

PRE-FILED DIRECT TESTIMONY OF
BENJAMIN LINDERMEIER
ON BEHALF OF FERN SOLAR LLC

NCUC DOCKET NO. EMP-104, SUB 0

INTRODUCTION

Q. PLEASE STATE YOUR NAME, TITLE, AND BUSINESS ADDRESS.

A. My name is Benjamin Lindermeier. I am Development Manager for BayWa r.e. Development, LLC, a Delaware limited liability company (“BayWa”). My business address is BayWa r.e. Development, LLC, 17901 Von Karman Avenue, Suite 1050, Irvine, California 92614.

Q. PLEASE DESCRIBE YOUR EDUCATION AND PROFESSIONAL EXPERIENCE.

A. I have more than seven years of experience in the development of renewable projects, ranging from combined heat and power plants to biogas municipal heating grids to solar photovoltaic (“PV”) development in Europe and North America. I have worked on hundreds of megawatts (“MW”) of solar PV projects in France, Canada, and the United States. I started as a Senior Project Developer with BayWa in April of 2015. I have held my current position as a Development Manager since January 2017. My prior roles include Project Manager Development and Project Engineer in the renewable space as well as Supply Chain Specialist in the computer industry. I hold a Bachelor’s degree in Business Administration from the University of Applied Sciences in Ingolstadt, Germany, and a Master of Science in Industrial Engineering and Management from the University of Applied Sciences in Mannheim, Germany.

20 **Q. WHAT IS YOUR RELATIONSHIP TO THE APPLICANT?**

21 **A.** As discussed in the application, Fern is a limited liability company organized
22 for the development and ownership of the Project. Fern was initially developed by Geenex
23 Solar, LLC, a Delaware limited liability company (“Geenex”), and later fully acquired by my
24 employer, BayWa. BayWa and Geenex continue joint development of the project. While
25 Geenex is spearheading land acquisition and local permitting with BayWa’s support, BayWa
26 is mainly in charge of engineering, procurement, construction, power marketing, and O&M.

27 **Q. PLEASE SUMMARIZE YOUR CURRENT EMPLOYMENT**
28 **RESPONSIBILITIES.**

29 **A.** My current role as a Development Manager with BayWa covers the whole
30 spectrum of solar PV development from land acquisition to support of closing of project sales
31 with long-term owners. This includes local, state, and federal permitting, title curative work,
32 and budgeting. Local permitting focuses on obtaining conditional use permits and fulfilling
33 their condition to enable issuance of a grading and building permit. State permitting includes
34 state environmental permits as well as Certificates of Public Convenience and Necessity or
35 Reports of Proposed Construction, as applicable. Federal permits are usually limited to
36 wetland related permits issued by the U.S. Army Corps of Engineers.

37 Within BayWa the development department coordinates with Engineering,
38 Construction, Legal, and Project Finance to take a project from idea to marketable asset.

39 **Q. HAVE YOU PREVIOUSLY TESTIFIED BEFORE THIS**
40 **COMMISSION?**

41 **A.** No.

42 **Q. WHAT IS THE PURPOSE OF YOUR TESTIMONY?**

43 A. The purpose of my testimony is to provide the Commission with background
44 information about BayWa's experience and portfolio, financial capabilities, and the financing
45 of the Fern Solar LLC ("Fern") solar PV generating project in Edgecombe County, North
46 Carolina (the "Project"). Another purpose of my testimony is to describe for the Commission
47 the offtake plans for Fern.

48 **COMPANY BACKGROUND AND PROJECT FINANCE**

49 **Q. PLEASE DESCRIBE THE COMPANY'S TECHNICAL EXPERIENCE**
50 **AND FINANCIAL CAPABILITIES TO OWN AND OPERATE THE PROJECT.**

51 A. As described in the application, BayWa is a fourth tier subsidiary, wholly
52 owned by its Munich-based international parent company BayWa AG ("BayWa AG"). BayWa
53 r.e. Solar Projects, LLC is the sole member of BayWa r.e. Development, LLC, which again is
54 the sole member of Fern Solar, LLC.

55 BayWa has the experience to build, own, and operate solar power generation facilities,
56 including the Project. As mentioned in the application, BayWa is operating and developing
57 approximately 50 solar PV facilities across the United States, including a completed site in
58 Colorado and others under development in Washington, Utah, New York, Illinois, Kentucky,
59 Virginia, Florida, California, and North Carolina in addition to the Project. With the
60 completion of these additional projects and the Project, BayWa expects to generate
61 approximately 1.2 gigawatts ("GW") of capacity across the United States.

62 BayWa also has the financial capacity to build and operate the Project. The
63 development of the Project is funded by BayWa through intra-company loans provided by its

64 parent company, BayWa AG. The most recent consolidated financial statements of BayWa
65 AG, BayWa's parent company, for 2017 are provided as Schedule 3 to the Application.

66 **Q. HOW WILL THE PROJECT BE FINANCED?**

67 A. As mentioned earlier in my testimony, the development of the Project is funded
68 through intra-company loans from Fern's parent company BayWa AG. Due to the size of the
69 Project, BayWa will secure a third-party construction loan, likely from a bank, for about 80%
70 of the costs for the Project's construction and equipment. The construction loan process has
71 not yet started. A detailed estimate of construction costs has been provided, under seal, as
72 Schedule 4 to the Application. During construction, BayWa will raise tax equity, additional
73 cash equity, and term debt. The construction loan will be retired when the project achieves
74 commercial operation with proceeds from term debt and tax equity.

75 **Q. WHAT IS THE CONSTRUCTION TIMELINE FOR THE FACILITY?**

76 A. Construction for the project is expected to begin in the second quarter of 2019
77 with an estimated date of commercial operation date in the second quarter of 2020.

78 **Q. DESCRIBE BAYWA'S EXPERIENCE WITH RAISING PROJECT**
79 **FINANCING.**

80 A. As a subsidiary of BayWa AG, BayWa has the capability on behalf of the
81 Project to arrange adequate financing, insurance, guarantees, security, and other assurances for
82 the Project's development, construction, and operation. Although BayWa finances
83 construction for smaller projects on balance sheet, BayWa has also successfully obtained third
84 party financing for loans on behalf of its other solar PV projects that is similar to the third party
85 financing BayWa anticipates for the Project. BayWa arranges project financings through a
86 team of professionals in Irvine, California.

SITE AND FACILITY DESCRIPTION

Q. WHERE IS THE PROJECT LOCATED?

A. The project will include approximately 1,235 acres of privately-owned land outside of Tarboro in Edgecombe County, North Carolina. The site is largely rural and agricultural in nature and most of the landowners will continue to farm and live in proximity to the site. The site will primarily lie behind ongoing farm operations and natural vegetative buffers.

Q. HOW WILL THE PROJECT BE INTERCONNECTED TO THE GRID?

A. Fern will interconnect with the transmission grid owned by Virginia Electric and Power Company, d/b/a Dominion Energy North Carolina ("Dominion"). The Project's switching station will connect to Dominion's existing Benson-Dunbar 115kV transmission lines, which cross the Project site. Fern Solar LLC, Dominion, and PJM Interconnection LLC have entered into an Interconnection Service Agreement which provides the terms and conditions under which the Project will interconnect.

Q. WHAT IS THE PROJECT'S ANTICIPATED ELECTRICITY PRODUCTION CAPABILITY?

A. The nameplate generating capacity of the facility will be 100 MW with anticipated gross capacity of approximately 150 MW with an anticipated generation of 250 GWh of electricity per year. Because solar power is subject to intermittent solar irradiance, Fern's maximum dependable capacity is projected to be 0 MW by definition.

Q. PLEASE DESCRIBE THE BASIC COMPONENTS OF THE FACILITY.

A. For the Fern solar project, about 151 MW of monocrystalline photovoltaic solar modules will be installed on single-axis trackers. These trackers are installed on a north-south

axis tilting in an east-west direction to enable the modules to follow the sun throughout the day. Trackers consist of galvanized steel and are anchored on H-shaped steel posts that are driven about 6 feet into the ground. The trackers do not have a concrete foundation. The total number of modules will be roughly 415,000 depending on exact wattage of the modules.

Forty-one (41) inverters with a capacity of 2.75MW each will transform DC power generated by the solar modules into 100 MW of AC capacity. Forty-one (41) transformers will step the voltage of generated power up from 600V at the inverters to 34.5kV. Power from these step-up transformers will be collected at the main power transformer that will again step up the voltage from 34.5kV to 115kV to align with the voltage at a switching station which will be built for the project. The switching station will connect to the existing 115kV transmission lines crossing the project site.

The project is located on a number of adjacent and non-adjacent parcels of land. The individual blocks of trackers with solar modules will be connected through medium-voltage cable runs between the parcels. These connections will be using either overhead poles or buried cable installed in culverts or via directional boring. Where projects parcels are not adjacent, easements with neighboring landowners have been secured to allow for installation of power lines.

There are currently no plans to include energy storage with the project.

Q. PLEASE EXPLAIN THE NEED FOR THE FACILITY.

A. Fern solar is expected to generate about 250 GWh per year, which will be injected into the existing power grid. This is more than the average electricity consumption of 23,000 US households.

132 The Fern project will interconnect with the Dominion Energy transmission grid,
133 affording it access to the PJM Interconnection (“PJM”), a Regional Transmission Organization
134 (“RTO”) in which Dominion participates. PJM coordinates the movement of electricity
135 through all or parts of Delaware, Illinois, Indiana, Kentucky, Maryland, Michigan, New Jersey,
136 North Carolina, Ohio, Pennsylvania, Tennessee, Virginia, West Virginia, and the District of
137 Columbia.

138 As discussed in Exhibit 3 of the Application, projections for corporate purchase of
139 energy and renewable energy credits (“RECs”) from solar facilities in the southeast market of
140 PJM is expected to increase over the next few years. Fern believes that healthy market
141 conditions will create sustainable offtake for its production.

142 Demand for renewable power is expected to increase in the Southeast over the expected
143 lifetime of the Project. Dominion Energy has committed to increasing its use of renewable
144 power to generate 5,000 MW of electricity by 2028. As noted in Exhibit 1 and on Schedule 4
145 to the Application, the Business Renewables Center, a non-profit initiative that is the leading
146 industry convener between corporate renewable energy buyers and renewable energy
147 developers, predicts that the demand for renewable energy in the PJM market, described below,
148 will increase over the next year as shared in a chart with its members in April 2018. Projections
149 from PJM indicate that the demand for power, particularly in the Southeast, will increase as
150 described below.

151 Dominion’s commitment is consistent with state-level policy set by the Virginia
152 General Assembly, which affirmed the growing importance of renewable energy generation in
153 passing the Grid Transformation and Security Act of 2018 (the “GTSA”), signed into law by
154 Governor Ralph Northam on March 9, 2018. The GTSA finds that up to an additional 5,000

155 MW of utility-scale electric generating facilities powered by solar and wind energy is in the
156 public interest, along with up to an additional 500 MW of non-utility scale solar or wind
157 generating facilities, including rooftop solar installations.

158 Fern anticipates contracting the sale of energy, capacity, and Renewable Energy Credits
159 (“RECs”) through PJM. Load growth for the PJM RTO as a whole, and more specifically for
160 the Dominion Virginia power zone, which serves parts of Eastern North Carolina and Virginia
161 (as shown as Schedule 9 to the Application), is expected to increase over the next ten to fifteen
162 years as described below for both winter and summer months.

163 Summer peak load in PJM is expected to grow by 0.4% per year over the next ten years,
164 and by 0.4% over the next 15 years.¹ For the Dominion Virginia Power zone, summer peak
165 load growth is expected to grow by 0.8% per year over the next ten years, and 0.8% per year
166 over the next fifteen years.² The anticipated ten year summer peak load growth in the
167 Dominion Virginia Power zone represents 2.6% growth over the January 2017 load forecast
168 report.³

169 Winter peak load growth in PJM is projected to average 0.4% per year over the next
170 10-year period, and 0.4% over the next 15-years.⁴ Winter peak load growth for the Dominion
171 Virginia Power zone is expected to grow by 0.9% per year over the ten years, and 0.9% per
172 year over the next nine to fifteen years.⁵ The anticipated ten year winter peak load growth in

¹ 2018 PJM Load Forecast Report (Jan. 2018), available at <https://www.pjm.com/-/media/library/reports-notice/load-forecast/2018-load-forecast-report.ashx?la=en>, at 2.

² *Id.* at 59-60.

³ *Id.* at 54.

⁴ *Id.* at 2.

⁵ *Id.* at 63-64.

the Dominion Virginia Power zone represents 3.9% growth over the January 2017 load forecast report.⁶

The area of North Carolina in PJM has slightly higher projected load growth than Virginia. North Carolina is expected to average between 0.8 and 0.9% per year over the next 10 years versus the PJM RTO load growth projections of 0.4% over the next ten years.⁷

Generation retirement also demonstrates the need for new sources of electricity in the region, and in North Carolina in particular. Approximately 209 MW of capacity in North Carolina was retired in 2017. This represents more than 10 percent of the 2,084 MW that retired RTO-wide in 2017.⁸

OFFTAKE PLANS

Q. DESCRIBE THE OFFTAKE PLANS FOR THE PROJECT.

A. BayWa has substantial experience with offtake in the PJM market and the expectations for power purchase from the PJM market in the southeast United States are strong. BayWa has previously secured and is actively negotiating for over 300 MW of offtake within the PJM market, and is using this experience to secure offtake for Fern. Currently, Fern is in active, exclusive negotiations for power purchase agreements with a group of investment-grade offtakers for approximately 80MW and is expecting final power purchase agreements with these parties in the third quarter of 2018. For the remaining 20 MW, Fern is actively pursuing offtake with potential buyers, some of whom have experience with PV power purchase agreements.

⁶ *Id.* at 54.

⁷ PJM North Carolina State Infrastructure Report (May 2018), available at <https://www.pjm.com/-/media/library/reports-notice/state-specific-reports/2017/2017-north-carolina-state-infrastructure-report.ashx?la=en>.

⁸ *Id.*

193 **Q. WHAT ARE THE LONG-TERM PLANS FOR OWNERSHIP OF THE**
194 **PROJECT?**

195 A. After securing power offtake, BayWa plans to market the project to potential
196 long-term owners who are able to utilize the federal investment tax credit. This is usually done
197 through a competitive, multi-stage bidding process. This process has not yet started.

198 While the project assets will be owned by a long-term investor, BayWa will provide
199 operation and maintenance services to the project.

200 **Q. DOES THIS CONCLUDE YOUR TESTIMONY?**

201 A. Yes.