

**STATE OF VERMONT
PUBLIC SERVICE BOARD**

Petition of South Forty Solar, LLC for a)
certificate of public good, pursuant to 30)
V.S.A. § 248, authorizing the installation and)
operation of a 2.5 MW solar electric)
generation facility located off of Sunset Cliff)
Road in Burlington, Vermont, to be known as)
the “South Forty Solar Farm”)

Docket No. _____

PREFILED DIRECT TESTIMONY OF KENNETH A. NOLAN

1 **Q. Please state your name, occupation, and business address.**

2 A. My name is Kenneth A. Nolan, and I am currently the Manager of Power Resources at
3 Burlington Electric Department (“BED”). My business address is 585 Pine Street,
4 Burlington, Vermont.

5
6 **Q. What is the purpose of your testimony?**

7 A. My testimony supports the Petition of South Forty Solar, LLC (“SFS”) for section 248
8 approval to construct and operate a 2.5 Megawatt (MW) solar electric generation project, to
9 be known as the South Forty Solar Farm (“South Forty Solar Farm,” or “Project”), in
10 Burlington, Vermont. I address issues related to 30 V.S.A. § 248(b)(2) (need for present and
11 future demand for service) and 30 V.S.A. § 248(b)(6) (integrated resource planning).

12
13 **Q. Please describe your professional background, qualifications, and experience.**

14 A. I am presently responsible for long range planning, power procurement, load forecasting,
15 rate design, and energy efficiency verification and reporting. I have been with BED since
16 1998. Prior to joining BED, I spent 11 years at the Vermont Public Power Supply
17 Authority, a joint action agency serving Vermont’s 14 smallest municipal utilities. I received

1 a Bachelor of Science degree in Electrical Engineering from the University of Vermont in
2 1988, and a Certificate in Public Utility Management from the Northeast Public Power
3 Association in 1995. Presently, I am a member of the Board of Directors of Renewable
4 Energy Vermont and VEPP, Inc. My resume is attached as *Exhibit SFS-KN- 1*.

5
6 **Q. Have you previously testified before the Public Service Board?**

7 A. Yes. Most recently I have provided testimony in support of BED's petition for a CPG to
8 install a 500 kW solar electric facility at Burlington International Airport, Docket No. 8265,
9 the East Avenue Loop Project (Docket No. 7314), the CVPS/GMP Merger Proceeding
10 (Docket No. 7770), and the Hydro Quebec US Power Purchase Agreement proceeding
11 (Docket No. 7670). In addition, I have participated in numerous rate cases, Integrated
12 Resource Planning dockets, and other dockets.

13
14 **Q. What has been your involvement and familiarity with the South Forty Solar Project?**

15 A. I have been BED's lead in negotiating a Power Purchase Agreement with the Project, in
16 getting the agreement approved by the city's elected officials, and in making the necessary
17 filings with the PSB and the Department of Public Service under Rule 5.200. I have also
18 been involved in BED's preliminary interconnection discussions regarding the Project.

19
20 **Need for the Project – 30 V.S.A. § 248(b)(2)**

21 **Q. Why does BED need the Project?**

22 A. BED needs the Project for two primary reasons: (1) to reduce BED's capacity costs; and (2)
23 to reduce BED's ISO New England related transmission costs. As explained more fully

1 below, solar generation will reliably reduce BED’s summer peak load and thus reduce BED’s
2 transmission and capacity costs. Below I provide an overview of the extensive analysis BED
3 performed in its 2012 Integrated Resource Plan (“IRP”), which the Public Service Board
4 approved in 2013. I then summarize BED’s conclusions based on the 2012 IRP that solar
5 generation can help meet BED’s capacity needs and reduce transmission costs. Finally, I
6 explain why the proposed Project appropriately meets this need, and why the assumptions
7 used in the 2012 IRP remain valid today.

8
9 *2012 IRP Resource Analysis Overview*

10 Since 2008, BED’s strategy has been to maintain diversity in its power supply
11 portfolio while securing long term renewable resources in a cost effective and
12 environmentally conscious manner. 2012 IRP at 8. The 2012 IRP thoroughly analyzed a
13 variety of efforts that BED could undertake to continue to provide reliable, economical, and
14 environmentally friendly electricity. To that end, the 2012 IRP assessed in relevant part
15 current resources, risk exposure, load projections, and capacity needs. It set forth BED’s
16 analysis in a 47 page Resource Analysis Section, Chapter 7 (pages 87–133).

17
18 *Capacity Gap*

19 BED concluded that its capacity obligations will materially exceed its capacity
20 producing resources for the entire IRP horizon (20 years). As explained on page 13 of the
21 2012 IRP, BED’s capacity requirement is a function of its load at the time of the ISO New
22 England (“ISO-NE”) annual peak load. BED based its capacity forecast on projections of

1 BED's peak load at the time of the New England annual peak, less projected energy
2 efficiency impacts.

3 BED expects a capacity shortfall over the next 20 years absent new capacity due to
4 both load growth and ISO-NE's method of setting capacity ratings for wind and hydro
5 resources, which BED uses extensively to supply its energy needs. Because wind and hydro
6 cannot be counted on to be producing on hot summer days, ISO-NE does not give them
7 full credit in the capacity markets, requiring BED to fill this capacity need with other
8 resources. 2012 IRP, page 13. During the hottest summer days, BED's load hits a peak and
9 BED needs resources available to meet these loads and presently does not have adequate
10 resources. The fact that the new Hydro-Quebec contract is an energy only contract and
11 does not provide any market capacity also contributes to BED's capacity shortfall. Lastly,
12 BED must provide its share of the New England "reserve margin," typically 15 percent of
13 the peak load amount, to help insure New England has enough resources available in the
14 event that a resource breaks or otherwise fails.

15
16 *Need To Reduce Transmission Costs*

17 Under the ISO-NE Open Access Transmission Tariff, transmission costs are billed
18 to BED based on BED's load during the hour in which Vermont's overall load peaks each
19 month. If BED reduces its load during this peak hour, then its share of the ISO-NE
20 transmission costs for the month is also reduced. BED can directly reduce its transmission
21 costs by taking steps to reduce its load at the time of the Vermont peak each month.

22

1 *Project Contributes To Closing Capacity Gap*

2 BED's 2012 IRP considered both the development of traditional peaking generation
3 to provide additional capacity as well as the expansion of BED's current demand response
4 program, and the use of behind-the-meter solar generation (both of which serve to reduce
5 peak hour load and thereby the need for capacity). The discussion of the capacity cases
6 considered may be found in Section 7.3.13 of the 2012 IRP. Based on the assumptions used
7 in the 2012 IRP, BED concluded that of the possible new capacity resources considered,
8 only solar generation, with its unique ability to generate during peak summer hours, was an
9 economical way of reducing BED's capacity shortfall. Unlike hydro and wind generation,
10 solar generation occurs during the 16 peak hours of each day and occurs more frequently
11 and at higher levels on peak load days in the summer. For this reason, the 2012 IRP
12 recommends solar generation as the most effective hedge against a short capacity position
13 for utilities like BED trying to move toward renewable supply. Accordingly, the Project will
14 reduce BED's ISO-NE capacity costs both by the direct reduction of BED's contribution to
15 the ISO-NE peak as well as by avoiding the reserve requirements that ISO-NE maintains for
16 reliability, generally 15 percent in excess of actual peak loads.

17 Subsequent to the filing and approval of its 2012 IRP, there has been no change in
18 market conditions that would call this conclusion into question. In fact, the Forward
19 Capacity Market auction results for the period beginning June 1, 2017 indicate that the
20 capacity market may see high prices sooner than was anticipated in the 2012 IRP.

21

1 *Project Will Reduce Transmission Costs*

2 By locating the Project “behind” the utility meters that are used for ISO-NE load
3 determination, BED will see reduced transmission costs under ISO-NE’s Open Access
4 Transmission Tariff (as well as any other charges that are billed or assessed on Network
5 Load “NWL”). Generation at the Project will reduce BED’s load at the hour of the
6 Vermont peak load during the summer months, and may have a lesser effect in the spring
7 and fall months. BED’s load coincident with Vermont’s peak load each month is used to
8 establish BED’s ISO-NE transmission charges. By reducing its load at the time of the
9 Vermont peak in each month BED will reduce its allocation of transmission charges, thereby
10 reducing costs.

11 While BED’s analysis of the proposed Project’s economic benefits focused only on
12 forecasted transmission costs from ISO-NE directly, BED is aware of efforts by the six New
13 England states to promote construction of additional transmission lines and to construct a
14 new natural gas pipeline to be paid for through the ISO-NE transmission tariff. BED has
15 been part of discussions where costs as high as \$4 billion for this initiative have been
16 discussed. Federal Energy Regulatory Commission Order 1000 has also opened the door for
17 new socialized transmission projects to be funded through the ISO New England allocation
18 process. To the extent the states’ efforts are successful, and the ISO-NE tariff is in fact used
19 to allocate the costs, or Order 1000-based projects are proposed in the future, efforts to
20 reduce BED’s load at the time of the Vermont peak will be even more valuable.

21

1 *Additional Project Benefit*

2 Another Project benefit derives from the value for energy and Renewable Energy
3 Credits (“RECs”) BED would receive from this Project. Solar produces energy at times that
4 are more valuable than the average cost of power. Examples would be the afternoon, which
5 is typically the highest price period of any given day, and in the summer, which is one of the
6 higher priced times of the year. For these reasons, BED has concluded that solar output, on
7 average, is roughly 10 percent more valuable than energy delivered during broader periods of
8 time. In addition, solar generation is considered a New or Class I REC in most New
9 England markets, bringing a high REC premium similar to new wind generators. With the
10 passage of Act 56 (RESET), BED may also have obligations to retire Vermont RECs from
11 projects sized less than 5 MW and located within the state. This Project could serve to meet
12 a portion of those RESET program needs. The energy and the REC benefits combined are
13 material Project benefits.

14
15 **Integrated Resource Planning – 30 V.S.A. § 248(b)(6)**

16 **Q. Will the Project assist BED in complying with its most recently approved IRP?**

17 A. Yes. The Board approved BED’s current 2012 IRP on July 15, 2013. BED’s 2012 IRP
18 identified obtaining an additional 5 MW of solar power within BED’s service territory as the
19 best alternative to help minimize capacity and transmission costs. BED has been working
20 diligently toward developing solar projects since that IRP approval was obtained, but due to
21 various constraints in the Burlington urban environment, such as historic preservation
22 concerns, preservation of tree canopies, roof orientations, etc., BED has found that the
23 actual solar potential in the city is limited. Including net metering, PPAs, and BED-owned

1 projects, BED has been able to achieve roughly 1.8 MW of solar capacity so far. This Project
2 represents a significant step in meeting the IRP requirements in a way that is not possible at
3 any other location in BED's service territory.

4

5 **Q. Does this conclude your testimony at this time?**

6 A. Yes.