



RINA Consulting

705 S. Main St. Suite 260
Plymouth, MI 48170

May 22, 2018

To Whom It May Concern;

This opinion of probable costs is based on the engineer's experience in the design and construction of energy facilities and are subject to final engineering. This opinion is also based on RINA Consulting's experience supervising the construction of PV plants and supervising the demolition of other non-PV facilities. The engineer is unaware of a significant body of decommissioned PV plants with which to benchmark its opinion of cost. With the exception of the PV modules and inter-module wiring, none of the activities undertaken to disassemble a PV plant are unique to PV plants. Disassembly costs can be estimated similar to other types of facilities. While 3rd party software such as RS Means do contain data on PV plant disassembly, RINA has found that the data is not applicable to large ground-mounted systems.

This opinion assumes a third-party contractor, experienced in the construction and decommissioning of PV facilities will lead the effort. The reported costs include labor, materials, taxes, insurance, transport costs, equipment rental, contractor's overhead, and contractor's profit. Labor costs have been estimated using regional labor rates and labor efficiencies from the Bureau of Labor Statistics. This opinion assumes open-shop labor rates.

This opinion of cost has been split between plant disassembly, site restoration, and salvage which reflects the overall decommissioning process. The PV plant will first be disassembled, with all above and below grade components removed to a depth of 3 feet. This includes all buried cables, conduits, and foundations. Costs for disassembly are overall less than those for original assembly of the facility. While PV modules will need to be removed by hand to retain their salvage value, the racks, buried cables, and concrete can be removed by machine to increase efficiency. It is assumed that concrete, gravel, and fiber optic cable do not have salvage value and will be disposed off site for \$95/ton or \$45/cy. Other materials are assumed to have salvage value and can be sold at market prices. The table at the end of this letter outlines the disassembly methods anticipated.

It is expected that the entire site will be re-seeded with native grasses and vegetation. It is assumed that mulching and stabilization of seeded areas will only be required where gravel roads or concrete foundations were removed. As all cables will be direct buried, excavation to remove the cables will not be required, and the disturbance to those areas will be minimal.

It is assumed that re-grading of the site to remove diversion dikes and retention ponds is not required. The earth-moving required to remove these features would likely trigger a NPDES (or state/local equivalent) permit, which would in turn require those same features to be installed to control storm water on the site. In addition it is assumed that silt fence and tracking control will be installed prior to disassembly and will be removed prior to demobilization.

Salvage values have been estimated using publicly available data from <http://www.scrapmonster.com>. Inverters were priced at the rate for Complete Computers, which is lower than what could be attained if they were disassembled on site. Transformers were priced at 80% of the market rate for Sealed Unit Transformers. PV modules were price at the rate for Low Grade Boards, which is lower than what could be attained if they were sold as functioning PV modules.

Inflation, if included in this estimate has been projected based on the Producer Price Indices for Final Demand Construction, Iron Steel Scrap, and Copper Base Scrap.

Anticipated Disassembly Methods	
Item	Removal Method
PV Modules	Hand Removal. Place modules face down on pallets, tape wire ends, tied down and transport via skid-steer to staging location. Assumed 5% breakage, salvage value for crystalline, no salvage for thin-film.
Inverters	Removal by crane and transport via flat-bed to staging location. Assume no disassembly. Assumed salvage value.
Transformers	Removal by crane and transport via flat-bed to staging location. Assume no disassembly. Oil removal performed by scrap facility. Assumed salvage value.
Racking Frame	Stabilize w/ machine. Cut legs and lower to ground level. Cut cross beams to appropriate size and transport via dump truck to staging location. Assumed salvage value.
Racking Posts	Remove via post-puller and transport via dump truck to staging location. Assumed salvage value.
Racking Wiring	Disconnect PV connectors, cut cable ties, and remove wires from cable tray. Transport via dump truck to staging area. Assumed salvage value.
Underground Cable	Excavate to cable depth at one end of trench. Use tractor or backhoe pull out all cables in common trench. Cables are direct buried so complete excavation of trenches is not required. Transport via dump truck to staging area. Assumed salvage value.
Fence	Machine roll fence fabric. Remove posts via post-puller and transport via dump truck to staging location. Assumed salvage value.
Concrete	Remove with excavator and jack hammer. Backfill and compact as needed. Transport via dump truck to staging area. Assumed offsite disposal.
Gravel	Remove with skid steer with sweeper. Transport via dump truck to staging area. Assumed offsite disposal.
Offsite Disposal	Assumed disposal at \$95/ton or \$45/CY including tipping fee.
Re-Seeding & Planting	Re-seed using an ATV-pulled drill seeder, at 5lbs bulk seed per acre of native grasses. Stabilize and mulch on areas where concrete or gravel was removed only.
Re-Grading	No bulk re-grading is included as this would alter site hydrology.
Erosion & Sediment Control	Install silt fence around project perimeter. Install tracking control at site entrance and replace once during disassembly. Remove at end of disassembly. We anticipate net soil disturbance is < 1 acre.

Feel free to contact the undersigned with any questions.

Rina Consulting

A handwritten signature in black ink, appearing to be 'JB', with a long horizontal flourish extending to the right.

Joshua Berkow, PE
Principal Power Systems Engineering Consultant

5/22/2018
Date

705 S. Main Street. Suite 260
Plymouth, MI 48170
(734) 634-4088



Project:	Salt Point Solar, LLC	Engineer:	J.Berkow
Client:	Cypress Creek	Issue Date:	5/22/18
Location:	Hyde Park, NY	Revision:	1

OPINION OF PROBABLE COST - PV PLANT DECOMMISSIONING - SAT - 2.13 MWac - ANNUAL INFLATION=1.43% - END OF LIFE: YEAR 35				
DISASSEMBLY & DISPOSAL				
ITEM	DESCRIPTION	QUANTITY	UNIT PRICE	TOTAL
1.0	PV Modules (325 W)	9,156	\$ 2.65	\$ 24,263.40
2.0	Inverter(s) (2.13 MVA)	1	\$ 1,340	\$ 1,340.00
3.0	Transformer(s) (2.13 MVA)	1	\$ 670	\$ 670.00
4.0	Racking Frame (Single Axis)	141	\$ 105	\$ 14,805.00
5.0	Racking Posts	1,551	\$ 14	\$ 21,714.00
6.0	Tracker Motors	141	\$ 29	\$ 4,089.00
7.0	Racking Wiring	53,499 LF	\$ 0.09	\$ 4,814.91
8.0	Underground Cable (LV, MV, Comm)	11,277 LF	\$ 0.65	\$ 7,330.05
9.0	Fence	7,090 LF	\$ 2.73	\$ 19,355.70
10.0	Concrete	9 CY	\$ 103	\$ 927.00
11.0	Gravel	463 CY	\$ 39	\$ 18,057.00
12.0	Offsite Disposal	473 CY	\$ 45	\$ 21,285.00
13.0	General Conditions	2 MWac	\$ 6,656	\$ 14,177.28
SUBTOTAL				\$ 152,828.34
SITE RESTORATION				
ITEM	DESCRIPTION	QUANTITY	UNIT PRICE	TOTAL
14.0	Re-Seeding	26.5 ACRES	\$ 301	\$ 7,976.50
15.0	Re-Grading	0 CY	\$ 26	\$ -
16.0	Erosion and Sediment Control	1 LS	\$ 18,103	\$ 18,103.00
SUBTOTAL				\$ 26,079.50
SALVAGE				
ITEM	DESCRIPTION	QUANTITY	UNIT PRICE	TOTAL
17.0	PV Modules (325 W)	9,156	\$ 14	\$ 128,184.00
18.0	Inverter(s) (2.13 MVA)	1	\$ 3,528	\$ 3,528.00
19.0	Transformer(s) (2.13 MVA)	1	\$ 5,600	\$ 5,600.00
20.0	Racking Frame (Single Axis)	328,069 LBS	\$ 0.23	\$ 75,455.87
21.0	Racking Posts	255,915 LBS	\$ 0.23	\$ 58,860.45
22.0	Tracker Motors	7,614 LBS	\$ 0.59	\$ 4,492.26
23.0	LV Wiring	5,163 LBS	\$ 4.09	\$ 21,116.67
24.0	MV Wiring	12,826 LBS	\$ 2.19	\$ 28,088.94
25.0	Chain Link Fence	108,506 LBS	\$ 0.23	\$ 24,956.38
SUBTOTAL				\$ 350,282.57
<i>TOTAL DISASSEMBLY, DISPOSAL, & SITE RESTORATION COST</i>				\$ 178,907.84
<i>TOTAL SALVAGE VALUE</i>				\$ 350,282.57
<i>NET DECOMMISSIONING COST</i>				\$ (171,374.73)

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Joshua Berkow, PE
Principal Power Systems Engineering Consultant

5/22/2018
Date



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Project:	Salt Point Solar, LLC	Engineer:	J.Berkow
Client:	Cypress Creek	Issue Date:	5/22/18
Location:	Hyde Park, NY	Revision:	1

OPINION OF PROBABLE COST - PV PLANT DECOMMISSIONING - SAT - 2.13 MWac - PRESENT DAY				
DISASSEMBLY & DISPOSAL				
ITEM	DESCRIPTION	QUANTITY	UNIT PRICE	TOTAL
1.0	PV Modules (325 W)	9,156	\$ 1.61	\$ 14,741.16
2.0	Inverter(s) (2.13 MVA)	1	\$ 816	\$ 816.00
3.0	Transformer(s) (2.13 MVA)	1	\$ 408	\$ 408.00
4.0	Racking Frame (Single Axis)	141	\$ 64	\$ 9,024.00
5.0	Racking Posts	1,551	\$ 9	\$ 13,959.00
6.0	Tracker Motors	141	\$ 18	\$ 2,538.00
7.0	Racking Wiring	53,499 LF	\$ 0.05	\$ 2,674.95
8.0	Underground Cable (LV, MV, Comm)	11,277 LF	\$ 0.39	\$ 4,398.03
9.0	Fence	7,090 LF	\$ 1.66	\$ 11,769.40
10.0	Concrete	9 CY	\$ 125	\$ 1,125.00
11.0	Gravel	463 CY	\$ 23	\$ 10,649.00
12.0	Offsite Disposal	473 CY	\$ 45	\$ 21,285.00
13.0	General Conditions	2 MWac	\$ 2,731	\$ 5,817.03
SUBTOTAL				\$ 99,204.57
SITE RESTORATION				
ITEM	DESCRIPTION	QUANTITY	UNIT PRICE	TOTAL
14.0	Re-Seeding	26.5 ACRES	\$ 183	\$ 4,849.50
15.0	Re-Grading	0 CY	\$ 16	\$ -
16.0	Erosion and Sediment Control	1 LS	\$ 11,030	\$ 11,030.00
SUBTOTAL				\$ 15,879.50
SALVAGE				
ITEM	DESCRIPTION	QUANTITY	UNIT PRICE	TOTAL
17.0	PV Modules (325 W)	9,156	\$ 14	\$ 128,184.00
18.0	Inverter(s) (2.13 MVA)	1	\$ 2,028	\$ 2,028.00
19.0	Transformer(s) (2.13 MVA)	1	\$ 2,352	\$ 2,352.00
20.0	Racking Frame (Single Axis)	328,069 LBS	\$ 0.13	\$ 42,648.97
21.0	Racking Posts	255,915 LBS	\$ 0.13	\$ 33,268.95
22.0	RESERVED	7,614 LBS	\$ 0.25	\$ 1,903.50
23.0	LV Wiring	5,163 LBS	\$ 1.72	\$ 8,880.36
24.0	MV Wiring	12,826 LBS	\$ 0.92	\$ 11,799.92
25.0	Chain Link Fence	108,506 LBS	\$ 0.13	\$ 14,105.78
SUBTOTAL				\$ 245,171.48
<i>TOTAL DISASSEMBLY, DISPOSAL, & SITE RESTORATION COST</i>				\$ 115,084.07
<i>TOTAL SALVAGE VALUE</i>				\$ 245,171.48
<i>NET DECOMMISSIONING COST</i>				\$ (130,087.41)

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