

Town of Hunter Checklist for Feasibility of Installing a Solar Photovoltaic System on the Closed Landfill

This checklist has been created specifically for the Town of Hunter, NY to determine the viability of its current closed landfill to support a solar photovoltaic (PV) system. The checklist was designed as a screening tool to determine if the closed landfill site has the potential to be a favorable location for the installation of a PV system. It is not intended to take the place of a professional consultant or engineer to determine the feasibility of the site, but to determine if engaging a consultant is worthwhile. It is expected that this checklist will be reviewed by an individual with substantial knowledge of the landfill and a general understanding of how PV systems work. This checklist has been created for the Town of Hunter, NY, but is applicable throughout New York State.

To use this checklist: Begin in Section 1. Review the questions and respond *Yes* or *No* accordingly. Your responses will dictate which question to go to next; either specifically (i.e., continue to question 1.2), or just move to the next question. If any of the yellow highlighted boxes are **not** checked, the Town might want to reconsider the project. If they are, consider moving forward with engaging a NYSERDA approved contractor (see resource list below). Where the answers to the questions were known for the Town of Hunter, the appropriate box has been checked by the Climate Smart Communities Regional Coordinator.

Section 1: Feasibility Assessment
Purpose: Determine whether the landfill is a suitable place for a PV system.

		Yes	No
1.1	Is there adequate solar resource potential? If located in New York State, select Yes and move on to question 1.2. Otherwise, follow instructions below. Note: Visit the website below to determine the Town's approximate solar potential based on its general location in its state. http://www.nrel.gov/gis/solar.html Under "types of maps" and "U.S. Solar Resource Maps" click on one of the "photovoltaic" maps. If the solar potential is greater than 3.5 kWh/m2/day, continue to question 1.2. If the solar resource is lower than 3.5 kWh/m2/day, then a PV system may not be viable at this location.	<input checked="" type="checkbox"/>	<input type="checkbox"/>
1.2	Will the PV system be connected to the utility electrical grid? Note: A system can be grid-connected (connected to the utility electrical grid), or it can work independent from a utility's electricity distribution system (off-grid). If "Yes" continue to question 1.3. If "No", continue to question 1.4.	<input type="checkbox"/>	<input type="checkbox"/>
1.3	Is the project area located less than 1/2 mile from a transmission or distribution line? Note: Distance from a transmission or distribution line is an important consideration If "Yes" continue to question 1.4. If "No", Town may be unable to connect to grid or needs to engage utility to determine options to reach closest distribution line, continue to question 1.4.	<input type="checkbox"/>	<input type="checkbox"/>
1.4	Is there currently access to the landfill or can access be created? Note: Existing roads may be sufficient to transport materials required for construction as they are likely designed to accommodate the large trucks used to haul waste to the landfill. Additional roads may be necessary to support operation and maintenance of the PV plan and to comply with local fire codes. If "Yes" continue to question 1.5. If "No", consider whether development of an access road is an endeavor the Town would like to pursue (depends on length of roadway needed, etc.).	<input checked="" type="checkbox"/>	<input type="checkbox"/>
1.5	Is there at least two acres of space available for the solar PV system? Note: If answered "yes" continue to question 1.6. Each megawatt (MW) will typically require 5 acres, depending on efficiency of the technology and mounting configuration. The larger the system, the lower the unit cost per watt, the more power produced, and the faster the payback. If answered "No", consider that sites with less than 2 acres may not be economically feasible, unless bundled with other installations.	<input checked="" type="checkbox"/>	<input type="checkbox"/>
1.6	Is the slope of the land less than 6 degrees or can the site be easily graded? Note: If "yes" continue to question 1.7. If "no" and the slope of the site is greater than 6 degrees (~10% grade), solar PV may not be viable.	<input type="checkbox"/>	<input type="checkbox"/>
1.7	Are there any state land-use restrictions or institutional controls in place due to the presence of a landfill? Note: If "yes", please note that restrictions may apply for areas near wetlands, critical habitat areas, areas surrounding airports, national parks, etc. Institutional controls include (i) proprietary controls, i.e. easements or covenants; (ii) governmental controls, i.e. zoning or building codes; (iii) enforcement and permit tools, i.e. restrictive landfill closure permits; and (iv) informational devices, i.e. deed notices. These restrictions may increase the cost of the system and may even directly restrict construction at the landfill site. If "no" continue to question 1.8.	<input type="checkbox"/>	<input type="checkbox"/>
1.8	Are there any environmentally sensitive areas, such as wetlands located near the site? Note: If "yes", a State Environmental Quality Review (SEQR) may be necessary if significant environmental impacts are expected. Usually if the PV panel surface area exceeds 4,000 square feet, an environmental assessment form must be completed and SEQRA is applicable. Wetlands permits may be required if work is to be performed within a certain radius of freshwater wetlands. The presence of wetlands nearby does not necessary impede construction, but may require that other PV layouts are considered. This could also increase permit costs. If "no" continue to Section 2.	<input type="checkbox"/>	<input type="checkbox"/>

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Section 2: Financial Considerations
Purpose: Determine the types of funding that may be sought to finance the installation. The Town should consider financial incentives well in advance as some programs specify system types and certified installers that must be used in order to receive funding.

- | | Yes | No |
|---|--------------------------|--------------------------|
| <p>2.1 Would the Town prefer to lease the site?</p> <p>Note: The Town can establish various ownership agreements depending on the preferred degree of project involvement and profit. For example, the Town can select a vendor to design, finance, build, own, operate, and maintain the system. The vendor would claim much of the project revenue but also the risks. The Town benefits by being able to collect revenue from leasing the site and/or by paying a lower cost for clean electricity through a Power Purchase Agreement. The Town would enter into a Power Purchase Agreement (PPA) with the Lessee. Most likely this would be put out to bid through an RFQ or RFP process. More information on PPA's can be found at: http://www.nrel.gov/docs/fy10osti/46668.pdf
 If answered "yes" then Lessee may take the lead on the design and other elements of the project. Continue to Section 3.
 If "no" then continue to the next question.</p> | <input type="checkbox"/> | <input type="checkbox"/> |
| <p>2.2 Does the Town intend to seek financial incentives for installing PV on the landfill?</p> <p>Note: If "yes", note that other than net-metering (see Section 4), there are several programs specifically available to help defray the costs of the installation:
 If "no", continue to the next question.</p> <p>Resources
 New York Power Authority (NYPA) partners with municipalities to help cover the upfront costs of an installation using a loan method. The Town then pays back the money that NYPA provided by sharing in the resulting electric bill savings.
 http://www.nypa.gov/services/esprograms.htm
 The New York State Energy Research and Development Authority (NYSERDA) Solar PV Program (PON 2112) provides cash incentives for installers of new grid-connected PV systems that are 50 kW or less for non-residential sites. The system size may be larger, but the incentive will only be provided for the eligible portion of the PV system.
 http://www.nyserdera.ny.gov/Funding-Opportunities/Current-Funding-Opportunities/PON-2112-Solar-PV-Program-Financial-Incentives.aspx?sc_database=web
 NYSERDA New York Sun Competitive PV Program (PON 2589) awards recipients who submit proposals of PV installation projects over 50kW.
 http://www.nyserdera.ny.gov/Funding-Opportunities/Current-Funding-Opportunities/PON-2589-New-York-Sun-Competitive-PV-Program.aspx
 NYSERDA grants typically require that the PV installation is connected to the grid.</p> | <input type="checkbox"/> | <input type="checkbox"/> |

Section 3: Landfill Characteristics
Purpose: Collect information regarding the existing landfill and landfill design.

- | | Yes | No |
|--|--------------------------|--------------------------|
| <p>3.1 Has the Town verified that the landfill is not planned for another alternative use?</p> <p>Note: Once answered "yes" continue to question 3.2.
 If "no", evaluate whether other projects such as a recycling center, snow storage area, or other community interests need to be taken into consideration while planning the system location. If other projects are planned then additional discussions with the groups heading those projects may be necessary.</p> | <input type="checkbox"/> | <input type="checkbox"/> |
| <p>3.2 Are there any institutional controls that limit development of the site?</p> <p>Note: As mentioned in question 1.7 these restrictions may require additional work to allow development of the landfill.
 If answered "yes" then these restrictions should be considered as they may restrict certain portions of the landfill from development or require additional permitting, legal work, etc. All these concerns should be evaluated prior to moving on with the process.
 If answered "no" continue to question 3.3.</p> | <input type="checkbox"/> | <input type="checkbox"/> |
| <p>3.3 Has the landfill been inspected for settlement or damage in the last 5 years?</p> <p>Note: If answered "yes" and no settlement is expected, continue to question 3.4.
 If "no", settlement of the landfill can directly impact the mounting system of the PV installation. Due to the fact the landfill in Hunter was closed in about 1991, the majority of settlement has likely occurred. However, the Town may want to consider having a site inspection performed by an engineer or surveyor to determine the most suitable areas for development. Multiple assessments may be needed to show settlement over time and to determine whether the settlement is significant.</p> | <input type="checkbox"/> | <input type="checkbox"/> |
| <p>3.4 Will the Town have to alter existing erosion control, stormwater management, vegetative cover specifications, gas venting, or leachate systems for installation of the PV system?</p> <p>Note: If "yes", the PV system should not prevent access to or make these existing measures/structures ineffective or inoperable. Ideally, an area of the landfill with the fewer impediments should be selected for the PV installation. The Town can begin to address this issue by looking at the system plans and determining if conflicts exist between the proposed PV location and existing systems.
 If answered "no", then continue to question 3.5.</p> | <input type="checkbox"/> | <input type="checkbox"/> |
| <p>3.5 Is the current landfill cap expected to last at least 25-30 years?</p> <p>Note: An inspection performed by an engineer or information provided by the company that constructed the landfill may be used to determine the cap's life expectancy.
 If answered "yes" continue to Section 4.
 If answered "no" and the landfill cap will need significant repairs in the next 25-30 years or is expected to settle significantly, then a PV system would be directly impacted by these changes. Approximately 25-30 years is the length of time that PV panels can last while still being efficient energy-wise. Might want to consider another location for the PV system.</p> | <input type="checkbox"/> | <input type="checkbox"/> |

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Section 4: System Design and Energy Assessment

Purpose: Evaluate the type of PV system that may be preferred and determine how the power will be managed.

- | | | Yes | No |
|-----|--|--------------------------|--------------------------|
| 4.1 | <p>Has the Town considered how much energy it wants to generate?</p> <p>Note: If "yes" continue to the next question.
 If "no", consider that 1 megawatt (MW) can power approximately 155 homes in New York each year. Each MW will typically require 5 acres of land for the system.
 Generally, prices range from less than \$8/Watt for small systems (50 kW) to \$4-5/Watt for larger systems (MW). Once the preferred size has been determined, continue to question 4.2.</p> | <input type="checkbox"/> | <input type="checkbox"/> |
| 4.2 | <p>Has the Town identified a solar PV company/engineer to work with?</p> <p>It is highly encouraged that the Town engage a firm or consultant to identify the best system for the landfill site. There are several types of ground mounted systems (on-slab, poured concrete, earth screw augers, etc.) available and different compositions of PV panels available. A consultant may also be needed for permit preparation, load assessment, cap inspection, etc..
 Note: If "yes", continue to the next question.
 If answered "no", it is suggested that a consultant specializing in PV installations assist the Town with the site hired to select the system. A map/listing of approved NYSEDA PV Installers in Greene County can be found at the website below. Once a contractor is identified, continue to question 4.3 if connecting to the grid or to Section 5 if this will be a stand alone system.
 http://www.nyseda.ny.gov/Contractors/Find-a-Contractor/Photovoltaic-Installers.aspx</p> | <input type="checkbox"/> | <input type="checkbox"/> |
| 4.3 | <p>Has the Town contacted the local utility to determine their procedures for connecting a PV system to the grid, if applicable?</p> <p>Note: If "yes" continue to the next question.
 If "no" the Town should begin to involve the utility company in their project. For non-residential installations with less than 2MW capacity net metering applies and is supported by Central Hudson Gas & Electric. There is a cap of up to 3% of the company's total demand. In net-metering, surplus energy is subtracted, or "netted" from the energy supplied by the utility to the customer. This can be a good financial incentive for installing a PV system. Once the Town or Town's consultant has contacted the local utility regarding a potential PV installation continue to the next section.</p> | <input type="checkbox"/> | <input type="checkbox"/> |

Section 5: Applicable Regulations

Purpose: Review federal and state laws for the post-closure use of landfills.

- | | | Yes | No |
|-----|---|--------------------------|--------------------------|
| 5.1 | <p>Are there any Town bylaws, permits, or ordinances that will apply to the PV system installation and construction?</p> <p>Note: The Town can inquire with the various departments as to what will be required, which may be especially important if using a third-party vendor to design and install the system.
 If "yes" then make note of these requirements and convey the requirements to the selected contractor.
 If "no," continue to question 5.2.</p> | <input type="checkbox"/> | <input type="checkbox"/> |
| 5.2 | <p>Has the landfill been closed in compliance with state and local regulations?</p> <p>Note: If "yes" continue to the next question.
 If "no" the Town should coordinate with a consultant or NYDEC to determine the landfill's current regulatory status. Ensuring that the landfill has been properly closed will help the permitting process (what is the permitting process?) and ensure that fewer problems arise in the future. The Town may need to modify the post-closure operations and maintenance manual to reflect the changes in site use and configuration.
 NYDEC regulations 5 NYCRR Part 360-2.15 cover landfill closure and post-closure criteria:
 http://www.dec.ny.gov/regs/14639.html</p> | <input type="checkbox"/> | <input type="checkbox"/> |
| 5.3 | <p>Will the array area be greater than 4,000 square feet?</p> <p>Note: If "yes" then a project-based review may be required in accordance with the State Environmental Quality Review Act (SEQRA).
 If "no," still consider that other wetlands laws may be applicable.</p> | <input type="checkbox"/> | <input type="checkbox"/> |
| 5.4 | <p>Are there wetlands located in close proximity to the proposed PV installation/construction?</p> <p>Note: If "yes" then state or local wetland laws may apply. The Town or a consultant can determine what permits should be filed and any studies that may be necessary to ensure that the construction does not impact the environment.
 If answered "no" then continue to Section 6.</p> | <input type="checkbox"/> | <input type="checkbox"/> |

Town of Hunter Checklist for Feasibility of Installing a Solar Photovoltaic System on the Closed Landfill

Section 6: Operations and Maintenance (O&M)

Purpose: Additional considerations following PV installation. Note that O&M would be the responsibility of the equipment owner if an entity other than the Town.

	Yes	No
<p>6.1 Is there currently any form of security at the site (i.e. fencing)?</p> <p>Note: If "yes", continue to next question. If "no", note that security may be sought to protect the panels from damage/tampering due to unauthorized vehicular access, trespassers, etc.</p>	<input type="checkbox"/>	<input type="checkbox"/>
<p>6.2 Can the Town ensure regular inspections and maintenance of PV equipment, either with existing staff or through hiring a consultant?</p> <p>Note: If "yes", the inspections may also be coordinated with inspections of the cap and landfill components. If "no", consider the potential for training an existing employee to inspect the system and/or determine how funding may be obtained to hire a professional technician. Once considered, continue to question 6.3.</p>	<input type="checkbox"/>	<input type="checkbox"/>
<p>6.3 If the Town owns/operates the PV equipment, are staff available to monitor the PV system output (computer-based)?</p> <p>Note: If "yes", a Data Acquisition System (DAS), a computer-based hardware system, can be used to monitor system production. If the system is not functioning as expected, the DAS will automatically send an alert to the system owner so that they know to schedule a repair or inspection. If "no" and staff are not available to help monitor then system, then subcontracting this task may be an additional cost to the Town. Once considered, continue to question 6.4.</p>	<input type="checkbox"/>	<input type="checkbox"/>
<p>6.4 Has the Town considered the long-term implications of the system such as end-of-life removal, replacement costs, or decommissioning?</p> <p>Note: If "yes" see below. If "no", the Town may consider creating a reserve fund to account for the cost of system removal. The typical solar array has a design life of at least 25 years and can retain some useful functionality beyond that time span. In addition, the landfill cap and maintenance systems may have a life expectancy and may require repair once the solar installation is removed.</p>	<input type="checkbox"/>	<input type="checkbox"/>