Zoning Inspector

From: Director of Development <dod@townofcanandaigua.org>
Sent: Thursday, October 27, 2016 4:19 PM
To: 'Eric Cooper'
Subject: FW: Large Scale Solar Commissioning Plan and Cost
Attachments: SOLAR PV ENERGY SYSTEM DECOMMISSIONING PLAN.pdf

For Bennet file please

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From: Daniel Bennett, Graystone [mailto:graystonecms@aol.com]
Sent: Friday, October 21, 2016 6:23 PM
To: cnadler@reevebrownlaw.com; dod@townofcanandaigua.org
Subject: Large Scale Solar Commissioning Plan and Cost

Chris/Doug,

Attached is an O&M Plan and more importantly a Decommissioning Plan.

You will notice that most of the equipment has substantial salvage and recycling value to offset the decommissioning labor and transportation cost. I gave you the best case and worst case values.

I also noted that the decommissioning plan should be updated every 5 years and reviewed 6 months prior to the decommissioning process. If a bond is required, the bond amount could start out low while the asset (salvage value) is at it's highest value and increase at each of the 5 year review/renewals as the asset (salvage value) decreases. This would also allow the solar developer to add to an account over time for the increased decommissioning bond amount as required.

Even though our project was tabled at the ZBA meeting and we are not on the agenda for Tuesday night, I will be there anyway.

Please let me know if there are any questions that have come up that I can help answer.

Dan

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"BUILDING A SUSTAINABLE FUTURE"

SOLAR PV ENERGY SYSTEM OPERATIONS & MAINTENANCE AND DECOMMISSIONING PLAN

4575 North Road, Canandaigua NY 14424

SOLAR PV ENERGY SYSTEM DESCRIPTION

Each Solar Energy System consists of Solar PV Modules, Electrical Inverters, Galvanized Steel Ground Mount Racking Systems, Electrical Equipment, Wiring Systems, Utility Power Lines, Fencing, Access Driveway, and Landscaping & Plantings.

The Solar Energy System is designed to have an Operational Life of 30 plus years with a one-time Inverter replacement. Tier 1 high quality Solar PV Modules will be used that have a minimum standard manufacturer's warranty to produce at least 80% at year 25 and are expected to last for 35 plus years losing less than 1/2% output per year. The high quality Inverters that will be used have a minimum standard manufacturer's warranty of 10 years with extended warranties available for 15 and 20 years. It is expected that the Inverters will be replaced at least one time during the Solar Energy System Operational Life period. The Ground Mount Racking System consists of galvanized steel, aluminum, and stainless steel structures and fasteners for enhanced resistance to corrosion. The foundations are typically machine driven galvanized steel column posts, ground screws, or helical screw posts. The Electrical Equipment consists of heavy duty electrical disconnects, breaker panels, switches, transformers, and meters. Wiring Systems consist of copper and aluminum cable, junction boxes, and conduit. Utility Power Lines will be a combination of overhead and underground cable systems with medium voltage switches and electrical components installed by the utility companies and private contractors per the utility requirements. Fencing is generally steel chain link six feet high around the main electrical components. The access driveway consists of a crushed stone construction and surface with a minimum practical size for access to the main electrical disconnects. The landscaping and plantings around, between, and under the solar rows will be of natural native plant species; shrubs (red osier dogwood that already grow naturally on the site) will provide buffer areas to limit site views and enhance the visual appearance of the site; low growing grasses will be planted between and under the solar rows enhancing the existing vegetation providing soil stabilization, natural absorption of water, and habitat.

When the Solar PV Modules have reached a point below the effective output level, the Solar Energy System can be refitted with new solar PV modules and inverters on the existing infrastructure, extending the operational life of the Solar Energy System.

OPERATIONS AND MAINTENANCE (O&M)

The Solar PV Energy System requires minimal Operations and Maintenance. All equipment must be maintained per the manufacturers' recommendations. The following outlines the anticipated frequency:

ONGOING

- Remotely monitor the status and output of the system and be alerted to any faults, alarms, and output irregularities. Depending on the alert priority, send out a technician to diagnose and rectify the problem as timely as necessary.

SEASONALLY

- Plow and clear snow up to and around major electrical equipment for access and service. Provide clear access for utility company personnel to main disconnect switch 24/7 as required.
- Trim and mow vegetation as required.

MONTHLY

- Visually inspect entire system for integrity, damage, debris, soiling, and irregularities.
- Inspect and clean on-site meteorological stations.

QUARTERLY

- Inspect all electrical components, wiring, and connections.
- Inspect (and clean if necessary) all Inverters and major electrical components.

SEMI-ANNUALLY

- Check a predetermined sample of electrical equipment for output and power quality.

ANNUALLY

- Inspect and test all electrical components, wiring, and connections.
- Inspect and test on-site meteorological stations.

EVERY 5 YEARS

- Perform Infrared Thermal Image Scans on entire system to find irregularities.
- Update Decommissioning Plan with Authority Having Jurisdiction (AHJ).

OTHER

- Inverters to be replaced at an average of year 15 (as needed).
- PV Modules to be replaced when their output is below an acceptable level.

DECOMMISSIONING PLAN

This Decommissioning plan is based on current best management practices and procedures. These procedures may be subject to revision based on new standards and emergent best management practices at the time of decommissioning. The plan will be reviewed every five years and updated six months prior to the start of decommissioning.

The Solar PV Energy System will be Decommissioned after the end of its operational life. This generally includes removal of all systems and improvements and restoring the property similar to original condition, excluding the general improvements to the property that are to be retained by the landowner and approved by the Authority Having Jurisdiction (AHJ).

Most of the components of the Solar PV Energy System are currently over 95% recyclable and should increase over time to closer to 100% with enhanced recycling programs. There are also substantial salvage values associated with many of the components through reconditioning, resell, and recycling programs: the electrical components and wire contain large amounts of copper and aluminum, the electrical equipment may be refurbished and reused, and the PV modules may be reused on other systems if they still have substantial output.

SOLAR PV MODULES: The modules will be disconnected, removed from the racking system, and sent to an approved salvage company to either test, refurbish, and resell or dismantle and recycle the components (over 95% recyclable glass, aluminum, silicon, copper, silver, etc.) and dispose of the components that are not recycled to an approved and regulated disposal facility. There are currently National PV module recycling programs in place and programs continue to be expanded and enhanced as the need over time increases. The salvage cost for the Solar PV Modules should exceed the cost of removal and transportation to offset other decommissioning costs.

INVERTERS: The Inverters will be disconnected, removed, and sent to an approved salvage company to either test, refurbish, and resell or dismantle and recycle the components (over 95% recyclable copper, aluminum, silver, plastic, etc.) and dispose of the components that are not recycled to an approved and regulated disposal facility. The salvage cost for the Inverters should exceed the cost of removal and transportation to offset other decommissioning costs.

STEEL GROUND MOUND RACKING SYSTEM: The racking system will be dismantled, the steel foundation posts will be removed and sent to an approved salvage company to either refurbish and resell or recycle the components (100% recyclable steel, aluminum, and stainless steel). The salvage cost for the racking system should exceed the cost of removal and transportation to offset other decommissioning costs.

ELECTRICAL EQUIPMENT: The electrical equipment will be disconnected, removed and sent to an approved salvage company to either test, refurbish, and resell or dismantle and recycle the components (over 95% recyclable copper, aluminum, steel, silver, etc.) and dispose of the components that are not recycled to an approved and regulated disposal facility. It is common practice to salvage, refurbish, and resell major electrical equipment. The salvage cost for the

electrical equipment should exceed the cost of removal and transportation to offset other decommissioning costs.

WIRING SYSTEMS: The electrical wiring systems will be disconnected, removed, and sent to an approved salvage company to recycle the components (over 95% recyclable copper, aluminum, plastic, etc.) and dispose of the components that are not recycled to an approved and regulated disposal facility. The salvage cost for the wiring systems should exceed the cost of removal and transportation to offset other decommissioning costs.

POWER LINE SYSTEMS: The power line systems will be disconnected and removed by the utility company and private contractors as per the requirements of the utility company. The underground cabling systems, overhead cabling systems, electrical equipment, switches, etc. that the utility company does not take will be sent to an approved salvage company to either test, refurbish, and resell or dismantle and recycle the components (over 95% recyclable copper, aluminum, silver, plastic, etc.) and dispose of the components that are not recycled to an approved and regulated disposal facility. Excess poles to be removed and salvaged or disposed of properly. The salvage cost for the power line systems should exceed the cost of removal and transportation to offset other decommissioning costs.

FENCING: The chain link fencing and steel fence posts will be removed and reused as temporary construction fence or sent to an approved salvage company to recycle the components (over 95% recyclable steel and misc. concrete) and dispose of the components that are not recycled to an approved and regulated disposal facility. The salvage cost for the fencing systems should be less than the cost of removal and transportation adding to the decommissioning costs.

ACCESS DRIVEWAY: The access driveway is to be removed if not agreed to leave in place for the landowner and approved by the AHJ. If all or portions are to be removed, the crushed stone material will be reused appropriately at another property for driveway or structural fill material. The plastic culvert piping will be either reused or recycled and the stabilization fabric will be properly disposed of if there is not a recycle program for that material. The salvage cost for the access driveway systems should be less than the cost of removal and transportation adding to the decommissioning costs.

LANDSCAPING & PLANTINGS RESTORATION: The landscaping and plantings are to be removed if not agreed to leave in place or relocate for the landowner and approved by the AHJ. The property is to be regraded and topsoil replaced at the former access driveway area if applicable and soil and vegetation replaced to a similar condition as original prior to the solar system. The cost to restore the site is the largest cost of decommissioning.

DECOMMISIONING COSTS with SALVAGE VALUE CONSIDERATIONS

4574 North Rd. Canadaigua 2MW Solar Garden

ITEM	PROCEEDURE	QUANTITY	REMOVAL COST with TRANSPORT	SALVAGE * MINIMUM VALUE	SALVAGE * MAXIMUM VALUE	NET COST MAXIMUM min. salvage	NET COST MINIMUM max.salvage
PV MODULES	Remove, Resell or Recycle	7218 each	$ 20,000	$ -	$ 100,000	$ 20,000	$ (80,000)
INVERTERS	Remove, Resell or Recycle	33 each	$ 3,300	$ -	$ 33,000	$ 3,300	$ (29,700)
GROUND MOUNT RACKING	Remove, Resell or Recycle	300000 lb	$ 20,000	$ 15,000	$ 50,000	$ 5,000	$ (30,000)
ELECTRICAL EQUIP.	Remove, Resell or Recycle	1 lot	$ 3,000	$ 5,000	$ 25,000	$ (2,000)	$ (22,000)
WIRING	Remove, Resell or Recycle	125000 ft	$ 7,500	$ 5,000	$ 10,000	$ 2,500	$ (2,500)
UTILITY POWERLINE	Remove, Resell or Recycle	1 lot	$ 5,000	$ 5,000	$ 10,000	$ -	$ (5,000)
ACCESS DRIVEWAY	Remove & Recycle	175 cy	$ 2,000	$ -	$ 500	$ 2,000	$ 1,500
FENCES	Remove, Reuse or Recycle	60 ft	$ 500	$ -	$ 100	$ 500	$ 400
LANDSCAPING, PLANTINGS & RESTORATION	Remove, Relocate & Re-Vegetate	10 acres	$ 7,500	$ -	$ -	$ 7,500	$ 7,500
		TOTAL:	$ 68,800	$ 30,000	$ 228,600	$ 38,800	$ (159,800)

MINUMUM DECOMMISSIONING COST WITH MAXIMUM SALVAGE VALUE: $ (159,800)

MAXIMUM DECOMISSIONING COST WITH MINIMUM SALVAGE VALUE: $ 38,800

*Note: SALVAGE VALUES PER CURRENT COST BASIS