

**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 LEIGH SEDDON

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

2 A. My name is Leigh Seddon, and I am the principal of L.W. Seddon, LLC. My business
3 address is 13 Bailey Ave., Montpelier, Vermont 05602.

4

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

6 A. My testimony supports the Petition of South Forty Solar, LLC (“SFS”) for section 248
7 approval to construct and operate a 2.5 megawatt (MW) solar electric generation project, to
8 be known as the South Forty Solar Farm (“South Forty Solar Farm,” or “Project”), in
9 Burlington, Vermont. I describe the construction and operation of the Project, and provide
10 testimony on its compliance with the section 248(b) criteria.

11

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

13 A. I am the founder of Solar Works, Inc., which became Alteris Renewables in 2008 and
14 merged with Real Goods Solar in 2011. Over the 35 years since the founding of Solar
15 Works, I have overseen the design and installation of photovoltaic and solar thermal projects
16 in the U.S. and in developing countries. I am currently a renewable energy consultant

1 located in Montpelier, Vermont, specializing in the design and permitting of community-
2 scale solar plants. My resume is attached as *Exhibit SFS-LS-1*.

3
4 **Q. Have you previously testified before the Public Service Board?**

5 A. Yes, I have provided testimony in Docket 7594 (Ferrisburgh Solar Farm), Docket 7618
6 (EOS Ventures), Docket 8027 (Limerick Road Solar) regarding Standard Offer solar projects
7 and have provided testimony in Docket NM-5330 (Superior Solar).

8
9 **Q. Please describe the Project and your role in its development.**

10 A. The Project is being developed by South Forty Solar, LLC, a domestic limited liability
11 corporation. South Forty Solar, LLC's principal place of business is 300 Swift Street, South
12 Burlington, Vermont 05403. The Project will be sited on a 40.9 (±) acre property held by
13 Keystone Development Corporation (an affiliate of SFS) under a long-term lease.

14 My role vis-à-vis South Forty Solar Farm is to provide the engineering design for the
15 solar array and to assist in the development and permitting of the Project.

16
17 **Project Description and Overview**

18 **Q. Please provide an overview of the Project.**

19 A. South Forty Solar Farm is a proposed 2.5 megawatt (MW) solar electric generation project to
20 be sited on an undeveloped tract of land located on the south side of the private Sunset Cliff
21 Road in Burlington, Vermont. See the Project location map, site plan, elevation, and photos.
22 *Exhibits SFS-LS-2a, -2b, -3, -4; SFS-JM-2a through 2g; SFS-MK-3.*

23

1 **Q. Please state the Project's capacity and anticipated energy production.**

2 A. The nameplate capacity of the Project will be 2.5 MW (AC). The Project anticipates using
3 10,800 (\pm) solar panels rated at 315 watts (DC) each. The final number and rating of the
4 solar panels and other equipment will depend upon SFS's selection of a panel manufacturer
5 and solar installer after all permitting is complete.

6 The expected net energy output of the Project (after DC to AC conversion) will be
7 4.0 (\pm) megawatt hours of electricity (MWh) (4,000,000 kWh) per year. This is the
8 equivalent of the annual electricity consumption of roughly 740 Burlington households,
9 based on average residential use of approximately 5,400 kWh per year as reported by BED.

10

11 **Q. Please describe the property on which the Project will be located.**

12 A. The Project site is on a 40.9 (\pm) acre portion of a tract of land within the City of Burlington
13 bordered by Sunset Cliff Road (private) to the north. The Project parcel is held by Keystone
14 Development Corporation under a long-term lease.

15 The subject property consists of open field formerly used as pasture, upland forest,
16 and a wet sand-over-clay forest to the south. The 40.9 (\pm) acre site is currently undeveloped
17 although in the past it was used for agricultural purposes. The parcel is bordered to the west
18 and east by residential lots ranging from 1/8 to 3/4 acre in size. A swimming pool and
19 associated lot owned by the Strathmore Homeowners' Association also borders the parcel to
20 the west. The southern boundary is comprised of similar single family house lots, but a
21 small park and open space area provide a buffer to the parcel. The northern boundary of
22 the tract is bordered by Sunset Cliff Road (located on Keystone's parcel) and a 19-acre parcel
23 with seasonal "camps" located beyond, on the shore of Lake Champlain. A Project Site Map

1 and Plan are included in *Exhibits SFS-LS-2a, -2b, and -3*, illustrating the anticipated
2 location of the Project's components in relation to the surrounding area.

3
4 **Q. Please describe the overall site plan and design objectives.**

5 A. The solar Project will occupy approximately 18.5 acres at the northern portion of the
6 property which consists predominantly of open field and upland forest. The majority of the
7 open field is designated as a Class II wetland; SFS has received a wetland permit to allow
8 placement of a portion of the array in this area. See testimony of Karina Dailey.
9 Approximately 10 acres of trees in the upland pine forest and 8 acres of shrubs will be
10 cleared to allow placement of the solar panels and equipment. An additional clearing extent
11 of approximately 10 feet beyond the proposed fence line (shrub management zone) is
12 necessary to allow for proper fence maintenance.

13 SFS has agreed with ANR to establish a 50 foot buffer around a rare wetland natural
14 community (Wet Sand-Over-Clay Forest) located on the southern portion of the Project
15 parcel. In addition, SFS and ANR have agreed to the establishment of a selective tree height
16 management zone within the designated 50 foot natural communities buffer to prevent
17 undue shading on the solar array. The layout of the solar field and the array elevation details
18 are shown on *Exhibits SFS-LS-3 and -4*.

19 To avoid and minimize environmental impacts, the Project has been designed as
20 follows:

- 21 • No earth moving, grading or excavation will be required in the wetlands or buffer
22 zone.

- 1 • Solar array support structures will be pile-driven steel to eliminate the need for
2 concrete footings and foundation excavation in the wetlands and buffer zone.
- 3 • Inverter enclosures will be located in the upland area outside the buffer zones and
4 mounted on pile driven foundations to avoid earth disturbance and the need for
5 concrete footings.
- 6 • Electrical conduit will be run above grade in the wetlands and wetland buffer zone.
- 7 • Accepted erosion control measures will be used to minimize the potential for
8 sediment to be discharged to the wetlands.
- 9 • Soil restoration measures will be implemented in upland areas to increase their
10 capacity to retain rainfall and reduce both the peak rate and volume of stormwater
11 leaving the site.
- 12 • The rare wetland natural community (Wet Sand-Over-Clay Forest) on the Project
13 parcel will not be impacted by the Project. In addition, because this natural
14 community currently contains a variety of invasive species, SFS is proposing to
15 perform invasive species control in this area.
- 16 • Clearing of forest vegetation in wetlands and their associated buffer is limited to
17 approximately 1.2 acres within wetlands and 1.5 acres in the wetlands buffer. Direct
18 impacts to wetlands from the placement of the solar array support posts and fence
19 posts are limited to approximately 91 square feet.
- 20 • No undue adverse impact on wildlife habitat. A wildlife study and an avian habitat
21 study found that wildlife species on this site are common and typical of that found in

1 a suburban environment. The Vermont Wetlands Program has indicated that the
2 wetlands on the site rate low for the wildlife function.

3

4 **Q. What are the setbacks from the Project to the closest property lines and the travelled**
5 **portions of public roads?**

6 A. The layout incorporates the following setbacks, which comply with the recently enacted solar
7 siting provisions of Act 56 (2015):

- 8 • East: 69 (\pm) feet from the closest solar array to the property line and 196 (\pm) feet to
9 the edge of the travelled portion of Curtis Avenue.
- 10 • South: 490 (\pm) feet from the closest solar array to the property line and 827 (\pm) feet
11 to the edge of the travelled portion of Edinborough Drive.
- 12 • West: 73 (\pm) feet from the closest solar array to the property line and 195 (\pm) feet to
13 the edge of the travelled portion of Nottingham Lane.
- 14 • North: 61 (\pm) feet from the closest solar array to the property line and 137 (\pm) feet
15 to the edge of the travelled portion of Starr Farm Road where it meets Sunset Cliff
16 Road.

17

18 **Q. Please describe the generation equipment to be used for the Project.**

19 A. The Project's equipment consists of the following: individual polycrystalline solar
20 photovoltaic panels, a metal support structure under the panels to create south-facing
21 collector arrays, electrical lines in underground conduit connecting the panels to the inverters

1 and switch gear enclosures, and underground electrical lines from the medium voltage
2 transformers to the BED distribution system.

3 Ten thousand eight hundred (10,800) (\pm) individual solar photovoltaic panels will be
4 used, each with a rated capacity of 315 watts (depending upon the final selection of a solar
5 installer and panel manufacturer). While the solar panel ultimately chosen may be somewhat
6 less or more than 315 watts, the total Project size will not exceed 2.5 MW (AC), and the
7 Project's footprint will not materially change.

8 The Project will utilize 300 (\pm) solar arrays, the support structures that hold the
9 individual solar panels at a fixed position to the sun. These arrays are set on steel foundation
10 piles and hold the solar panels at a 30 degree tilt angle, facing true solar south. The support
11 structures are designed to hold the bottom of the solar panels at approximately 4 feet above
12 existing grade so that snow accumulation on the ground in winter does not affect solar
13 generation. The height of the arrays will be approximately 10.5 feet above grade. These
14 arrays will be placed in rows set a sufficient distance apart (approximately 32 feet on center)
15 to minimize self-shading.

16 The solar arrays and other equipment will be surrounded by a minimum 7-foot high
17 wire mesh fence that is consistent with fencing at other Vermont solar projects and satisfies
18 the National Electrical Code. The fencing will be secured and kept close to the ground level
19 to avoid access by small animals and crawling deer. Depressions along slopes will be filled
20 with material or have secured mesh fencing in place. See *Exhibit SFS-LS-5e*.

21 The Project's four inverters (which convert solar DC energy to utility AC energy)
22 and associated switchgear will be housed in two small prefabricated structures. The height
23 of these enclosures, including foundation piles, will be approximately 12 feet above grade.

1 The inverters will comply with applicable codes and standards with respect to electrical
2 interference, including UL1741 (*Standards for Inverters, Converters, Controllers and Interconnection*
3 *System Equipment for Use with Distributed Energy Resources*), and certified as an FCC Class A
4 device.

5 The Project's two medium voltage transformers (to step up the inverter voltage to
6 interconnect with the utility distribution line) will be located adjacent to the inverter
7 enclosure on the same structure. These transformers will comply with applicable codes and
8 standards including NEMA TR-1 (2000) and ANSI C57.12.00 (2010).

9 *See Exhibits SFS-LS-5a through -5i* for pictures and specifications of
10 representative solar panels, racks, inverters, inverter enclosures, and transformers. The final
11 selection of equipment will occur after the Project is permitted the vendors and contractor
12 are selected, but the equipment is expected to be materially the same.

13
14 **Q. Please describe in more detail the electrical system, including collector and feeder**
15 **lines and interconnection with BED.**

16 A. SFS currently anticipates using four (4) SMA inverters, or the equivalent, placed at two
17 locations within the array rows. One location will have two 750 kW inverters and the other
18 will have two 500 kW inverters. *See Exhibit SFS-LS-3.* The inverters will be housed in two
19 prefabricated enclosures (1.5 MW and 1 MW), each of which is approximately 32 feet long
20 by 12 feet wide by 10.5 feet high in dimension. The enclosures will also house controls,
21 metering, and other necessary electrical equipment. The inverters in each structure will be
22 connected to a medium voltage transformer located on each structure's steel deck. The
23 transformers will use a non-toxic, biodegradable cooling oil (EnviroTemp or equivalent).

1 ***Exhibit SFS-LS-5h.*** In addition, each structure will be equipped with secondary oil
2 containment for each transformer. The containment system will consist of an in-ground
3 sump pit under each transformer similar to the C.I. Agent secondary containment system
4 shown in ***Exhibit SFS-LS-5i.*** The containment systems will be designed to hold 150
5 percent of transformer fluid at each station. The transformers will step up the inverter
6 output (342V) to distribution voltage (13.8 kV) for interconnection to BED's distribution
7 circuit located on Starr Farm Road.

8 Preliminary facilities planning by BED done in May 2013 calls for ground mounted
9 switchgear and metering to be located at the NW corner of the parcel. From there, primary
10 voltage power from the Project will run in underground conduit to a new pole located on
11 the north side of Sunset Cliff Road. From this pole, power will run to an existing BED pole
12 (#3667) located at the intersection of Curtis Avenue and Starr Farm Road.

13 A one-line diagram of the electrical system (also included in the interconnection
14 application filed with BED), is attached as ***Exhibit SFS-LS-6.***

15
16 **Q. Please describe any other features that will be installed as part of the Project.**

17 A. The Project will include the following facilities and features:

- 18 • A 24' x 48' maintenance building, small parking area, and information kiosk located in
19 the northeastern corner of the Project parcel.
- 20 • A gravel access drive running southwest from the northeast corner of the Project parcel
21 to the furthest inverter station.
- 22 • Landscaping along Sunset Cliff Road, Curtis Avenue, and at the end of Nottingham
23 Lane.

1 **Q. How will the Site be accessed and how will the equipment be delivered?**

2 A. Access to the solar Project will be from the private Sunset Cliff Road (coming from Starr
3 Farm Road) using the access drive.

4 The solar panels and rack components will be shipped on pallets, typically delivered
5 by standard tractor-trailer truck. SFS expects approximately 25 (\pm) truckloads will be needed
6 to deliver the solar panels and racks over a 6-week period. In addition, the two inverter
7 enclosures with transformers will be delivered by tractor-trailer flatbed after the solar array is
8 installed. All other equipment and material including wire, cable, conduit, etc. will be
9 transported to the site utilizing standard delivery trucks.

10

11 **Q. Please describe what equipment will be used for the Project's construction, and how
12 it will be constructed.**

13 A. Construction equipment for installing electrical conduit and the solar array will likely include
14 a tire or track mounted excavator and a small pile driver to install the foundation posts. A
15 crane will be used for placement of the two inverter/transformer stations. The maintenance
16 building foundation and slab will require use of standard excavation machinery and concrete
17 delivery trucks.

18

19 **Q. What is the anticipated sequencing and schedule for Project construction?**

20 A. Project construction is expected to take approximately 18 weeks. The general sequence of
21 construction will be as follows. The first stage of construction will include the clearing of
22 the treed area designated for panel installation. After clearing, a gravel access road to the
23 inverter locations will be constructed and underground 3-phase primary wiring will be

1 installed to the point of interconnection with BED. The second stage of construction will
2 involve construction of the array support structures. The third stage of the construction will
3 involve installation of the solar modules, placement of the inverter enclosures, and wiring to
4 the enclosures. Following completion of these activities, the system will be tested and
5 commissioned for operation. Finally, the maintenance shed and parking area will be
6 completed. After selection of the EPC contractor, the sequence and timing of these
7 activities may be adjusted.

8
9 **Q. What are the operation and maintenance activities for the Project?**

10 A. The operation of the solar plant is totally automatic and requires no on-site personnel. The
11 plant will be continually monitored via the internet to confirm proper operation and
12 performance. Energy metering will also be accomplished by remote telemetry.

13 On-site maintenance activities will be limited to periodic vegetative management,
14 snow removal in winter to provide access to the inverter enclosures, and annual equipment
15 and wiring inspections.

16
17 **Q. What are the benefits that a project of this type will provide to Vermont?**

18 A. South Forty Solar, LLC has entered into a long term (25 year) power purchase agreement to
19 sell 100 percent of the Project's output to BED, including the energy, capacity, and other
20 environmental attributes (i.e., renewable energy credits). This will provide the city with a
21 long term renewable energy source at stable prices, serving its electrical needs by supplying
22 approximately 4,000,000 kilowatt hours (kWh) of solar power annually.

1 The solar energy produced by the Project will result in substantial environmental
2 benefits. BED has established the goal of increasing its supply of renewable energy sources
3 in order to lower greenhouse gas emissions and provide stable long-term rates. The Project
4 will support achievement of that goal and is in conformance with BED's approved 2012
5 Integrated Resource Plan. Likewise, the Vermont Legislature has required Vermont utilities
6 to obtain 55 percent of their retail sales from new or existing renewable sources in 2017, a
7 requirement that will increase annually. *See* 2015, Act No. 56. The solar energy produced by
8 this Project will result in less electricity needed in the New England region from plants that
9 use fossil fuel or nuclear energy. The Project burns no greenhouse-gas-emitting fuel to
10 produce electricity, and thus will help in a small but measureable way to reduce global
11 warming, acid rain, and the negative public health effects associated with the use of fossil
12 fuel and the waste storage challenges presented by nuclear energy production.

13 Aside from these benefits, the South Forty Solar Farm will benefit the broader
14 Vermont economy in other ways: the payment of municipal, education, and other taxes,
15 employing Vermont consultants for the development work, and, where commercially
16 feasible, purchasing Project equipment from and employing Vermont businesses for
17 construction and installation work.

18
19 **Q. Has the Petitioner provided 45-day notice to the Burlington City Council and**
20 **Planning Commission, and the Chittenden County Regional Planning Commission?**

21 A. Yes, South Forty Solar provided the required notice with accompanying information and
22 plans, by letter dated March 5, 2014. A copy of the 45-day notice package is attached as

23 ***Exhibit SFS-LS-8.***

1 **Q. Have other efforts been made to inform the local community of the Project?**

2 A. Yes. The Project development team has engaged in public outreach over the last two years,
3 including:

4 • Meetings to explain the Project with elected officials and department staff members
5 of the City of Burlington, including the City Council, Mayor's Office, Community
6 and Economic Development Office, Planning Commission, and Conservation
7 Board.

8 • Outreach to offer Project information to the Chittenden County Regional Planning
9 Commission.

10 • Meetings with and presentations to the Neighborhood Planning Assembly (Ward 4
11 & 7 NPA).

12 • Meetings with adjoining neighborhood association groups to explain the Project and
13 discuss infrastructure and screening plans.

14 • Direct meetings with individual neighbors to discuss the Project and screening plans.

15 • Interviews with news media outlets to provide information about Project status and
16 plans.

17

18 **Q. Please describe any comments that SFS has received to date from the local or
19 regional bodies or others in the local community.**

20 A. In March 2014, the Project team received questions and comments from the Burlington
21 Conservation Commission and the public after our March 10th presentation. These

1 questions/comments and the Project team's responses were provided to the Agency of
2 Natural Resources as part of SFS's wetlands permit application.

3 In addition, I understand that SFS has engaged with individual neighbors to discuss
4 the Project and any potential concerns they might have.

5
6 **Q. Please describe South Forty Solar, LLC's efforts to date to address any potential**
7 **issues regarding the Project.**

8 A. The principal issues of concern that have surfaced during the design and development of the
9 Project have been (1) impact on wetlands and natural communities, (2) stormwater runoff
10 from the existing undeveloped property, and (3) the aesthetic impact of the Project on
11 adjacent neighbors. The Project team has worked diligently to assess these impacts and then
12 devise measures to mitigate any identified adverse impact.

13 As detailed in the testimony of Karina Dailey, since 2013 the Project team has
14 studied potential impacts on existing wetlands, natural communities, and wildlife. Over this
15 period it has also devised solutions to minimize any identified adverse impacts. In particular,
16 the Project size has been reduced, setbacks increased, low impact construction techniques
17 proposed, and a comprehensive vegetation management program created. Recognizing
18 these efforts to minimize impacts, a wetland permit was issued on May 8, 2015 by the
19 Department of Environmental Conservation.

20 Storm water management in the Strathmore residential community has been an issue
21 since the first houses were built in the 1980s. The Project team is well aware of the impacts
22 that peak storm water flows in this area have on the Strathmore community and have
23 carefully designed the Project not to increase peak storm water flows off of the Project

1 parcel. This will be accomplished by improving the water retention capacity of the upland
2 soils after tree clearing and providing a storm water catch basin under an eastern part of the
3 array. See prefiled testimony of Jeremy Matosky.

4 Finally, the Project team has been responsive to concerns from area residents and,
5 more specifically, adjacent neighbors about the potential visual impacts of the Project.
6 Mitigation of these concerns led to the inclusion of wooden fence and vegetative screening
7 along Sunset Cliff Road, retention of a treed visual buffer to the east, and creation of a
8 managed hedgerow to the west to specifically provide a visual buffer without creating
9 shading on the solar array. Please see testimony of Mark Kane, *Exhibit SFS-MK-3*.

10
11 **Q. Please describe South Forty Solar's plans to decommission the Project at the end of**
12 **its useful life.**

13 A. At the end of the Project's expected useful life, South Forty Solar will assess whether: (i) it is
14 financially viable to continue to operate the Project as is; or (ii) a section 248 amendment
15 should be filed to repower the Project with new solar panels; or (iii) the Project will be
16 decommissioned. If decommissioned at that time, the solar panels would be sold for reuse
17 or be returned to the manufacturer for recycling. The solar panel support structures,
18 underground electrical wiring, inverters, transformers, enclosures, and any other on-site
19 Project equipment, will be removed from the site. This will effectively restore the site to
20 pre-development conditions. SFS has developed a Decommissioning Plan that outlines this
21 process, as well as a funding mechanism (Letter of Credit) based upon an estimate of the
22 cost of decommissioning the Project. Consistent with past Board decisions regarding solar
23 projects larger than 1 MW, the decommissioning fund will be in place at the time

1 construction begins, will be funded by an irrevocable standby letter of credit that includes an
2 automatic renewal provision (“evergreen clause”), and will be increased over time to account
3 for inflation. *See Exhibits SFS-LS-9.*

4
5 **SECTION 248 CRITERIA**

6 **Q. Which Section 248 criteria does your testimony address, and which criteria will be**
7 **addressed by other witnesses?**

8 A. My testimony addresses 30 V.S.A. §§ 248(b)(1) (Orderly Development of the Region),
9 248(b)(2) (Need for the Project), (b)(3) (System Stability and Reliability), (b)(4) (Economic
10 Benefit to the State), (b)(6) (Integrated Resource Planning), (b)(7) (Comprehensive Energy
11 Plan), and (b)(10) (Transmission Facilities). I also provide testimony regarding 30 V.S.A.
12 § 248(b)(5) (Environmental Considerations), including 10 V.S.A. §§ 6086(a)(5)
13 (Transportation Systems), (a)(6) (Educational Services), (a)(6) (Municipal Services), (a)(8)
14 (Aesthetics – Noise, Historic Sites), and (a)(9)(K) (Development Affecting Public
15 Investments).

16 Kenneth Nolan’s prefiled testimony addresses 30 V.S.A. §§ 248(b)(2) (Need for the
17 Project) and (b)(6) (Integrated Resources Planning).

18 Mark Kane’s prefiled testimony addresses 30 V.S.A. § 248(b)(1) (Orderly
19 Development) and 30 V.S.A. § 248(b)(5)/10 V.S.A. § 6086(a)(8) (Aesthetics – Visual).

20 Jeremy Matosky’s prefiled testimony addresses other criteria under 30 V.S.A. §
21 248(b)(5), including 10 V.S.A. § 1424a(d) (Outstanding Resource Waters), and 10 V.S.A.
22 §§ 6086(a)(1)(A) (Waste Disposal), (a)(1)(C) (Water Conservation), (a)(1)(D) (Floodways),

1 (a)(1)(F) (Shorelines), (a)(2) (Sufficiency of Water Supply), (a)(3) (Burden on Existing Water
2 Supply), and (a)(4) (Soil Erosion).

3 Karina Dailey's prefiled testimony addresses the remaining criteria under 30 V.S.A.
4 § 248(b)(5): 10 V.S.A. §§ 6086(a)(1)(E) (Streams), (a)(1)(G) (Wetlands), (a)(8) (Rare and
5 Irreplaceable Natural Areas), and (a)(8)(A) (Rare Threatened and Endangered Species and
6 Necessary Wildlife Habitat).

7
8 **Orderly Development of the Region – 30 V.S.A. § 248(b)(1)**

9 **Q. Will the Project unduly interfere with the orderly development of the region?**

10 A. No, the Project will not unduly interfere with the orderly development of the region, and will
11 not cause any direct impacts on the capacity of the region to develop. The Project will not
12 cause an undue burden on public roadways, or other types of municipal or state services or
13 infrastructure. It will not utilize land or resources that are otherwise specifically
14 contemplated for other forms of development under either the town or regional plans, as
15 further described in the prefiled direct testimony of Mark Kane.

16 The Project is also consistent with any relevant land conservation measures of the
17 City of Burlington Municipal Development Plan and is consistent with the Chittenden
18 County Regional Plan. See the prefiled direct testimony of Mark Kane.

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

21 **Q. Is the Project required to meet the need for present and future demand for service
22 which could not otherwise be provided in a more cost effective manner through**

1 **energy conservation programs and measures and energy efficiency and load**
2 **management measures?**

3 A. SFS has self-certified as a FERC Qualifying Facility and will not be a regulated distribution
4 utility under Vermont law. SFS is not required, nor does it have the ability, to deliver energy
5 conservation programs and load management measures to Vermont electricity consumers.
6 My understanding is that the Board has found in similar dockets, where the petitioner
7 proposed a merchant plant, that the concerns that this provision is intended to address—
8 protecting ratepayers by ensuring that utilities are making sound investments that are both
9 necessary and cost-effective—do not present themselves here. SFS is a private company
10 which is paying for the development, permitting, construction, financing, and operation of
11 this Project. SFS, not Vermont ratepayers, bears the risk of these investments. But even if
12 the Board decides that this criterion does apply to this Project, the Project is required to
13 meet the need for present and future demand.

14 First, the Project will help to meet present and future demand for energy in general.
15 The Comprehensive Energy Plan (“CEP”) issued on December 15, 2011 projects an average
16 annual electric use increase of 0.4 percent through 2030. BED’s Integrated Resource Plan
17 (“IRP”) projects a compound annual growth rate (including both residential and
18 commercial/industrial sales) of 0.98 percent through 2031. *See* IRP at 51, *available at*
19 <https://www.burlingtonelectric.com/about-us/what-we-do/our-integrated-resource-plan>.

20 Second, the Project will help to meet present and future demand for renewable
21 energy specifically. The CEP sets a goal for the state of obtaining 90 percent of its total
22 energy from renewable sources by 2050. Act 56 of the 2015–16 Legislative Session codifies
23 this goal, requiring Vermont utilities to obtain 55 percent of their retail sales from new or

1 existing renewable sources by 2017 and 75 percent by 2032. This requirement will increase
2 demand not only for renewable energy, but for renewable energy credits as well. BED's IRP
3 calls for increasing its renewable portfolio, including through power purchase agreements
4 with solar facilities located in the City of Burlington. IRP at 23–24. SFS has executed a long
5 term (25 year) power purchase agreement to sell 100 percent of the Project's output to BED,
6 confirming BED's need for the Project's output.

7
8 **System Stability and Reliability – 30 V.S.A. § 248(b)(3)**

9 **Q. Will the Project adversely affect system stability and reliability?**

10 A. The Project will not adversely affect system stability and reliability. A complete Application
11 for Interconnection pursuant to PSB Rule 5.500 was filed with BED on July 6, 2015 and
12 BED deemed the application complete on July 20, 2015. *Exhibit SFS-LS-7a.*

13 BED's Fast Track analysis was completed and received by SFS on August 4, 2015.
14 As expected, the analysis indicates that due to the size of the Project a system impact study
15 will need to be completed. *Exhibit SFS-LS-7b.* SFS and BED will shortly sign a system
16 impact study agreement with the expectation that the results will be available in early fall
17 2015. At this point, SFS has no reason to believe that the Project cannot be interconnected
18 with BED's existing distribution circuit on Starr Farm Road. As with any independent
19 generation project, SFS will pay for necessary studies, conductor upgrades, and circuit
20 protection upgrades required for safe and reliable operation of the Project.

21
22

1 **Economic Benefit to the State – 30 V.S.A. § 248(b)(4)**

2 **Q. Please describe the economic benefits of the Project to the State and its Residents.**

3 A. South Forty Solar will contribute positively to the local and State economy through the use,
4 where commercially practicable, of in-state suppliers, contractors, and consultants, and the
5 payment of local and state property taxes. At this stage, the entire development team is
6 Vermont-based. The total development and capital cost of the Project is in the range of \$7
7 million dollars, operating costs in the range of \$60,000 per year, and property taxes
8 (municipal and education) in the range of \$50,000 per year.

9 During the development and construction phases, South Forty Solar will have
10 retained (directly or through contractors) approximately 50 individuals to work on
11 engineering, environmental, aesthetic, legal/permitting, and construction-related tasks.
12 During the operations phase, several individuals contracted by South Forty Solar, LLC and a
13 plant operations and maintenance contractor will be involved in operating, maintaining, and
14 monitoring the Project.

15
16 **Environmental Considerations – 30 V.S.A. § 248(b)(5)**

17 **Aesthetics (Noise) – 10 V.S.A. § 6086(a)(8)**

18 **Q: Will the Project have an undue adverse effect on aesthetics with respect to noise?**

19 A. No, it will not cause an undue adverse effect due to noise, for the reasons discussed below.

20 First, construction activities will be limited to daylight hours and of a limited
21 duration (approximately 18 weeks), which will minimize the effects of construction-related
22 noise at neighboring properties.

1 With respect to operation of the Project, the only components which would generate
2 sound that may be audible from off-site locations are the inverters and transformers located
3 at the two inverter stations. Since the inverters only operate during daylight hours and the
4 transformers are idling at night, sound propagated by the plant will only be audible during
5 the day. The manufacturer's reported sound levels for this equipment are as follows:
6 inverters – 50 dBA at a distance of 1 meter; transformers – 60 dBA at a distance of 1 meter
7 as measured from each inverter station. Based on the combined sound levels of the
8 equipment at each inverter station, maximum sound levels from each station will be 60.8
9 dBA at a distance of 1 meter.

10 Using a standard spherical propagation model, sound levels due to both inverter
11 stations have been calculated at the closest property line locations and also the closest
12 residences. While some sound attenuation will occur due to the solar panels, trees, and
13 vegetation, for purposes of these calculations we made the conservative assumption that no
14 attenuation would occur.

15 The table below shows estimated sound levels from the Project at the location along
16 each property line where the highest sound levels will be encountered, and also at the nearest
17 residence (218 Curtis Ave.)

18	Northern property line:	22.9 dBA
19	Western property line:	16.3 dBA
20	Southern property line:	16.7 dBA
21	Eastern property line:	17.6 dBA
22	Nearest residence:	17.9 dBA

1 sites were identified within the Project area. CAP concluded that no further archaeological
2 work was needed.

3 Therefore, the Project will not have any undue adverse impact on archaeological
4 sites. The testimony of Mark Kane addresses potential impacts, if any, to off-site historic
5 structures.

6
7 **Development Affecting Public Investments – 10 V.S.A. § 6086(a)(9)(k)**

8 **Q. Will the Project unnecessarily or unreasonably endanger the public or quasi-public**
9 **investment in adjacent lands, services, or facilities, or materially jeopardize or**
10 **interfere with the public’s use and enjoyment of those lands, services, or facilities?**

11 **A.** No, it will not.

12 The public investments directly adjacent to the Project parcel include Starr Farm
13 Road, Curtis Avenue, and Nottingham Lane. The Project site is located entirely outside any
14 public highway right-of-way and will be set back more than 100 feet from all public roads.
15 As noted above, the Project will not create any adverse burdens on these public roads.

16 Edinborough Park, which is located south of and adjacent to the southwestern
17 corner of the Project parcel, will not be affected by the Project. The nearest Project
18 equipment to the park will be located 512 feet away, separated by the undisturbed wetland
19 forest area. As Mark Kane indicates in his prefiled testimony, the vegetation on the southern
20 half of the parcel provides highly effective screening along the parcel’s southern boundary.

21 Given the proximity of the Project to one of the approach corridors for the
22 Burlington International Airport, the FAA has requested the Project file for their standard

1 review of airport obstructions. This filing was completed on July 12, 2015 and has been
2 assigned Aeronautical Study Number (“ASN”) 2015-ANE-1100-OE. ***Exhibit SFS-LS-10.***

3
4 **Q. Will the Project pose an undue adverse effect to public health and safety?**

5 A. No. The Project does not present any unique risks to the public and it will not pose an
6 undue adverse effect to public health and safety. Specifically:

- 7 • The Project is designed to meet the safety standards of the National Electrical Code
8 (“NEC”), National Electrical Safety Code (“NESC”), and utility interconnection
9 standards for safe and reliable operation of solar electric plants.
- 10 • All inverter/switchgear equipment will be inside a locked, UL-listed, code-approved
11 electrical enclosure.
- 12 • The electrical lines that connect the string combiners to the inverters and switch gear
13 enclosure, and from the transformer to the BED distribution system, will be located
14 inside underground conduit, with the exception of lines running across the wetland
15 and its buffer zone, which will be in above ground conduit mounted to the solar
16 array racks. In addition, the electricity will be transmitted from the Project to the
17 existing BED distribution system at a voltage and in a manner that does not pose
18 undue risks related to electromagnetic fields.
- 19 • A perimeter fence will enclose the entire solar plant to deter vandals and trespassers.
20 The fence will be posted with appropriate electrical warning signs and/or placards.
- 21 • The solar panels have an anti-reflective coating (in order to absorb rather than reflect
22 the sun’s energy) that will prevent undue glare. In any event, the Project is not

1 directly adjacent to a public road and given the woodlands to the south and
2 vegetative screening on the east and west, the glass covers of the solar panels will
3 have extremely limited visibility to cars on public roads adjacent to the property.
4

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

6 **Q. Is the Project consistent with the principles for resource selection expressed in an**
7 **approved least cost integrated plan?**

8 A. It is my understanding that the Public Service Board has previously ruled that this provision
9 does not apply to projects sponsored by private developers rather than regulated distribution
10 utilities. Nevertheless, the Project is wholly consistent with BED's IRP. The models that
11 BED ran "support[ed] long-term investment in solar generation within the City of
12 Burlington as a means of economically controlling capacity and transmission costs." IRP at
13 23. BED's Action Plan calls for it to "increase the level of behind-the-utility-meter solar
14 generation in Burlington," including by "entering Purchase Power Agreements [sic] for
15 viable projects." IRP at 24. This Project is exactly the kind of solar resource called for in
16 the IRP.
17

18 **Comprehensive Energy Plan – 30 V.S.A. § 248(b)(7)**

19 **Q. Does the Project comply with the Vermont Comprehensive Electric Plan?**

20 A. The Project complies with the CEP. The CEP is comprehensive, covering electricity,
21 heating and process fuels, and energy in transportation and land use decisions. It sets an
22 ambitious long-term goal of obtaining 90 percent of the state's total energy needs from
23 renewable sources by mid-century. The CEP notes that sunlight is Vermont's most

1 abundant renewable energy resource; PV power is generated without noise, requires low
2 levels of maintenance, emits no pollution, and is extremely distributable; PV is largely a peak
3 electric load-following resource; PV costs are going down; Vermont is already one of the
4 top 10 states for PV on a per capita basis; utility-scale systems are the most cost-effective
5 way to install PV technology; and PV is becoming a serious and meaningful contributor to
6 the state's electrical needs and is an important part of Vermont's renewable energy industry.
7 See [http://www.vtenergyplan.vermont.gov/sites/cep/files/2011%20CEP_Volume%20](http://www.vtenergyplan.vermont.gov/sites/cep/files/2011%20CEP_Volume%202.pdf)
8 [2.pdf](http://www.vtenergyplan.vermont.gov/sites/cep/files/2011%20CEP_Volume%202.pdf).

9
10 **Transmission Facilities – 30 V.S.A. § 248(b)(10)**

11 **Q. Can the Project be served economically by existing or planned transmission facilities**
12 **without undue adverse effect on Vermont utilities or customers?**

13 A. Yes, the Project can be served economically by existing or planned transmission facilities
14 without undue adverse effect on Vermont utilities or customers. The Project will
15 interconnect with BED's existing distribution system which is served by VELCO's East
16 Avenue and Queen City substations. VELCO will be provided with BED's system impact
17 study for the Project and will review whether the Project will require any system
18 modifications or upgrades at the transmission level. See response above regarding
19 compliance with section 248(b)(3).

20 The costs of any electrical system modifications required to interconnect the Project
21 to the BED distribution system and to guarantee safe and reliable operation for both BED's
22 distribution system and VELCO's transmission system will be borne by SFS.

23

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

2 A. Yes it does.