Decommissioning Plan

ASD Shutesbury MA Solar LLC
Ground-Mount Solar Array
Town of Amherst, MA

April 2023

Prepared by: Frank Lentz
Reviewed and approved by: Stephen M. Loss, PE

Prepared For:

ASD Shutesbury MA Solar LLC
c/o AMP Solar Development
518 17th Street, Suite 950
Denver, CO 80202

Prepared By:

Verdanterra
601 Technology Drive, Suite 200
Canonsburg, PA 15317

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ATTACHMENTS

1.0 Background

On behalf of ASD Shutesbury MA Solar LLC (Operator/Owner), Verdanterra has prepared this Decommissioning Plan (Plan) for the proposed *Shutesbury Road Solar project* (the facility) located along the south side of Shutesbury Road, Amherst, MA 01059. The overall facility consists of an approximately 9.35-megawatt (MWdc) solar power generation surrounded by a 7-foot-tall perimeter chain link security fence.

The intent of this Plan is to provide a general scope of decommission work as well as to act as a mechanism for decommissioning assurance within the Town of Amherst Planning Board. As a result, this decommissioning estimate has been prepared for the current site layout.

1.1 Facility Description

The proposed facility will be constructed on currently wooded space with existing topography that is wellsuited for solar array development. Project components are planned to consist of the site features listed below:

- 9,313 linear feet of 7-ft perimeter chain link fence.
- 3,976 square yards of 15-foot-wide gravel access drives and turn arounds.
- 17,160 photovoltaic (PV) solar modules (i.e., “panels”).
- 87 single-axis tracker racking frames.
- Two (2) SMA SC2660-UP Inverters.
- Three (3) Power Electronic transformers.
- One (1) concrete equipment pad supporting the electrical equipment.
- 920-feet of underground, and 740-feet of overhead collector line; and
- Underground conduit and conductors along the trenches.
- Battery Energy Storage System (BESS) Equipment:
  - Twenty-seven (27) Powin Stack 750E batteries (746 kWh each), each contained in their own module.
  - Nine (9) Dynapower DPS 500 DC-DC converters.

2.0 Decommissioning Activities

Facility decommissioning will consist of the following major steps:

- Dismantle and Demolish;
- Disposal and Recycle; and
- Site Restoration and Stabilization.

2.1 Dismantle, Demolish, and Disposal or Recycle

Elements of the photovoltaic system at the Facility will include steel which is a recyclable or re-saleable component. Due to their resale value, these components will be dismantled and disassembled rather than being demolished and disposed.

Prior to commencing decommissioning, the owner/operator will coordinate with the local utility company to determine schedule and procedure for disconnecting facility infrastructure from the point of interconnection. Once disconnection is completed, all facility electrical connections will be disconnected and tested to confirm the system is de-energized prior to starting removal.

All electrical connections to the PV modules will be cut and the modules will be removed from their framework by cutting or dismantling the bolted connections to the supports. Modules will then be removed. The interior materials of the PV modules are silicon-based and are not considered hazardous materials. In the event of a total module fracture during removal, these modules may be permissible for disposal at a licensed landfill. Decommissioning contractor will be responsible for assessing condition of PV modules and managing for proper disposal throughout removal procedure.

The photovoltaic module frame and racking system and all other metal project components, including driven support posts, perimeter chain-link fencing, and gates, will be demolished and removed from the site for recycling, salvage, or disposal. Concrete stormwater facility outlet structures and endwalls will be broken onsite and removed completely for disposal.

Any aboveground utility poles owned by ASD (three for this project) will be completely removed and disposed of off-site in accordance with utility best practices. All overhead electrical conductors will be removed from the PV equipment and terminated as required by the Utility Company. Underground conductorsand circuits will be removed. Once equipment is removed from the site, the facility gravel accessroad will be excavated to a depth that matches into adjacent site grades. Removed aggregate will be hauled offsite and sold as fill. Any geotextile fabric and geogrid will be disposed at a landfill.

The DC-DC converters will be removed from their concrete pads. Their electronic components and internal cables will be removed. These components will be lowered to the ground where they will be transported whole for reconditioning and reuse or disassembled / cut into more easily transportable sections for salvageable, recyclable, or disposable components.

The BESS containers will be removed from their concrete pads and set on tractor trailers for transport. The containers will be transported to their manufacturing facility where they will be recycled. There is no salvage value for the BESS containers under the decommissioning cost, with the exception of the steel panels.

Concrete slabs used for DC-DC converters and BESS containers will be broken and removed to a depth of two feet below grade. Clean concrete will be crushed and disposed of off-site and/or recycled and reused either on or off-site. Excavations will be filled with subgrade material found on-site of quality and compacted density comparable to the surrounding area.

A final site walkthrough will be conducted to remove debris and/or trash generated within the site during the decommissioning process and will include removal and proper disposal of any debris that may have been wind-blown to areas outside the immediate footprint of the facility being removed.

2.2 Site Restoration and Stabilization

Solar facilities are largely pervious, vegetated surfaces. Decommissioning and removal of equipment will not result in excessive earth disturbance; however, some restoration and site stabilization will be required upon completion of work. The areas of the facility that are disturbed will consist of the array areas where construction vehicles travel, the footprint of the access roads, the corridors of the perimeter fencing, equipment pad areas, stormwater management basins, and underground electric lines. The site will be de-compacted by disking and mixing with suitable sub-grade materials selected to support revegetation and to match the existing soil types. Disturbed areas will be seeded with an appropriate local grass seed mix and topsoil if needed.

3.0 Permitting Requirements for Decommissioning

In addition to any decommissioning requirements listed in the conditions of the original project approvals, other permits for decommissioning activities may be required by state or local agencies. The decommissioning contractor shall be responsible for obtaining any required permits or approvals, at the time of decommissioning.

4.0 Schedule

Decommissioning, demolition, and dismantling of the facility is anticipated to be completed over a duration of approximately four (4) to five (5) months and is not intended to occur during the winter season or require multiple mobilizations.

5.0 Opinion of Probable Decommissioning Cost

A decommissioning cost estimate was prepared under the direction and supervision of a Professional Engineer registered in the State of Massachusetts and is included as **Attachment B**. Assumptions and references applicable to each line item are listed as they are used.

6.0 Decommissioning Assurance

6.1 Form of Decommissioning Assurance

Financial security for decommissioning may be required if requested by the Town of Amherst Planning Board prior to issuance of a building permit. The Owner/Operator will provide decommissioning assurance in an amount equal to the decommissioning cost estimate for the site included as Attachment B or as agreed between the Owner/Operator and the Town Planning Board. Decommissioning assurance shall be provided in a form acceptable to the Planning Board.

6.2 Amount of Decommissioning Assurance

The initial amount of the decommissioning assurance shall be determined concurrently with the design and engineering documents that will be submitted for building and electrical permits.

7.0 Use of Decommissioning Assurance

If the Owner/Operator fails to start decommissioning activities within six (6) months of discontinued operations, the Town shall have the right to undertake decommissioning activitiesand make a claim against the decommissioning assurance. In such circumstances, the Town shall have such access to the site as may be necessary to allow their qualified contractors to conduct decommissioning activities.

For purposes hereof the “date of discontinued operations” shall be defined as:

- The date of discontinued operations designated by the Owner/Operator in its notice to the Town; or
- In absence of such notice, the last day of a continuous period of six (6) months in which the facility has not operated and where such inactivity is not the result of a casualty, equipment problem, permitting matter, natural disaster, or financial matter that the Owner/Operator is in good faith attempting to remedy.

In the event the Town must carry out Decommissioning activities, it shall be entitled to indemnification from the Owner/ Operator for expenses reasonably incurred in connection with decommissioning, net of any salvage value for the solar facility components.

8.0 Acknowledgement and Approval

The Town hereby acknowledges receipt of this Decommissioning Plan and affirms that the Plan (assuming establishment of the escrow fund agreed upon by the Town Planning Board and ASD) satisfies the conditions of the applicable permit approvals relevant thereto.

Town of Amherst Planning Board
Signed:

Date: _____

_____ _____
Name: Name:

_____ _____
Name: Name:

_____ _____
Name: Name:

Attachment A: Site Location Map

Attachment B: Decommissioning Estimate

DECOMMISSIONING COST ANALYSIS
ASD SHUTESBURY MA SOLAR LLC

	DESCRIPTION OF ITEM	QUANTITY	UNIT		UNIT COST		TOTAL COST (2023)	TOTAL COST (After 25 Years)**	LOGIC
	I. DISASSEMBLY & DISPOSAL								
A	Disconnection of Electrical System	1	EA	$	1,200.00	$	1,200.00	1,968.73	* Assumes one 10-hour day for 2 qualified linemen.
B	Administrative Costs	1	EA	$	3,000.00	$	3,000.00	4,921.82	
1	PV Modules	17,160	EA	$	5.00	$	85,800.00	140,763.99	* Use Crew A-5 (2 Laborers; .25 Truck Driver; .25 Flatbed Truck) = $1,222/day. Assume crews can remove approximately 250 panels/day.
2	Inverter(s)	2	EA	$	1,222.00	$	2,444.00	4,009.64	* Use Crew A-5 (2 Laborers; .25 Truck Driver; .25 Flatbed Truck) = $1,222/day. Assume crews can remove 1 inverter per day.
3	Transformer(s)	3	EA	$	306.00	$	918.00	1,506.08	* Use Crew A-5 (2 Laborers; .25 Truck Driver; .25 Flatbed Truck) = $1,222/day. Assume crews can remove 1 transformer in two hours.
4	Racking Frame (Single-Axis Tracker)	87	EA	$	14.05	$	1,222.00	2,004.82	* Use Crew A-5 (2 Laborers; .25 Truck Driver; .25 Flatbed Truck) = $1,222/day. Assume crews can remove all in 1 day.
6	Racking Posts	609	EA	$	18.00	$	10,962.00	17,984.32	* Use Crew A-5 (2 Laborers; .25 Truck Driver; .25 Flatbed Truck) = $1,222/day. Assume crews can remove approximately 70/day.
7	LV Wiring	39,591	LF	$	0.41	$	16,232.31	26,630.83	* Use Crew A-5 (2 Laborers; .25 Truck Driver; .25 Flatbed Truck) = $1,222/day. Assume crews can remove approximately 3,000 LF/day.
8	MV Wiring	2,487	LF	$	0.41	$	1,019.67	1,672.88	* Use Crew A-5 (2 Laborers; .25 Truck Driver; .25 Flatbed Truck) = $1,222/day. Assume crews can remove approximately 3,000 LF/day.
9	Underground System for Battery Storage	3	EA	$	611.00	$	1,833.00	3,007.23	* Use Crew A-5 (2 Laborers; .25 Truck Driver; .25 Flatbed Truck) = $1,222/day. Assume crews can remove approximately 3,000 LF/day.
10	Fence	9,313	LF	$	2.40	$	22,351.20	36,669.51	* Use Crew A-5 (2 Laborers; .25 Truck Driver; .25 Flatbed Truck) = $1,222/day. Assume crews can remove approximately 500 LF/day.
11	Concrete (Pads, outlet structures and endwalls)	447	CY	$	70.00	$	31,283.52	51,323.93	* Use Crew B-3B (2 Laborers; 1 Equip Oper; 1 Truck Driver; 1 Backhoe; 1 Dump Trk) = $3,534/day. Assume crews can remove approx 50 CY/day.
12	Gravel (Access Road and equipment pads)	888	CY	$	35.00	$	31,076.46	50,984.23	* Use Crew B-3B (2 Laborers; 1 Equip Oper; 1 Truck Driver; 1 Backhoe; 1 Dump Trk) = $3,534/day. Assume crews can remove approx 100 CY/day.
13	DC-DC Converters	9	EA	$	333.33	$	3,000.00	4,921.82	* 2 Laborers, 1 Equipment Operator, 1 Truck Driver, 1 Backhoe, 1 Dump Truck = $3,000/day. Assume 1 day.
14	Batteries (Recycle cost)	27	EA	$	150.00	$	4,050.00	6,644.45	* Assume 400 miles to manufacturer. Use tractor trailer. Two day trip to manufacturer and back.
15	Utility Pole Removal	3	EA	$	1,000.00		3,000.00	4,921.82	Estimate includes labor and all required tools and vehicles.
					SUBTOTAL	$	**219,392.16**	**359,936.09**	
	II. SITE RESTORATION								
16	Re-Seeding (access drive, basins, and 50% of site)	20.4	AC	$	2,400.00	$	48,963.17	80,329.27	* Cost includes:(Seed: 4-7 species (native types) Also with estimate is laborSpraying; Disking; Planting; Mulch; One man & machine)
17	Re-Grading (Includes filling the swm basins and swales and restoring gravel pad areas)	4,015	CY	$	5.00	$	20,075.31	32,935.68	* (2 Laborers; 1 Equip Oper; 1 Truck Driver; 1 Backhoe; 1 Dump Truck) = $3,448/day. Assume crews can grade approximately 700 CY/day.
					SUBTOTAL	$	**69,038.48**	**113,264.95**	
	III. SALVAGE								
18	Racking Frame (Single-Axis Tracker)	4,350	LBS	$	0.09	$	-391.50	-568.05	Scrapmonster
19	Racking Posts	46,040	LBS	$	0.09	$	-4,143.64	-6,012.19	Scrapmonster
20	Chain Link Fence	29,802	LBS	$	0.50	$	-14,900.80	-21,620.25	Rockaway Recycling and others 3.2 lbs per linear foot. $0.50 per lb.
21	DC-DC Converter Panels / Steel	8,137	LBS	$	0.08	$	-650.95	-944.49	Rockaway Recycling
					SUBTOTAL	$	**-20,086.88**	**-29,144.97**	
									Legend:
		DEMOLITION COST				**$**	**288,430.64**	**473,201.04**	* = Costs derived from RS Means Heavy Site estimating manual
		SALVAGE VALUE CREDIT				**$**	**-20,086.88**	**-29,144.97**	** = Assumes 2% annual increase in labor costs and 1.5% annual increase in salvage value
	AMOUNT OF DECOMMISSIONING ASSURANCE =					**$**	**268,343.76**	**444,056.07**	

DECOMMISSIONING QUANTITIES				
	DESCRIPTION OF ITEM	UNIT	QUANTITY	NOTES
	I. DISASSEMBLY & DISPOSAL			
1	Disconnection of Electrical System	LS	1	Standard
2	PV Modules	EA	17,160	CAD
3	Inverter(s)	EA	2	"
4	Transformer(s)	EA	3	"
5	Racking Frame (Single Axis Trackers)	EA	87	Single-Axis Trackers
6	Racking Posts	EA	609	Each frame consists of 2 posts
7	LV Wiring	LF	39,591	Use Length of each array row x 1.2 for connections
8	MV Wiring	LF	2,487	Use Length between farthest Inverter/Transformer pad to POI x 1.5 for connections
9	Fence	LF	9,313	L.F. of fence measure from CAD drawing
10	Concrete (Pads and outlet structures)	CY	447	1 pad at 9,600 sf, 3 outlet structures
11	Gravel (Access Road)	CY	888	Access drive and turnarounds = 35,781 sf x 8" depth. Quantity pulled from CAD
12	DC-DC Converters	EA	9	Provided by Owner
13	BESS Containers	EA	27	Provided by Owner
14	Utility Poles	EA	3	CAD
	II. SITE RESTORATION			
15	Re-Seeding	AC	20.40	Use total disturbed area = access road outside fence, swales, ponds + 50% area within fence
16	Re-Grading (includes filling basins and swales)	CY	4,015	Use volume of access road and pads below existing grade; swales and basins
	III. SALVAGE			
17	Racking Frame (Single Axis Trackers)	LBS	4,350	
18	Racking Posts	LBS	46,040	4" dia. Structural pipe = 10.8 lbs/ft. Avg. wt. per post = 75.6 lbs. Assume worst case with Sonotube below grade = no salvage value.
19	Chain Link Fence	LBS	29,802	Use 3.2 lbs/LF of fence
20	DC-DC Converters	LBS	8,137	Calculated