRODUCTION AND WITNESS QUALIFICATIONS**

2 **Q. Please state your name and business address**

3 A. My name is Michael Vickerman, and my business address is 214 N. Hamilton St.,
4 Suite 300, Madison, WI 53703.

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

6 A. I am Policy Director for RENEW Wisconsin, Inc. (RENEW).

7 **Q. On whose behalf are you testifying?**

8 A. I am testifying on behalf of RENEW.

9 **Q. Please describe your work experience.**

10 A. I began working for RENEW Wisconsin in October 1991 as its Advance Plan 6
11 intervention manager. I became RENEW's Executive Director in 1994, and
12 served in that capacity until 2012. Since then, I have been RENEW's Policy
13 Director. My work with RENEW today focuses on renewable energy policy
14 development at the regulatory, legislative, and municipal level. Specific to this
15 testimony, I authored an article in the fall of 2021 discussing the value proposition

1 that distributed front-of-meter solar farms are uniquely poised to deliver for
2 Wisconsin citizens, and making a policy case for their increased deployment. My
3 professional qualifications are further summarized in Ex.-RENEW-Vickerman-1.

4 **Q. Please describe RENEW.**

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

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

13 A. My testimony begins with a discussion of the parallel generation tariffs currently
14 on offer to larger customers in Northern States Power-Wisconsin (NSPW)
15 territory, examining how those tariff structures effectively inhibit customer uptake
16 of solar installations exceeding 100 kilowatts (kW). I also discuss several tariffed
17 services that NSPW proposes to modify, specifically its Pg-2A and Pg-2B
18 offerings, and assess their likely effectiveness in spurring an increased level of
19 front-of-meter and larger-scale behind-the-meter solar installations.

20 **Q. Are you sponsoring any other exhibits?**

21 A. Yes, I am sponsoring the following exhibits:

- 22 • Ex.-RENEW-Vickerman-2, an updated table of distribution-scale solar
23 farms in Wisconsin;

- 1 • Ex.-RENEW-Vickerman-3, a series of case studies involving distribution-
2 scale solar farms developed by OneEnergy Renewables;
- 3 • Ex.-RENEW-Vickerman-4, a filing from Madison Gas and Electric
4 reporting the final cost of its Dane County Airport solar project;
- 5 • Ex.-RENEW-Vickerman-5, a filing from Madison Gas and Electric
6 reporting the final cost of its O'Brien solar project;
- 7 • Ex.-RENEW-Vickerman-6, an excerpt from Wisconsin Power & Light's
8 Initial Brief filed in 6680-CE-183; and
- 9 • Ex.-RENEW-Vickerman-7, a PDF of an online article I authored titled
10 "Smaller Solar Farms in Wisconsin – Why More Are Needed."

11 **II. OVERVIEW OF SOLAR PV PENETRATION IN NSPW TERRITORY**

12 **Q. How much solar generating capacity is located in NSPW territory today?**

13 A. I estimate that there exists somewhere between 11,500 kWAC and 12,000 kWAC
14 of installed solar capacity operating in NSPW territory today (see Table 1 on page
15 4). The solar capacity falls into three categories: (1) front-of-meter installations
16 serving the utility's community solar program; (2) behind-the-meter installations
17 above 100 kWAC; and (3) behind-the-meter generation installations up to 100
18 kWAC. Information sources for Table 1 on page 4 include NSPW's annual report
19 for 2020, NSPW's most recent annual report on its Solar*Connect Community
20 pilot, and NSPW witness Tyrel Zich's direct testimony.

21 As of today, no solar electric array measuring one megawatt (MWAC) or
22 larger has been energized within NSPW territory. The three 700 kWAC facilities
23 serving the utility's Solar*Connect Community program represent the largest

1 front-of-meter arrays in NSPW territory. The largest behind-the-meter array in
 2 NSPW territory has a DC panel rating of 532 kW. As a point of comparison, the
 3 other four investor-owned utilities are operating front-of-meter projects larger
 4 than one MW and all but WPS have interconnected behind-the-meter arrays that
 5 exceed one MWAC.

Table 1: Solar PV capacity installed in NSPW territory		
Type	No. of installations	Capacity (AC)
Front-of meter (Solar*Connect Community pilot)	3	2,100
Behind the meter (above 100 kWAC)	5	~1,100
Behind the meter (up to 100 kWAC)	848	~8,500 kW
Total	856	~11,700 kW

6

7 **Q. Looking at Tables 1 through 4 in Mr. Zich’s testimony (Direct-NSPW-Zich-**
 8 **3-4), what do the numbers there tell you about the state of the solar**
 9 **marketplace in NSPW territory?**

10 A. In the category of solar generation, NSPW reports 848 interconnections under the
 11 Pg-1 net metering tariff yet only five interconnections under the Pg-2D self-
 12 supply tariff. This is a highly visible fault line running through the solar
 13 marketplace in NSPW territory, and it tracks along the 100 kWAC threshold that
 14 divides the two rate categories. Solar systems up to 100 kWAC that supply the
 15 host customer are placed in the Pg-1 service while installations larger than 100
 16 kW supplying their hosts fall into the Pg-2D category. The fact that there are 169

1 times as many systems taking service under Pg-1 as compared to Pg-2D is
2 indicative of a stark contrast between the value proposition for each. It should be
3 noted that three of the five Pg-2D installations are owned by La Crosse-based
4 Gundersen Health, which has numerous facilities in NSW territory. The solar
5 deployment being undertaken by Gundersen is part of an ambitious effort to
6 reduce its carbon footprint systemwide.

7 **III. DISCUSSION OF PARALLEL GENERATION TARIFFS SERVING**
8 **BEHIND-THE-METER SOLAR SYSTEMS GREATER THAN 100**
9 **KILOWATTS.**

10 **Q. What is the specific economic attribute of the Pg-2D services that would**
11 **account for the relative paucity of customers enrolled in that service?**

12 A. The economic unattractiveness of NSW's Pg-2D rate stems from the treatment
13 of generation exported to the grid. This is an offset-only service. It does not
14 compensate the system owner for any generation that flows beyond the
15 customer's premises. There is no structure for banking kilowatt-hours not
16 consumed by the customer, and there is no monetary credit awarded to the
17 customer for exports occurring in real time. Put another way, the service requires
18 the customer to donate to the utility all kilowatt-hour (kWh) production not
19 consumed by the customer.

20 **Q. What is the consequence of such a rate structure?**

21 A. Because this rate structure does not compensate generation exported to the utility,
22 only a small subset of commercial and institutional customers have the requisite
23 load size and shape for efficiently internalizing solar generation produced on
24 premises. This thin slice of customers includes high-occupancy hospitals, cold
25 storage warehouses, and other facilities with extensive refrigeration equipment

1 onsite. The vast majority of NSPW’s commercial customers—e.g., small
2 manufacturers, agricultural businesses, offices, schools, and tourism-based
3 enterprises—do not have large loads that hold steady over the course of an 8,760-
4 hour year. For those customers, the only recourse that makes any economic sense
5 is to reduce the capacity of the solar installation below the 100 kW threshold and
6 take advantage of the net energy billing structure in Pg-1. The annual netting
7 structure in the Pg-1 tariff is another inducement for commercial customers to
8 downscale their solar installations and accept a lesser offset than what could be
9 achieved under Pg-2D. It is reasonable to assume that a number of large solar
10 installations have not gone forward due to the unfavorable economics and the
11 inherent unfairness of the Pg-2D tariff structure.

12 **Q. How does the Pg-2D tariff relate to the parallel generation tariffs proposed in**
13 **this proceeding?**

14 A. In this proceeding, NSPW proposes to modify its Pg-2B service in a way that
15 could benefit the owners of installations currently operating under the current Pg-
16 2D tariff. As explained in Mr. Zich’s direct testimony, the current Pg-2B tariff,
17 titled “Energy Purchase Service – LMP,” allows Qualifying Facilities (QFs) 5
18 MW or less to sell all their generation to the company at the current avoided cost
19 rates. The revamped PG-2B service, titled “Sales to Company After Customer
20 Self-Supply,” would allow both QFs and customer-generators with facilities up to
21 one MW to sell generation not offsetting retail load to the company at the avoided
22 energy rate.

1 **Q. Would the current population of generation owners operating under Pg-2D**
2 **tariff consider taking service under the proposed Pg-2B tariff?**

3 A. In my opinion, this group of customers would consider a tariff that provides any
4 compensation for exports as an improvement over their present service. Instead of
5 involuntarily donating any excess generation to the utility, these solar system
6 owners would receive some compensation for generation exported to the utility. A
7 tariff that does not compensate solar system owners for generation exported to the
8 grid constitutes an unfair subsidy to the rate base entirely at the customer-
9 generator's expense. I am not aware of any regulatory principle supporting the
10 involuntary donation of customer-generated electricity to a utility. In our view,
11 this is not a just and reasonable rate.

12 It is also worth pointing out that a tariff that fairly compensates exports
13 has the potential to elicit more robust customer adoption of larger behind-the-
14 meter solar installation than does the current Pg-2D tariff. Compensating exported
15 electricity could mean the difference between a customer going forward with a
16 solar installation that offsets a meaningful percentage of that customer's load
17 versus a customer decision to scuttle a planned installation due to the inequity and
18 unfavorable economics of an offset-only tariff.

19 The discussion above on NSW's proposed Pg-2B service should not be
20 interpreted as an endorsement of the tariff as proposed, as my testimony does not
21 delve into the assumptions and calculations of utility costs avoided by the tariffs
22 proposed by NSW in this proceeding. Other RENEW witnesses will address

1 those issues in their testimony and will assess the reasonableness of the proposals
2 offered by NSPW based on their own analysis.

3 **Q. Do you have any final thoughts about NSPW's current treatment of larger**
4 **behind-the-meter generation?**

5 A. The handful of PV systems taking service under Pg-2D illustrates that self-
6 supply-only tariffs are a significant disincentive to prospective installation owners
7 that do not have a consistently large load to offset. A reasonable export rate must
8 be part of the equation. Otherwise, many potential behind-the-meter systems
9 larger than 100 kW will not move past the drawing board. No system owner is
10 going to donate value to the utility. They will instead either undersize the
11 installation to minimize exports or invest in onsite storage, if they can afford it.
12 Most customers cannot.

13 **IV. DISCUSSION OF FRONT-OF-METER DISTRIBUTED SOLAR**
14 **GENERATORS IN WISCONSIN AND WHETHER NSPW'S PG-2A**
15 **WOULD ENCOURAGE MORE OF THESE INSTALLATIONS.**

16 **Q. Are front-of-meter solar arrays interconnected to distribution grids**
17 **becoming more commonplace in Wisconsin?**

18 A. Yes. I have prepared a table that lists both utility-owned and nonutility-owned
19 front-of-meter solar generation facilities in Wisconsin. (Ex.-RENEW-Vickerman-
20 2). The solar arrays identified in this exhibit, including those hosted by large utility
21 customers, feed electricity directly into utility distribution systems without
22 serving any retail load onsite. Virtually all of these solar arrays have been
23 constructed and energized in the last five years. The aggregate generating capacity
24 represented by this group of distributed power plants is about 140 MW.

1 **Q. What accounts for this upsurge in the development of this type of solar**
2 **power here?**

3 A. Here, as elsewhere in the country, smaller-scale solar development has benefited
4 from a combination of declining equipment costs, increases in generation
5 efficiency, and growing utility comfort in interconnecting these generators to their
6 distribution systems. The first wave of distributed solar plants in Wisconsin was
7 triggered by a Request for Proposals issued by Dairyland Power Cooperative in
8 2016. The winning bidders—SoCore Energy (now ENGIE North America) and
9 CMS Energy—constructed 13 solar plants in Wisconsin ranging in size from 600
10 kW to 2.75 MW, which are now supplying power to Dairyland-member
11 distribution cooperatives. The success of that venture inspired several regulated
12 utilities to explore development platforms that could support the development of
13 smaller-scale solar farms in their territories. These investigations led to the
14 development and rollout of regulatory structures designed to facilitate utility
15 deployment of solar power on a distributed scale. These initiatives include
16 Madison Gas and Electric’s Shared Solar and Renewable Energy Rider programs,
17 We Energies’ Solar Now program, and NSPW’s Solar*Connect Community
18 programs, among others. These utility-driven programs have, in a span of only
19 three years, leveraged more than half of the generating capacity represented in
20 Ex.-RENEW-Vickerman-2. With the exception of the three arrays supplying
21 electricity to NSPW’s Solar*Connect Community program, the solar farms
22 serving those utility programs are owned by the sponsoring utility.

1 **Q. Did those utilities develop the projects serving their various distributed solar**
2 **offerings?**

3 A. Almost without exception, the projects supplying power to the utilities’
4 distributed solar programs were developed by IPPs such as SunVest Solar and
5 OneEnergy Renewables. From the conception of these projects to their
6 construction and completion, these independent companies were responsible for
7 almost every detail, as evidenced by OneEnergy’s case study of the 5 MW Morey
8 Field it developed, which is now owned by Madison Gas and Electric (see Ex.-
9 RENEW-Vickerman-3)

10 “OneEnergy Renewables originated and developed the Morey Field
11 Solar project, working with the City of Middleton to sign a long-
12 term lease agreement, and with MGE to arrange the interconnection
13 to the local grid, coordinating Power Purchase Agreements between
14 all parties, and securing the necessary permits from the Federal
15 Aviation Administration to build adjacent to an active airport.”

16 While utilities such as We Energies and Madison Gas and Electric have the
17 capital and the customer base to support smaller-scale solar developments that are
18 interconnected to their distribution grids, they do not have the in-house technical
19 expertise or the staffing levels necessary to plan, design and develop projects. For
20 that reason, these utilities have elected to partner with selected IPPs, relying on
21 their expertise and development experience to advance projects that can
22 ultimately be fitted into the approved regulatory framework.

23 **Q. Do these IPPs own any of the projects they develop in the territories of**
24 **regulated electric utilities?**

25 A. With the exception of the entities that own the arrays dedicated to NSPW’s
26 Solar*Connect Community program, IPPs do not have any ownership stake in the

1 many projects they have developed and built for Wisconsin's electric utilities.
2 However, a number of IPPs, including ENGIE North America and OneEnergy
3 Renewables, have built and presently own and operate more than 20 distributed
4 solar power plants in Wisconsin, mostly in the western part of the state. These
5 arrays supply electricity to electric cooperatives and municipal electric utilities
6 under long-term Power Purchase Agreements (PPAs).

7 **Q. Why have IPPs been able to own and operate solar power plants in that**
8 **particular market space?**

9 A. Electric cooperative associations and municipal utilities have not shown any
10 interest thus far in developing and owning solar generation at any scale. There is
11 one overriding explanation for this behavior, and that is economics. Due to their
12 organizational structure, rural electric cooperatives cannot efficiently monetize
13 the federal Investment Tax Credit (ITC) that has spurred and supported solar
14 electric development in the United States since 2009. Municipally owned electric
15 utilities are nonprofit enterprises, and are thus ineligible for any sort of tax credits.
16 Their inability to apply tax credits to lower the cost of solar development puts
17 them at a substantial economic disadvantage vis a vis for-profit developers that
18 often work hand in hand with financing entities that can fully monetize the ITC.
19 As a result of these factors, these entities turn to IPPs to build their supplies of
20 solar power at a lower cost than what they could achieve using their own
21 resources.

1 **Q. What is the typical duration of a PPA involving a smaller solar array?**

2 A. PPAs between electric providers and solar developers typically extend over a
3 minimum of 20 years. Long-term contracting is critical to a solar developer's
4 ability to secure affordable financing terms to build the project. Just as long-term
5 recovery of capital expenditures in rates enable utilities to expand their
6 infrastructure in a cost-effective manner, contracts of similar length are similarly
7 crucial to solar developers that must rely on external financing to invest in
8 facilities where expenses are front-loaded and revenue flows are not initiated until
9 construction is completed. The 2.5 MWAC Blue Prairie solar project owned and
10 operated by OneEnergy Renewables is a typical example. This project, which was
11 energized in mid-2021, sells power to Jackson Electric Cooperative under a 25-
12 year PPA (see Blue Prairie case study in Ex.-RENEW-Vickerman-3). It is highly
13 likely that Blue Prairie would not have been financeable under a PPA of shorter
14 length.

15 Another vehicle for attracting affordable long-term financing for smaller
16 solar projects is the forward purchase of renewable energy credits (RECs). This
17 option is available to solar developers if the language in the contract or tariff does
18 not specify the transfer of RECs to the power purchaser. In the case of
19 OneEnergy's Butter Solar initiative, a 10-site portfolio of smaller solar farms
20 completed in 2019, forward purchases of RECs by such entities as Organic Valley
21 and the City of Madison were essential elements for securing financing for these
22 arrays (see Butter Solar case study in Ex.-RENEW-Vickerman-3). Before ground
23 was broken, the City of Madison entered into a contract with OneEnergy to

1 purchase 25 years of RECs generated by five of the Butter Solar arrays with an
2 aggregate capacity of 10 MWAC. Through this long-term commitment to Butter
3 Solar’s RECs, the City of Madison is offsetting about one-third of its own
4 electricity usage with these zero-emission generation sources. It is highly unlikely
5 that the five arrays would have proceeded to construction without the City’s 25-
6 year REC purchase commitment.

7 **Q. What contract durations does NSPW propose to offer in its Pg-2A parallel
8 generation tariff?**

9 A. NSPW proposes to offer 1-, 5-, 10- and 15-year contracts for avoided capacity
10 only.

11 **Q. Are the contract durations offered in NSPW’s Pg-2A parallel generation
12 tariff sufficient to elicit interest from IPPs to develop projects for the purpose
13 of selling their output to the utility?**

14 A. No. As noted above, building solar generating capacity is a capital-intensive
15 endeavor in which the vast majority of expenses are incurred before the project
16 begins generating a return on investment. A contract of 20 years or longer
17 provides lenders and investors with confidence in the predictability and stability
18 of revenue flows that will be counted on to amortize their investments. Given the
19 high likelihood that changes to revenue flows will occur upon the expiration of
20 the original contract, attracting investments from the financial community would
21 be difficult if not impossible to accomplish without agreeing to a substantial risk
22 premium in the financing terms, which would diminish the return on investment
23 that the developer would otherwise expect to earn.

1 In addition, it needs to be emphasized that front-of-meter solar generation
2 provides capacity benefits to the utility as well as low-cost energy to customers
3 over their 30-year-plus lifespans. Tariff structures that do not shield these
4 investments from the vagaries of marginal energy and capacity pricing
5 methodologies from one year to the next cannot help but understate the long-term
6 value of these investments. For that reason, I doubt very much that any solar
7 developer will develop a small solar farm for the purpose of selling its output to
8 NSPW through the proposed Pg-2A tariff. NSPW's proposed 1-, 5-, 10- and 15-
9 year contract durations may be appropriate for existing facilities currently in the
10 middle of their expected useful lives and those seeking an extension to an initial
11 contract.

12 **Q. Are there any utility-administered solar programs in Wisconsin that rely on**
13 **long-term commitments from customers to secure the benefits of smaller**
14 **solar farms?**

15 A. Yes, there is one. Madison Gas and Electric's Renewable Energy Rider (RER)
16 service is predicated on 30-year commitments from larger customers to purchase
17 the output from solar generating facilities that the utility builds for their exclusive
18 use. Indeed, the relationship between MGE and an RER customer is highly
19 analogous to the supply arrangement negotiated between a solar developer and the
20 purchasing utility. Through these RER contracts, the utility can count on a
21 predictable and stable flow of revenue over their 30-year contract lifespans. At the
22 same time, the customer can rely on the stable and predictable provision of a

1 desirable energy source from Year 1 to Year 30, and will know much it will cost
2 in each year covered under the RER contract.

3 What solar developers are looking for from a PPA with a utility is no
4 different than what MGE expects to secure with an RER customer. Having
5 leveraged four distribution-scale solar farms to date totaling 42 MW of solar
6 capacity, MGE's RER program has been enormously successful in building solar
7 capacity that did not require an investment from its rate base. It is RENEW's view
8 that IPP-owned solar farms can provide the same benefits to utility customers, if
9 the terms of the PPA are fair and if the contracts are of sufficient length.

10 Also, with IPP-owned solar generation, there is an additional source of
11 savings. As a general rule, IPPs operate with a lower cost of capital than do
12 electric utilities. With this attribute, IPPs can flow their lower borrowing costs to
13 project bottom lines, thus lowering the unit cost of the power purchased through
14 the PPA.

15 **Q. Are distribution-level solar projects more expensive to develop and operate**
16 **than transmission-level solar projects?**

17 A. There is a growing body of evidence suggesting that the cost of distribution-scale
18 solar generation up to 20 MW is comparable to larger solar power plants in the 50
19 to 100 MW size range. This evidence includes the final reports that MGE recently
20 submitted to the Commission upon completing its Dane County Airport and
21 O'Brien solar projects. In those reports, MGE estimated the final costs of the 9
22 MW Dane County Airport and the 20 MW O'Brien project. The estimate for the
23 Dane County Airport array was \$14,430,354 or \$1,603/kW (without AFUDC).

1 (See Ex.-RENEW-Vickerman-4). For the O'Brien project, the estimate came to
2 \$30,083,524, or \$1,504/kW (without AFUDC) (See Ex.-RENEW-Vickerman-5).
3 These construction costs are comparable to the current construction cost estimates
4 in Wisconsin Power and Light's pending application to build six solar farms
5 totlaing 414 MW (Docket No. 6680-CE-183). The current utility estimate, which
6 was communicated in Wisconsin Power and Light's Initial Brief of February 11,
7 2022, is now \$1,594/kW (without AFUDC) (see Ex.-RENEW-Vickerman-6).

8 **Q. What are the factors that allow for the development of distribution-scale**
9 **solar generating facilities at costs comparable to larger solar power plants?**

10 A. Irrespective of whether the project is developed for IPP ownership or as a turnkey
11 project for utility ownership, the advantage of developing small solar farms is that
12 there are fewer moving parts in the development process, and they tend to be
13 more manageable in size than those typical of larger projects. As documented in
14 an online article I authored titled "Smaller Solar Farms in Wisconsin – Why More
15 Are Needed," interconnecting solar generation to the distribution grid can avoid
16 significant investments in transmission upgrades and new substations that larger
17 solar farms require (see Ex.-RENEW-Vickerman-7). Many solar farms ranging in
18 size from 1 MW to as much as 20 MW involve only one landowner, which
19 reduces transaction costs relative to larger projects. Dealing with fewer
20 landowners simplifies the land acquisition process and results in a less iterative
21 project design process. The permitting requirements for smaller projects are less
22 burdensome and time-consuming than with larger projects. Last, smaller-scale
23 projects provide developers with more options for sourcing equipment and

1 construction personnel from the local area, thereby reducing dependence on
2 lengthy supply chains, interactions with customs officials, and costs associated
3 with housing nonresident construction crews. In general, developing smaller solar
4 farms is often a simpler affair compared with CPCN-level solar development,
5 leading to savings in time and money.

6 **Q. What other attributes of distribution-level solar farms are worthy of**
7 **Commission consideration and policy support?**

8 A. In addition to their cost, which are comparable to larger solar developments,
9 smaller-scale solar arrays help support distribution grids, avoid distribution
10 capacity costs, and free up transmission capacity that would otherwise be filled to
11 provide the same quantity of generation. Moreover, due to their compactness,
12 smaller-scale solar farms can be sited on parcels that would be too small to host
13 larger, transmission-level projects. There are numerous farms and commercial
14 properties served by robust distribution feeders that can accommodate solar arrays
15 ranging from OneEnergy’s Strobilus project on the small end to MGE’s O’Brien
16 installation at the large end. Distribution-scale solar is also ideally sized to deliver
17 carbon-free electricity to customers that have adopted ambitious carbon reduction
18 goals but lack the necessary conditions or resources for hosting solar generation
19 onsite. As exemplified by OneEnergy’s Butter Solar portfolio, the RECs
20 generated from these solar installations can help forward-looking municipalities,
21 school districts and companies achieve their carbon reduction goals. Also, on a
22 unit basis, distribution-level solar farms are just as efficient in displacing carbon
23 emissions as larger developments, perhaps more so, owing to their negligible

1 contribution to line losses. Finally, the record on solar development in recent
2 years clearly shows that smaller-scale solar arrays avoid a number of risks
3 associated with larger-scale development, such as community opposition and
4 lengthier development timetables. With that in mind, an expansion of distribution-
5 scale solar installations would be a prudent complement to the current utility
6 preference for acquiring large-scale solar projects.

7 **Q. Can you offer any other data points that demonstrate the value of**
8 **distribution-scale solar development?**

9 A. The Renewable Energy Rider and Shared Solar programs operated by MGE
10 provide another useful data point confirming the value of smaller-scale solar
11 projects. Going into 2020, there was a total of 500 kW of MGE-owned—but not
12 rate-based—solar capacity built to serve customers in other locations. By April of
13 this year, that number will grow to 42.5 MW. Partnering with companies such as
14 EDF Renewables and OneEnergy Renewables, MGE oversaw the approval and
15 construction of four distribution-scale solar farms within a three-year window,
16 relying on a development approach that uses land efficiently while avoiding
17 conflicts with neighbors. MGE’s experience attests to the ability of distribution-
18 level solar generation to fit in well with urbanized utility territories. Based on the
19 example set by MGE, NSPW should seriously consider expanding its
20 Solar*Connect Community program as well as establishing a sleeved tariff option
21 similar to MGE’s Renewable Energy Rider service. Both options would greatly
22 expand solar development opportunities for IPPs in NSPW territory.

1 **Q. In your estimation, do you believe that utilities like NSPW can achieve their**
2 **carbon reduction goals without a stepped-up effort to expand the presence of**
3 **behind-the-meter and smaller-scale front-of-meter solar generation in their**
4 **territories?**

5 A. No, I do not. There are simply not enough locations in Wisconsin that have the
6 requisite attributes, such as proximity to transmission infrastructure and
7 landowner support, to support large-scale solar development at a pace and scale
8 enabling Wisconsin electric utilities to achieve carbon neutrality. The
9 decarbonization challenge facing utilities is immense; they will need every tool in
10 the toolbox just to get within hailing distance of their carbon neutrality goals.
11 With that perspective, it does not serve the larger public interest to allow utilities
12 to offer tariffed services that are economically unattractive to solar developers.
13 We have already have in Wisconsin a number of parallel generation tariffs that
14 have yet to bring in their first customer (e.g., We Energies' Dedicated Renewable
15 Energy Resource, Alliant's Renewable Energy Partner, and MGE's PV Connect
16 programs). We do not need any more of them.

17 **Q. Do you have any recommendations for the Commission's consideration?**

18 A. Yes. Regarding NSPW's Pg-2A proposal, I urge the Commission to require
19 NSPW to offer 20-year and longer contracts in addition to the 1-, 5-, 10- and 15-
20 year contracts proposed by the utility.

1 **Q. Do you have further recommendations regarding contracts with QF**
2 **resources?**

3 A. Yes. While it is critical that QFs to have the option to enter into long-term
4 contracts for all the reasons I have described in my testimony, the details on
5 contract terms can materially affect developers' costs and their ability and
6 willingness to enter into long-term contracts. I urge the Commission to direct
7 NSPW to develop a standard offer contract for QF resources greater than 100 kW.

8 **Q. Does this complete your direct testimony?**

9 A. Yes, it does.