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**BEFORE THE
PUBLIC SERVICE COMMISSION OF WISCONSIN**

Application for Grant County Solar, LLC to Construct a New
Solar Electric Generation Facility located near Potosi and Harrison Townships, in Grant County, Wisconsin

Docket No. 9804-CE-100

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REBUTTAL TESTIMONY OF PAUL CALLAHAN

Q. Please state your name and business address.

A. My name is Paul Callahan, and my business address is 700 Universe Blvd., Juno Beach, FL, 33408.

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

A. Until August 2020, I was employed by NextEra Energy Resources, LLC (“NEER”) as a Director of Solar Project Engineering in the Engineering & Construction (“E&C”) Department. NEER is a wholly-owned subsidiary of NextEra Energy, Inc. (“NextEra Energy”) and the indirect parent company of the Applicant, Grant County Solar, LLC (“Grant County Solar”). I am currently employed by Summit Energy Group, LLC supporting various NEER solar projects including the NEER affiliate Grant County Solar, LLC’s (“Grant County Solar”) 200 megawatt (“MW”) alternating current (“AC”) solar generation project and its associated facilities to be located in Grant County, Wisconsin (the “Project”).

Q. Please describe your responsibilities at NEER and, specifically, the Grant County Solar Project.

A. In my previous capacity as a Director of Project Engineering - E&C, I was responsible for leading project engineering both during development and execution of new select

1 renewable generation projects. This included preliminary engineering, detailed
2 engineering, supporting procurement of major power plant equipment, and engineering
3 services procurement. Currently, I am a consultant supporting the development of the
4 Project.

5 **Q. Please summarize your education and professional background.**

6 A. I hold a Bachelor of Science degree in Civil Engineering from Virginia Tech and am a
7 registered Professional Engineer in the State of Florida.

8 I have over 40 years experience in the electrical power generation sector including
9 32 years with NextEra Energy. With NextEra Energy, I held various engineering and
10 project management positions and have experience with many types of generation
11 including fossil, nuclear, and solar facilities. Overall, I have had extensive experience
12 overseeing the engineering and design of over 4,000 MW of solar photovoltaic (“PV”)
13 generation projects on behalf of NEER affiliates.

14 **Q. Are you sponsoring any exhibits with your testimony?**

15 A. Yes. I am sponsoring the following exhibit:

16 Ex.-Grant County Solar-Paul Callahan-1: Resume of Paul Callahan.

17 Ex.-Grant County Solar-Paul Callahan-2: White Paper “Health and Safety Impacts of Solar
18 Photovoltaics,” N.C. State University, N.C. Clean Energy Technology Center, May 2017.

19 Ex.-Grant County Solar-Paul Callahan-3: V. Fthenakis, K. Zweibel, “CdTe: Real and
20 Perceived EHS Risks.” National Center for Photovoltaics and Solar Program Review
21 Meeting, 2003.

1 **Q. What is the purpose of your rebuttal testimony?**

2 A. First, I am sponsoring and adopting the Direct Testimony of Rafael Guzman previously
3 filed in this proceeding. Mr. Guzman is no longer with the Company. I am also responding
4 to certain portions of the direct testimony filed by Public Service Commission of Wisconsin
5 (“PSCW” or “Commission”) staff witnesses Bert Chee and Tyler Tomaszewski, Wisconsin
6 Department of Natural Resources (“WDNR”) staff witness Lindsay Tekler, and Grant
7 County Intervenors (“GCI”) witnesses Preston and Jennifer Adrian, Daniel Cray, Brianna
8 Eisenstout-Frear and Henry Frear, Ross Reynolds, and Kelsey and Travis Wagner
9 (collectively, the “GCI Witnesses”).

10 Electrical Codes and Applicable Requirements

11 **Q. Mr. Chee has suggested an order condition requiring Grant County Solar to**
12 **construct, maintain, and operate all project facilities in compliance with the National**
13 **Electrical Code (“NEC”), the National Electrical Safety Code (“NESC”) and/or Wis.**
14 **Admin. Code ch. PSC 114, as appropriate. (Direct-PSC-Chee-6). What is your**
15 **response to this request?**

16 A. As set forth on page 9 of the Direct Testimony of Mr. Guzman, which I have adopted,
17 Grant County Solar will construct, maintain, and operate all applicable Project facilities in
18 accordance with the NEC, NESC, and/or Wis. Admin. Code ch. PSC 114, as applicable.

19 **Q. Mr. Tomaszewski recommends a certificate condition requiring Grant County Solar**
20 **to obtain all necessary federal, state, and local permits prior to commencement of**
21 **construction (Direct-PSC-Tomaszewski-12). Do you agree?**

1 A. Yes. As stated on page 11 of Mr. Guzman’s Direct Testimony and identified in Table 1.8.1
2 of the Application, Grant County Solar will obtain all applicable permits prior to the
3 commencement of construction activities.

4 Construction Activities

5 **Q. Ms. Tekler recommends several construction activity measures related to waterways
6 and wetlands (Direct-WDNR-Tekler-3-4). Is Grant County Solar willing to
7 implement these construction activity measures?**

8 A. Yes, to the extent applicable to the Project, Grant County Solar will comply with
9 Ms. Tekler’s recommended construction activity measures related to waterways and
10 wetlands.

11 **Q. Mr. Tomaszewski also suggests that Grant County Solar adhere to time-of-day work
12 restrictions during construction of the Project (Direct-PSC-Tomaszewski-7). Will
13 Grant County Solar comply with any such applicable restrictions?**

14 A. As set forth in the Application, Grant County Solar will comply with applicable time-of-
15 day work restrictions. Moreover, as discussed in the Rebuttal Testimony of David Gil,
16 Grant County Solar will provide notice of construction to all parties on the Commission
17 mailing list in this proceeding prior to the commencement of construction. The notice will
18 include the contact information for a dedicated Project contact person to answer inquires
19 and receive any complaints. In addition, Grant County Solar will clearly post contact
20 information at construction site entrances.

1 Minor Siting Flexibility

2 **Q. What does Mr. Tomaszewski recommend with respect to minor siting flexibility?**

3 A. Consistent with previous solar generation projects, Mr. Tomaszewski recommends that the
4 Commission include a certificate condition whereby Grant County Solar may propose
5 minor adjustments in the approved Project layout. (Direct-PSC-Tomaszewski-10-12.) For
6 any proposed modification, Mr. Tomaszewski recommends that Grant County Solar
7 consult with Commission staff regarding the proposed change and submit for Commission
8 staff review and approval a letter describing: the nature of the requested change; the reason
9 for the requested change; the incremental difference in any environmental impacts;
10 communications with potentially affected landowners regarding the change;
11 documentation of discussions with other agencies regarding the change; and, a map
12 showing the approved route and the proposed modification, property boundaries, relevant
13 natural features such as woodlands, wetlands, waterways, and other sensitive areas.

14 **Q. Do you agree with the process proposed by Mr. Tomaszewski to allow for minor siting**
15 **flexibility?**

16 A. Yes. Grant County Solar believes that it is important to have minor siting flexibility to
17 accommodate the final Project design. As the Commission has recognized, given that
18 detailed engineering is not complete prior to the Commission issuing the Certificate of
19 Public Convenience and Necessity, minor siting flexibility may be needed to accommodate
20 the final design of the Project. For example, situations may be discovered in the field that
21 were not apparent based on the information available to Grant County Solar in the
22 development of the Project. (*See e.g.*, Docket No. 9696-CE-100, *Application for a*
23 *Certificate of Public Convenience and Necessity of Two Creeks Solar, LLC to Construct a*

1 Despite the substantially low risk of the Project causing stray voltage, as set forth
2 in both Section 5.13.7.4 of the Application and the adopted Direct Testimony of Grant
3 County Solar Witness Guzman, consistent with Wis. Admin. Code § PSC 128.17 and the
4 Commission’s recent decisions on the issue in the Two Creeks Solar and Point Beach Solar
5 proceedings (*see* Two Creeks Solar Final Decision, p. 38; *see also* Point Beach Solar Final
6 Decision, pp. 21, 38), Grant County Solar will conduct pre- and post-construction stray
7 voltage testing at any confined animal operation located within 0.5 mile of the Project Site
8 in coordination with the local distribution utility. The Project Site, rather than the “project
9 area” or “Project Study Area” is the appropriate focus of any such testing and is consistent
10 with reference to “facility” in Wis. Admin. Code § PSC 128.17, given that the Project
11 facilities will be within the Project Site. Grant County Solar will provide the results of the
12 stray voltage testing to Commission staff.

13 In the highly unlikely event that a stray voltage problem attributable to the
14 construction and operation of the Project is discovered, Grant County Solar will work with
15 the local distribution utility and agricultural facility owner to rectify any such issue.

16 Severe Weather

17 **Q. The GCI witnesses express concern that the Project will not be designed to withstand**
18 **severe weather (Direct-GCI-Adrian-1,4-5; Direct-GCI-Cray-5; Direct-GCI-Frear-9;**
19 **Direct-GCI-Reynolds-2). Will the Project be designed to withstand extreme weather**
20 **events?**

21 **A.** Yes. Grant County Solar will design and construct the Project to withstand various extreme
22 weather events, including high winds, flooding, and accumulating winter precipitation.

1 As discussed fully in Grant County Solar’s Response to PSCW Staff Data Request
2 No. 2.02, the Project will meet the site-specific wind load requirements of both the
3 Wisconsin Department of Safety and Professional Services (“DSPS”) and the American
4 Society of Civil Engineers (ASCE) 7-10.

5 Consistent with applicable requirements, the Project facilities, including the
6 racking system, the tracker support posts and the PV module attachment to the racking
7 system, will be designed in accordance with Risk Category I - ASCE 7-10. Based on the
8 Project location, compliance with Risk Category 1 –ASCE 7-10 requires the structural
9 components of the Project to withstand wind gusts of up to 105 MPH. Multiple other
10 structures classified as Risk Category 1, such as billboards and agricultural facilities, are
11 also located in and around the Project area. The 105 MPH code specified wind speed is
12 established based on historical wind speeds in the region and includes consideration of
13 tornados.

14 **Q. Is it likely that panels will shatter during an extreme weather event?**

15 A. No. To provide decades of corrosion-free operation, solar cells are encapsulated from air
16 and moisture between two layers of plastic, with a layer of tempered glass and a polymer
17 sheet or industrial laminate. In the same way a windshield cracks but does not shatter when
18 broken, a damaged solar cell does not generally create small pieces of debris.

19 **Q. In the event there is damage from an extreme weather event, what mitigation
20 measures would Grant County Solar implement?**

21 A. As discussed above, Grant County Solar will design and construct the Project to withstand
22 various extreme weather events, including high winds, flooding, and accumulating winter
23 precipitation. Moreover, given that the Project will be primarily located on agricultural

1 land and that the Project Site will be use-restricted behind locked fences and gates, the
2 public health and safety from extreme weather events is small.

3 However, as discussed in Grant County Solar's response to PSCW Data Request
4 No. 3.05, in the unlikely event damage to the Project occurs as the result of extreme weather
5 events, depending on the extent of such damage, Grant County Solar will take the following
6 steps, as applicable: (a) respond to any emergency situation and notify appropriate first
7 responders and regulatory agencies, as applicable; (b) make any necessary repairs to
8 resume service; and, (c) file appropriate insurance claims or legal claims to recover
9 damages. Moreover, if it is demonstrated that damage from the Project has occurred due to
10 an extreme weather event, and such damage has resulted in an adverse impact to
11 neighboring property, Grant County Solar will work with landowners to identify and
12 address any such adverse impacts.

13 It is anticipated that Grant County Solar and/or its contractors will maintain
14 commercial general liability insurance with limits of one million dollars (US \$1,000,000)
15 per occurrence and two million dollars (US \$2,000,000) aggregate for bodily injury and/or
16 property damage. Moreover, it is anticipated that excess liability insurance will be
17 maintained covering employer's liability, commercial general liability, and business auto
18 liability, each to a limit of twenty million dollars (US \$20,000,000) combined single policy
19 limit for bodily injury and property damage.

20 **Q. GCI witness Cray expresses concern over snow build up. Will the Project cause the**
21 **accumulation of snow?**

22 **A.** No. As discussed in Grant County Solar's response to PSCW Data Request No. 2.02, the
23 final Project design will include automated weather controls. When the module trackers

1 detect the onset of adverse weather conditions, the tracker controller will adjust the module
2 trackers to orient the PV panels in a safe, stowed position until the adverse weather
3 condition clears. During the winter, Grant County Solar will remove or maintain
4 accumulated frozen precipitation on or between the PV arrays as needed to allow for
5 maintenance access and safe operation. In addition, the Project will be designed with a
6 minimum of 18” to 24” clearance from the edge of panels to the ground in order to
7 minimize the effect of severe weather impacts such as deep and drifting snow, and
8 flooding. The Project design also includes a minimum of 12” above the modeled 100-year
9 flood plain elevation.

10 Solar Panel Materials

11 **Q. GCI expresses concern that solar panels may pose a health risk if damaged or**
12 **disposed improperly. (Direct-GCI-Frear-7-8). How do respond to this concern?**

13 A. Modern PV solar panels are made of materials typical of those found in electronic
14 equipment and are encased, so as not to pose a concern for the water supply or public
15 health.¹ Solar PV panels typically consist of glass, polymer, aluminum, copper, and
16 semiconductor materials that can be recovered and recycled at the end of their useful life.
17 (*Id.*)

18 **Q. Two PV panels currently being considered for the Project are thin film panels and**
19 **mono crystalline panels. Do either mono crystalline or thin film panels pose a**
20 **material risk or toxicity to public health and safety?**

21 A. No. Crystalline silicon panels represent approximately 90 percent of solar panels in use
22 today. Research has shown they “do not pose a material risk or toxicity to public health

¹ Ex.-Grant County Solar-Paul Callahan-2.

1 and safety.” (*ibid.*) Thin-film solar panels represent a small percentage of panels in use
2 today; some use a stable compound called cadmium telluride or other semi-conductor
3 materials. Research has shown the tiny amount of cadmium in these panels does not pose
4 a health or safety risk.²

5 Stormwater

6 **Q. The GCI witnesses have concerns with water drainage and stormwater runoff at the**
7 **Project Site. (Direct-GCI-Cray-7-8; Direct-GCI-Reynolds-1-2; Direct-GCI-Wagner-**
8 **6). How will stormwater be controlled at the Project Site during both construction**
9 **and operation?**

10 A. As discussed more fully in the Rebuttal Testimony of Grant County Solar witness Valerie
11 Locker, Grant County will obtain authorization under the Wisconsin DNR General Permit
12 to Discharge under the Wisconsin Pollutant Discharge Elimination System WPDES Permit
13 No. WI-S067831-5 (“WDNR Stormwater General Permit”) prior to the commencement of
14 construction. Detailed Erosion Control and Stormwater Plans and Civil Grading Drawings
15 will be prepared for the Project and submitted to and approved by WDNR prior to the
16 commencement of Project construction.

17 In general, the Project will require limited grading because the existing contours of
18 the Project Site are suitable for a solar plant with the exception for some localized minor
19 grading. During construction of the Project, temporary stormwater best management
20 practices will be implemented in accordance with the WDNR Stormwater General Permit
21 and the Project-specific Erosion Control and Storm Water Management Plans. Prior to the
22 start of work, Grant County Solar will meet with WDNR and Commission Staff to review

² Ex.-Grant County Solar-Paul Callahan-3.

1 the Erosion Control and Stormwater Management Plans and discuss the sequence of work.
2 The Erosion Control and Stormwater Management Plans will delineate each drainage sub-
3 basin on the Project Site based on a detailed topographic survey. Depending on various
4 factors such as size contributing area, slope of the land and receiving location of
5 stormwater, each sub-basin will specify the appropriate temporary erosion control features
6 including, silt fence, hay bales, sedimentation basins, diversion ditch, etc., as appropriate.
7 These temporary erosion control features will be frequently inspected during the execution
8 of earthwork, in accordance with the WDNR Stormwater General Permit.

9 A permanent basin will be constructed on the north side of the substation to manage
10 and treat stormwater runoff. The proposed basin location is shown in Grant County Solar's
11 Response to PSCW Data Request No. 1.02, Attachment 1.02. The basin will be designed
12 to control the discharge rate of a 100-year storm event per Wisconsin DNR General Permit
13 to Discharge under the Wisconsin Pollutant Discharge Elimination System WPDES Permit
14 No. WI-S67831-5. The size of the basin will be determined during final Project design.

15 The basin location and design will maintain existing hydrologic flow patterns.
16 Stormwater will enter the basin via sheet flow from the south and east. The location of the
17 basin is a natural concentration point that continues flow to the north. The basin will outlet
18 to the north along the natural drainage route. Surface reinforcement will be utilized where
19 necessary to reduce erosion potential. Because the soils in the substation area are primarily
20 Lean Clay (CL) which are Hydrologic Soil Group D, it is anticipated that a wet basin will
21 be used. Moreover, as discussed by Grant County Solar witness Valerie Locker, the
22 majority of the Project Site, including areas beneath and around arrays, will be planted with
23 perennial vegetation and managed as grassland. Stormwater infiltrates soil at a higher rate

1 on perennial grassland than on cultivated cropland. In addition, given the Project Site is
2 predominantly agricultural, limited clearing will be required. As such, the addition of
3 perennial vegetation will manage additional runoff resulting from the solar panels and
4 access roads.

5 Once constructed, the permanent stormwater facilities and perennial vegetation will
6 be managed in accordance with the WDNR stormwater permits applicable to the Project.
7 In contrast to agriculture, the Project will not require regular ground disturbance once the
8 Project is constructed and vegetation is established.

9 Municipal Services

10 **Q. The GCI witnesses express concern regarding the ability of municipal first**
11 **responders to safely and adequately respond to emergencies at the Project. (Direct-**
12 **GCI-Adrian-1, 5.) Will municipal first responders be educated about the Project.**

13 A. As set forth in Section 6.1.2 of the Application, the Project will be installed to conform to
14 all applicable electrical and fire codes and will not require any unique fire, police, or rescue
15 services. In addition, the Project operations team will meet with local responders to review
16 the Project configuration and educate local responders about any potential assistance of
17 emergency responders that may be required.

18 **Q. Will the Project Site be designed to prevent trespassing?**

19 A. As set forth in Section 2.2.8 of the Application, Grant County Solar will utilize “deer
20 fencing” or equivalent around the PV solar array sites that is consistent with all codes,
21 including North American Electric Reliability Council Critical Infrastructure Protection
22 requirements. For the substation site, Grant County Solar will utilize a seven-foot chain
23 link fence that includes one foot of barbed wire on top. Each fenced area will include

1 appropriate safety signage, and locked inverter and switchgear equipment cabinets. These
2 features will prevent the public from inadvertent contact with electrical equipment.

3 **Q. Will municipal first responders have access to the Project Site?**

4 A. Each fenced area will have at least one entrance gate with access to a public road. The
5 access roads will not be available for use by landowners, however, municipal first
6 responders, depending on their preference, will be provided keys to the lock box at the
7 Project Site to enable access in the event of an emergency.

8 **Q. Does this conclude your prefiled rebuttal testimony?**

9 A. Yes, it does.