August 2020

New York Solar Guidebook
for Local Governments

New York Solar Guidebook

Assisting local governments across New York State in navigating and managing solar energy development in their communities.

The New York Solar Guidebook is a compilation of information, tools, and step-by-step instructions to support local governments with the development, installation, and maintenance of solar energy projects in their communities. This guide covers the most pressing issues in New York State's solar market today, addressing topics such as:

- Understanding the basics of solar energy technology, equipment, and terminology
- Understanding the permitting and inspection process for solar photovoltaic (PV) installations through the New York State Unified Solar Permit. This section has been updated to incorporate the 2020 NYS Uniform Fire Prevention and Building Code (Uniform Code)
- Rooftop access and ventilation requirements for residential and nonresidential solar installations. This section has been updated to incorporate the 2020 NYS Uniform Code
- Step-by-step instructions on completing a State Environmental Quality Review (SEQR) for solar projects
- New York State's Real Property Tax Law Section § 487
- Payment-in-Lieu-of-Taxes (PILOT) Agreements for community solar projects larger than 1 MW
- Land-use tools for siting solar while protecting farmland
- Navigating solar installations in agricultural districts
- Decommissioning solar energy systems
- Using the Model Solar Energy Local Law to assist in drafting local solar laws and regulations for your community
- Leasing underutilized municipal land for solar development through the Municipal Solar Procurement Toolkit

You can download specific chapters of the New York Solar Guidebook at nyserda.ny.gov/SolarGuidebook.

NYSERDA offers free technical assistance to local governments implementing the Guidebook's policies and best practices. The NYSERDA team will work one-on-one with local governments to address solar permitting, zoning, property taxes, SEQR, or any other issues regarding solar projects. Local government officials can request free technical assistance at **nyserda.ny.gov/SolarGuidebook** or email questions to **cleanenergyhelp@nyserda.ny.gov**.

The NYSERDA team looks forward to partnering with communities across the State to help them meet their solar energy goals.

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NYSERDA offers objective information and analysis, innovative programs, technical expertise, and support to help New Yorkers increase energy efficiency, save money, use renewable energy, and reduce reliance on fossil fuels. NYSERDA professionals work to protect the environment and create clean energy jobs. A public benefit corporation, NYSERDA has been advancing innovative energy solutions since 1975.

Acronyms

The following acronyms are used frequently throughout this Guidebook.

AC - Alternating Current

AHJ - Authorities Having Jurisdiction

CEQR - City Environmental Quality Review

DC - Direct Current

EAF - Environmental Assessment Form

EIS - Environmental Impact Statement

EGC - Equipment Grounding Conductor

FEAF - Full Environmental Assessment Form

GEC - Grounding Electrode Conductor

NEC - National Electrical Code

NYSDEC - New York State Department of Environmental Conservation

NYSERDA - New York State Energy Research and Development Authority

DEP - NYC Department of Environmental Protection

OCPD - Overcurrent Protective Device

ORES - Office of Renewable Energy Siting

PILOT - Payment-in-Lieu-of-Taxes

RPTL - Real Property Tax Law

REV - Reforming the Energy Vision

PV - Photovoltaic

SEQR - State Environmental Quality Review

Solar Basics and Frequently Asked Questions

Understanding the basics of solar energy technology, equipment, and terminology.

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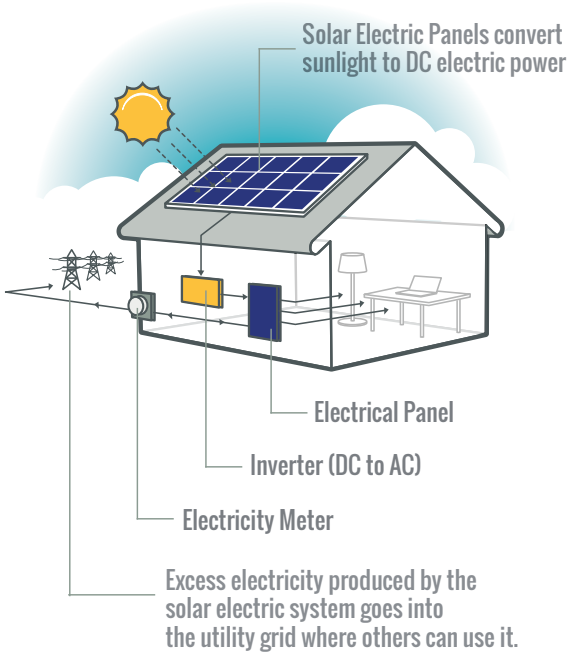
1. Solar Basics

An introduction to the common equipment and terminology used in solar technology. Topics of discussion include solar PV systems, solar terms, system components, net metering and financial considerations with regards to solar development.

1.1 Solar PV Systems



Solar electric systems convert the energy in sunlight into electrical current, which can power electric loads, be fed back to the electric grid, or be stored in batteries. All solar electric systems consist of the same basic components but vary widely in terms of size and complexity. This tool focuses on utility grid-tied residential solar PV systems under 25 kW in size. Solar electric systems should not be confused with solar thermal systems, which are a separate technology that captures the sun's thermal energy to heat water and air.

When sunlight strikes a solar electric array, electrons in the array are agitated into motion, creating direct current (DC). The electrical current flows along conductors from the array to an inverter. The inverter transforms the DC into alternating current (AC), which powers most common electrical appliances. The AC flows through conductors to the site's electric service panel, and then to individual branch circuits and loads. If the solar PV system is grid-tied (connected to the electric grid) and produces more electricity than is used at the site, the excess current is pushed back into the utility grid. This basic description of a solar electric system applies to most installations.

Most of New York's solar PV installations are residential, utility grid-tied, and do not include battery storage. They are typically roof-mounted and range from 4 to 10 kW. New York State's Standardized Interconnection Requirements (SIR; www3.dps.ny.gov/W/PSCWeb.nsf/All/DCF68EFCA391AD6085257687006F396B) allow residential solar PV systems up to 25 kW.

1.2 Solar Terms

The following terms are frequently used when discussing solar energy and associated technologies.

Alternating current: AC describes one type of electric charge flow. The AC stream of charges periodically reverses itself, whereas direct current (DC) describes a stream of electrons that moves in one direction only. AC is the standard electric current for power grids worldwide. Solar electric cells capture particles of light and convert them into DC electricity. An inverter translates DC into AC for consumers to use in their homes and businesses.

Ampere: Abbreviated as amp, this unit is used to measure electric current.

Balance-of-system: BOS costs refer to the costs of all aspects of a solar PV installation, except the cost of the modules and inverters. BOS costs include all wiring and miscellaneous materials, along with soft costs, such as time and administrative costs associated with selling and signing a contract, system design and permitting, installation labor costs, inspections, travel to and from the installation site, and other costs of doing business. These costs account for as much as 50 percent of the total solar PV system installation. New York State has focused on reducing BOS costs to reach its goal of installing 6 gigawatts of solar by 2025.

Direct current: DC describes the direct, constant flow of electricity. Unlike AC, DC does not periodically reverse direction. A solar PV system comes equipped with an inverter that converts DC into AC, the standard electric current for power grids in the United States.

Energy payback: Gauges how long it will take to recover the energy originally required to manufacture a solar PV system. Because most solar PV systems last 20 – 25 years, there is a pronounced net environmental benefit over the system's life span. The U.S. Department of Energy estimates an energy payback of 1-4 years for rooftop solar PV systems. The original energy used is often referred to as embedded energy.

Feed-in tariff: FITs are long-term generation contracts that have favorable terms designed to encourage the production of renewable energy by individuals and businesses. FITs are typically offered for long periods of time, such as 10, 15, or 20 years.

Inverter: A key component of any solar PV system that converts direct current (DC) electricity into alternating current (AC) electricity, which is the standard current in the United States.

Kilowatt: kW is a unit of measure that equals 1,000 Watts and is the main mechanism for measuring the size or capacity of a solar PV system. The Watt is named after Scottish inventor and mechanical engineer James Watt (1736 – 1819).

Kilowatt-hour: 1 kWh is equivalent to the electricity generated or consumed at a rate of 1,000 Watts over the period of one hour.

Net metering: A common feature of grid-connected solar PV systems whereby excess electricity produced by a solar array is fed back into the utility grid. System owners can earn credits on future energy bills for the excess electricity their systems generate. The credits can then be used later when homeowners need power from the local utility, such as at night or on cloudy days.

Power purchase agreement: PPAs are becoming a popular way for homeowners to take advantage of solar power without the financial responsibility associated with installation costs. Under the agreement, a third party installs the solar PV system and the homeowner agrees to buy the electricity (kWh) it generates, typically at a rate lower than what the utility offers.

Photovoltaic: PV technology converts solar energy into direct current electricity. The technology uses semiconducting materials that exhibit the photovoltaic effect, a naturally occurring phenomenon in which photons of light emitted from the sun knock electrons off their valence shell into a higher state of energy, creating electricity. A solar PV system uses solar panels, which are composed of a number of solar (PV) cells, to convert sunlight directly into electricity.

Photovoltaic cells: PV cells are thin layers of semiconducting material that are usually made of silicon. When the silicon is exposed to light, an electrical charge is generated. Solar (PV) cells form the basis of a solar PV panel, which together make up a solar PV system.

Remote net metering: A variation on net metering whereby a solar PV system's production is credited to an electricity consumer(s) located at a different physical site.

Solar photovoltaic (PV) systems: A technology that converts sunlight directly into electricity. A PV system is made up of solar modules (panels), which are made up of solar cells.

Solar thermal systems: A technology that uses sunlight to heat water or air. In contrast to a solar PV system, a solar thermal system uses mirrors to concentrate sunlight to produce heat.

1.3 System Components

1.3.1 Modules

A solar PV module or "solar panel" is an electrical generation device that produces DC current when exposed to sunlight. Most modules consist of 60-72 small, conjoined solar cells, an aluminum frame, and a tempered glass front piece. Modules are roughly three feet by five feet and are mounted in either a portrait (a vertical rectangle) or landscape orientation (a horizontal rectangle). In monocrystalline modules, individual cells are made from single pieces of silicon. Polycrystalline modules feature cells made from multiple pieces of silicon.

Installers wire together multiple modules to combine their voltage. Multiple strings of modules can be combined to add their current (amperage).

The size of solar PV systems is typically given in rated DC capacity at standard test conditions (STC). For example, a system with 10 modules rated at 300 Watts each is a 3,000-Watt (3 kilowatt) system. Most solar PV modules come with a manufacturer's production warranty of 25 years and are expected to have a useful life of approximately 30 years.

A SolarWorld Polycrystalline module (left) and a SunPower Monocrystalline module (right)
Source: SolarWorld and SunPower

1.3.2 Inverter

All utility grid-tied solar PV systems have at least one inverter, which converts DC to AC. Most residential solar PV systems have one or two string inverters, which are connected to one or more strings of modules. Inverters are generally mounted vertically on basement, garage, or exterior walls, and can be located indoors or outdoors.

Microinverters are a special type of inverter that are mounted on the underside of individual solar PV modules. Unlike string inverters, each microinverter services only 1-2 modules, which permits greater flexibility in system design.

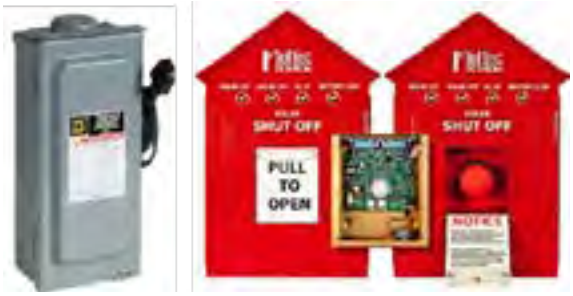
Most solar PV professionals describe system size in terms of module capacity (kilowatts DC), whereas most electric utilities refer to system size by inverter capacity (kilowatts AC).

A Fronius String Inverter (left) and an Enphase Microinverter (right)
Source: Fronius and Enphase

1.3.3 Balance of System Components

"Balance of system" (BOS) generally refers to all equipment in a solar PV installation except the modules and inverter. (Occasionally, inverters are included in the term.) BOS components include racking, conductors, conduit, disconnects, fuses, mounting hardware, combiner boxes, and occasionally batteries.

BOS Components: A Square D Fusible AC Disconnect (left) and a MidNite Solar Rapid Shutdown Device (right)
Source: Square D and MidNite Solar



1.3.4 Racking

Most solar PV arrays are mounted to roofs using specially-designed aluminum racking systems. Typically, L-shaped brackets are connected to the roofing members of a house with lag bolts. Long aluminum rails are bolted onto the L-feet, and individual modules are attached to the rails with clamps. All roof penetrations must be flashed to prevent leaks and roof damage[1], and the system designer must ensure that the roof is structurally strong enough for the additional load of a PV system. Any necessary replacement or repair work on a roof must be done prior to the installation of the solar PV system.

A Solar Electric Racking System

Detail of an L-Foot with a SnapNrack Flashing

System designers may choose to use a ballast mounting system on flat roofs. Instead of using lag bolts to anchor the racking to the building's structural members, heavy concrete blocks weigh down the array. Ballasted systems are less likely to create leaks in the roof membrane but add substantial weight and may be too heavy for some roofs.

Solar electric arrays are also commonly ground-mounted. Arrays can be mounted on racking directly on the ground, or atop a metal pole. As with roof mounts, metallic racking must be bonded (made electrically continuous to provide a path for fault currents). When designing a ground-mounted system, the designer must account for soil conditions. Voltage drop is a concern for ground mounted systems, which often have long conductor runs.

Ground-mounted solar PV arrays sometimes include tracking equipment, which rotates the array throughout the day to follow the sun's trajectory. Tracking may occur along one or two axes. The additional energy produced by these systems must be weighed against their additional cost, complexity, and maintenance.

[1] Section 1503.2 of the International Building Code, Section 903.2 of the International Residential Code.

1.3.5 Conductors

Conductors (wire) coming from the modules are typically factory-assembled “PV Wire” with a factory-formed termination (see NEC 690.31). These factory leads are labeled “PV Wire” or “Type USE-2” and are rated to withstand all weather conditions. They are then spliced with standard building wire, using appropriate connectors and enclosures. The standard building wire is installed in raceway (conduit) to its next point of connection. Under certain conditions, conductors may be direct burial or part of a cable assembly. NEC 690.32 and NEC 310 provide guidance on allowable conductor types and methods.

The maximum allowable voltage for residential solar PV systems is 600 volts DC, but nonresidential systems may run up to 1,000 volts DC (NEC690.7(C)). Conductors must be protected from accidental contact. When exposed, they must be installed in raceway (such as conduit), or otherwise rendered inaccessible. For example, the exposed conductors on the back side of a ground-mounted array must be guarded or located at least eight feet above ground.

1.3.6 Raceway (Conduit)

Raceway includes conduit, boxes, fittings, and enclosures that provide a pathway and protection for individual conductors. All raceway systems must be suitable for the environment in which they are installed. All metal raceways must be bonded to form part of the equipment grounding conductor.

All DC conductors that enter a structure must be installed in a metal raceway NEC 690.31(G) or MC cable that meets NEC 250.118(10). Flexible and nonmetallic conduits may be permitted under certain conditions. In addition to NEC 690, refer to Chapter 3 of the NEC for types of permitted conduits and uses.

1.3.7 Battery Backup

Most residential solar PV systems are utility grid-tied, but do not include a battery backup system. In the event of a blackout or grid failure, such solar PV systems de-energize and do not function until grid power is restored, as required by NYS’ Standardized Interconnection Requirements (SIR; www3.dps.ny.gov/W/PSCWeb.nsf/All/DCF68EFCA391AD6085257687006F396B).

Off-grid (“stand-alone”) solar PV systems are not connected to the grid. Solar PV output is stored in a battery bank, which provides power to the site’s electric loads. In addition to a battery bank, these systems include one or more charge controllers, which determine the amount and rate of power that can be stored and drawn from the battery bank.

Battery-backup solar PV systems are utility grid-tied and include a battery system that is used in the event of grid failure. Due to the high cost and additional complexity, battery backup on solar PV systems is currently rare. Section 690.71 of the NEC contains additional requirements for solar PV systems with batteries.

1.4 Net Metering

Solar electric systems are a distributed generation (DG) technology that currently qualifies for net metering in New York State. Any power produced by a solar PV system that isn’t consumed on-site is pushed into the utility grid. The solar PV system owner receives a credit for this production on their monthly utility bill. Utilities typically install a meter at solar PV sites, which tracks the amount of electricity taken from and fed into the grid. The site owner is billed for only the net electricity consumed. Nonresidential solar PV systems can credit their production to off-site electric accounts through remote net metering, but this type of arrangement is outside the scope of this document.

1.5 Financial Considerations

Most homeowners view the installation of a solar PV system as a financial investment. Over time, the power it produces generates savings on their electric bills.

1.5.1 Incentives

Although the costs of residential solar PV systems have fallen significantly in recent years, they still typically cost tens of thousands of dollars. The project cost includes the modules, inverters, balance of system components, and "soft costs," such as installation and administrative labor, customer acquisition, and engineering.

Several incentives make projects more affordable for homeowners. NYSERDA's NY-Sun Incentive Program administers a step-down megawatt block incentive program.[2] Visit the NY-Sun Program Site for the most up-to-date information regarding available incentives. For information regarding tax credits, we encourage you to speak with a tax accountant.

Other incentives may exist at the local level, including real property tax exemptions, and a real property tax abatement program in New York City. Unlike most residential home improvements, most solar PV installations in New York State do not increase the taxable value of a home.[3] However, local governments can opt out of this exemption. One excellent resource to navigate incentives is www.dsireusa.org. Customers should consult a tax advisor to determine their eligibility for tax credits.

1.5.2 Purchase Types

Many homeowners choose to buy a solar PV system with cash, or by taking out a loan. As the system owners, they can apply for all applicable tax credits. Installation companies typically offer a 5 to 10-year warranty, and some manufacturers offer extended warranties. An increasing variety of loans are available to help customers finance the purchase of solar PV systems.

Leasing a solar PV system is another common option. With this model, a third-party company (often the installation contractor) is responsible for installing, operating and maintaining a solar PV system at the customer's site. Customers sign long-term leases (typically 20 years) and make monthly payments to the company that owns the solar PV system. In return, customers receive all electricity produced by the system. At the end of the lease term, the homeowner typically has the option of renewing the lease, purchasing the equipment at fair market value, or having the system owner remove the equipment. The company that owns the solar PV system receives most of the tax benefits.

A third option is a power purchase agreement (PPA). It is similar to a lease, but instead of paying a flat monthly fee, customers pay for the amount of electricity actually produced by the solar PV system.

2. Frequently Asked Questions

2.1 Project Revenue

2.1.1 What is the difference between a "Large-Scale Renewable" project and a "Distributed Energy Resource" project?

Solar energy projects in New York State are divided into two general categories; large-scale renewables (LSR) and distributed energy resources (DER). LSR projects, also known as "utility-scale solar," are typically larger than 5 MW_{ac}, and are built with the primary purpose of supplying wholesale electricity to the grid. A DER project is typically 5 MW_{ac} or less and must have a customer(s), known as the "offtaker," to purchase the electricity. Most DER projects are community solar projects, residential/commercial rooftop solar projects, or small ground mounted solar.

[2] http://www.nyserda.ny.gov/All-Programs/Programs/NY-Sun
[3] https://www.tax.ny.gov/research/property/assess/manuals/vol4/pt1/sec4_01/sec487.htm

2.1.2 What are Renewable Energy Certificates? Do All Projects Qualify?

A renewable energy certificate (REC) is a certificate created by a tracking system, such as the New York Generation Attribute Tracking System (NYGATS), that represents the environmental attributes of one megawatt hour of electricity generated from a renewable source like solar or wind. A typical New York household requires about seven megawatt hours of electricity to be powered for a full year. RECs are used to substantiate environmental claims related to renewable energy use, such as for compliance with a State-mandated renewable compliance program, or for voluntary claims such as a climate action pledge. As such, RECs provide a tradable, traceable means for claiming the benefits of renewable electricity generation. In New York, under the Order Adopting the Clean Energy Standard, only eligible large-scale renewable facilities are able to generate Tier 1 RECs.[1] DER projects are compensated for environmental attributes under a separate compensation mechanism known as the environmental or "E" component of the VDER value stack.

2.1.3 How do large-scale solar projects make money?

Large-scale solar projects rely on two main streams of income to generate revenue and continue operations: 1. the sale of electricity generated by the renewable generator, typically either sold in the NYISO market (wholesale) or sold to an offtaker under a contract called a power purchase agreement, which compensate projects based on the power they generate, and 2. the sale of RECs to NYSERDA or another offtaker, which provides compensation for the project's environmental attributes. Through annual Renewable Energy Standard solicitations, NYSERDA seeks to purchase eligible RECs from renewable energy projects under long-term contracts to provide these projects with a predictable revenue stream via selling their RECs. Once a project is operational and transfers RECs to NYSERDA, they can then be sold to Load-Serving Entities, such as utilities, for compliance under the Clean Energy Standard. By providing a contract to renewable energy developers to purchase RECs from the projects they have built or plan to build, developers are granted financial security for their projects and, once operational, the RECs can be used by utilities to comply with environmental standards. It is important to note that projects do not receive payments from NYSERDA until they are operational and producing energy.[2]

2.1.4 What is the Investment Tax Credit?

Initially implemented in 2005, the Investment Tax Credit (ITC) is an important federal policy mechanism that has propelled the growth of solar across the United States. Section 48 of the Internal Revenue Code of 2006 (as amended) allows project owners or investors to be eligible for the federal business energy ITC for installing designated renewable energy generation equipment. The ITC allows project owners to apply a percentage of the project's engineering, procurement, and construction costs (such as the panels, inverters, and racking equipment) as a credit towards their income taxes. The ITC is a one-time dollar-for-dollar reduction, and does not cover interconnection or some other "soft" development and financing costs. The current ITC rate is set at 26% in 2020 and is scheduled to step down to 22% in 2021 and 10% in 2022. The ITC has been subject to frequent changes as energy policies have evolved. It is possible that the ITC may be modified or extended.

2.2 Local Benefits

2.2.1 What is RPTL §487?

New York State Real Property Tax Law (RPTL) Section §487 provides a 15-year exemption from real property taxation for renewable energy systems, including solar. This statute only applies to the value that a solar electric system adds to the overall value of the property; landowners with an installed renewable energy system continue to pay property tax on their homes and land. Property owners must also continue to pay special district taxes (such as a fire district tax payment, but could also include a library, sewer, water, or ambulance tax). The exemption has been a cornerstone of the State's efforts to meet its clean energy goals, providing essential economic incentives for solar. Local taxing jurisdictions do have the option to opt out of RPTL §487 and make the system fully taxable; however, projects may not be financially viable at full taxation. If a jurisdiction opts out of RPTL §487, it must opt out for systems of all sizes, not just large-scale, and must file copies of the local law opting out of RPTL §487 with both the New York Department of Taxation and Finance and NYSERDA.

[1] http://documents.dps.ny.gov/public/Common/ViewDoc.aspx?DocRefId=%7B44C5D5B8-14C3-4F32-8399-F5487D6D8FE8%7D
[2] https://www.nyserda.ny.gov/All-Programs/Programs/Clean-Energy-Standard/REC-and-ZEC-Purchasers

2.2.2 What are PILOTs and Host Community Agreements?

If a taxing jurisdiction does not opt out of RPTL §487, it may enter into a payment-in-lieu-of-taxes (PILOT) agreement – an annual payment which replaces a portion of the property tax revenue a project would have otherwise generated. A PILOT cannot exceed the value of taxes that would be paid without the exemption. In order to negotiate a PILOT agreement, taxing jurisdictions must notify solar developers of their intent to require a PILOT within 60-days after being notified of the developer's intent to construct a project in their community. PILOT payments can also be paired with Host Community Agreements (HCAs), which provide certain benefits directly to the municipality hosting the project, and can be uniquely adapted for each municipality. Unlike PILOTs, which are typically distributed with constraints similar to tax revenue, HCAs are flexible and can be allocated as the host community sees fit.

2.2.3 Why should solar projects receive tax breaks?

Even while receiving an exemption under RPTL 487, a solar project can generate economic benefits in a community by growing the tax base, creating jobs, and generating supplemental income for farmers and landowners. Solar development can take place on existing or abandoned commercial sites, brownfields, landfills, agricultural lands, former industrial sites, and otherwise underutilized sites. Often, this land is generating minimal or no income for the municipality. By choosing to develop solar on this land, municipalities can turn underutilized sites into valuable and revenue-generating land, with the flexibility to direct PILOT payments or HCAs where the need is greatest. Full taxation typically discourages solar project development, and would cause communities to miss out on opportunities to fund local infrastructure and public services. Once installed, renewable energy systems do not create significant increased demands on municipal services or infrastructure, so PILOT payments usually provide a net benefit to the host community.

2.2.4 Is solar a good use of farmland?

While local governments can implement zoning laws to protect their most productive farmland, solar can be developed on farmland in a way that maintains the current economic benefits to the community and preserves prime farmland. In addition, solar projects can be designed with co-use in mind, as developers are more proactively designing project layouts that include fencing and water access for sheep, pollinator friendly landscaping for honey production, and compatible native vegetation for soil and water erosion prevention. When solar is developed on farmland, it often supplies the landowner with significantly higher income than they would have received without solar on the land, and can support the continuation of agricultural practices on farms with distressed economics, including ensuring that farms retain local ownership. As such, the local community benefits from PILOTs, HCAs, and land lease payments. These lease payments can provide farmers with 20 years or more of guaranteed financial security, diversifying their income while preserving the land for future use. Unlike alternative types of development, such as residential construction, after decommissioning at the end of a solar energy system's useful life, agricultural land can be returned to its original state and farming may resume.

In many instances, even while supporting solar, the land can continue to be used for agricultural operations such as livestock grazing, beekeeping, cultivation of certain crops, or planting of pollinator-friendly vegetation under and around the panels. New York has seen an emergence of solar projects that incorporate wildflowers and native plants to support bees, hummingbirds, and insects, and which may increase the future productivity of soil. Increasing the habitat for pollinators supports agricultural production and is great for New York's food supply.[3] Other options include planting shade-tolerant crops and elevating solar panels to allow farm equipment to pass safely underneath.[4]

2.2.5 My region is often overcast or cloudy. Does solar really make sense in New York?

Yes! It is a common misconception that solar only works well in climates where there is abundant sunshine. Solar panels do not require perfectly sunny weather to generate electricity, and modern solar resource datasets allow developers to accurately estimate the amount of sunshine at a given location. Solar photovoltaic (PV) technology continues to become more efficient, enabling solar projects to generate in the absence of strong, direct sunlight, and increasing the viability of project locations throughout New York. Additionally, the cooler temperatures in New York actually make panels more efficient. Combined with the strong demand for renewable energy throughout New York, availability of suitable land, and supportive policies, solar makes sense in most areas of New York State.[5]

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[3] "New York State's First Pollinator-Friendly Solar Farm." Cypress Creek Renewables, ccrenew.com/news/jefferson-solar-ribbon-cutting/.

[4] "Overview of Opportunities for Co-Location of Solar Energy Technologies and Vegetation." National Renewable Energy Laboratory, www.nrel.gov/docs/fy14osti/60240.pdf.

[5] Bobby Magill Follow "Rooftops in Cloudy Places Could Be Solar Gold Mines." Climate Central, 15 Apr. 2016, http://www.climatecentral.org/news/cloudy-places-could-be-solar-gold-mines-20253.

2.3 Safety

2.3.1 Are solar panels toxic?

Solar panels largely consist of widely-used and non-toxic components, including an aluminum frame, tempered glass, and various common plastics. The most common type of solar panel consists of crystalline silicon PV cells which generate electricity when exposed to light. These non-toxic crystalline silicon cells consist almost entirely of silicon, one of the most common elements in the Earth's crust.[6]

Cadmium-based thin-film solar panels are the second most common type of panel (accounting for less than 15% worldwide), however NYSERDA is not aware of any of these installations currently in New York.[7,8] While cadmium is toxic, the form of cadmium used in these types of solar panels is cadmium telluride (CdTe), which has 1/100th the toxicity of elemental cadmium. When a CdTe panel is exposed to fire, the glass panels absorb the cadmium such that more than 99.9% of the cadmium is stored in the glass itself and not released into the environment. CdTe panels have also passed the EPA's Toxic Characteristic Leaching Procedure test, which tests the potential for crushed panels in a landfill to leach hazardous substances into groundwater.

Some minor system components, including solder, may contain toxic chemicals at extremely low concentrations. Analysis performed by the North Carolina Clean Energy Technology Center did not find a potential toxicity threat from leaching, even in worst case scenarios (hurricane, fire, tornado, etc.), indicating an insignificant threat to human health and the environment.

Release of toxic chemicals from other solar system equipment including inverters, racking, and cabling is also unlikely as solar installations must conform to state fire safety and electric codes, and they pose little or no risk of contaminating the soil or ground water.

2.3.2 Can solar panels break and release toxic materials?

The most common solar panel failure modes include glass breakage and various failures of internal electrical connections, neither of which would typically result in the release of any materials to the environment. Solar panels are constructed primarily of silicon or cadmium telluride, tempered glass, and metals. Similar to a car windshield, when solar panels experience a catastrophic event, the panels typically stay fully intact, thus not releasing any materials into the environment.

Additionally, reputable solar panel manufacturers will ensure that their equipment is certified to applicable performance and safety standards including those established by the International Electrotechnical Commission (IEC) and Underwriters Laboratory (UL).

2.3.3 Do solar panels affect water runoff at the site?

Federal, state, and local rules are in place to ensure that solar arrays are installed in ways that protect public water supplies, wetlands, and other water resources. Rooftop solar systems have little to no effects on the direction or flow of water. Ground-mounted systems will be designed to manage runoff using deep-rooted vegetation such as "pollinator-friendly" grasses and wildflowers, pervious pavement, or topographical features such as berms, swales, or retention ponds, which can provide a net water quality benefit.

Various state agencies also maintain requirements and relevant guidance on this topic:

- The Department of Environmental Conservation's State Pollutant Discharge Elimination System (SPDES) website details permit requirements for stormwater discharge.[9]
- The Department of Agriculture and Markets' Guidelines for Solar Energy Projects includes guidance related to drainage for solar installations on agricultural lands.[10]

[6] "Health and Safety Impacts of Solar Photovoltaics." NC Clean Energy Technology Center, May 2017, ncsolarcen-prod.s3.amazonaws.com/wp-content/uploads/2017/10/Health-and-Safety-Impacts-of-Solar-Photovoltaics-2017_white-paper-1.pdf.
[7] https://data.ny.gov/Energy-Environment/Solar-Electric-Programs-Reported-by-NYSERDA-Beginn/3x8r-34rs
[8] "Crystalline Silicon Photovoltaics Research." Energy.gov, https://www.energy.gov/eere/solar/crystalline-silicon-photovoltaics-research
[9] State Pollutant Discharge Elimination System (SPDES) website https://www.dec.ny.gov/chemical/43133.html
[10] https://agriculture.ny.gov/system/files/documents/2019/10/solar_energy_guidelines.pdf

2.3.4 Should we be worried about electromagnetic fields (EMF) associated with solar?

There are two kinds of EMF; "ionizing fields," which are high level and harmful, and "non-ionizing," which are low-level and generally harmless. Non-ionizing radiation comes from computers, appliances, cell phones, and wireless routers, whereas ionizing radiation comes from harmful sources such as UV lights or X-rays. EMF from solar systems are non-ionizing, similar to that of your household appliances. Studies show that the exposure level within the array or at the fenced boundary of a system falls well below recommended exposure limits. This exposure level decreases even more as you move away from the system, and is nonexistent at night when the system is not producing energy. Ultimately, EMF from solar systems is extremely insignificant and cannot be associated with a health effect.[11]

2.3.5 Do solar panels create glare? I'm worried about the visual impacts for my town and aviation.

Solar panels are designed to be dark colors, usually black or blue, that absorb the sunlight to create electricity. If panels were reflecting the sun, or creating glare, they would not be effective. PV panels are designed with anti-reflective coating to increase panel efficiency and keep the level of reflected light around 2% - less than the reflectivity of water. Airports around the world have been installing PV arrays to provide onsite generation, and studies show that glare from the solar arrays is a negligible issue.[12]

2.3.6 Do solar panels create high ambient temperatures in their surroundings?

The theory that a functioning solar PV array increases the ambient temperature of its surroundings is known as the "heat island" effect. The "heat island" effect proposes that solar panels create a darker landscape that reflects less light, and therefore creates a localized area of increased heat. Few studies have been conducted on the subject, but it has been generally concluded that the area surrounding a large-scale solar array is unlikely to experience a net heating change from the panels. It is, however, possible to see some heating occur under the panels themselves. This can be mitigated with proper implementation of vegetative cover instead of gravel.[13] With any PV array, the significance of the heating depends on the location of the array, time of the year, and surrounding environment.[14, 15]

2.3.7 Does the fire department need special equipment to handle solar panel fires?

No special equipment is needed to handle solar panel fires, just proper training. Solar panels, like any electrical device, can be a fire hazard themselves or act as a physical barrier that hinders the ability of firefighters to put out an unrelated fire. Project developers and municipalities must ensure the local fire department is aware of the installation and informed about the procedures for de-electrifying the system and responding to incidents. In addition, the New York State Fire Code directly addresses solar PV installations, requiring clear labeling, instructions, setbacks, and safety features.

2.3.8 Are solar panels recyclable?

Solar panel recycling and disposal is not yet a major consideration in New York State, as most installations are newly operational and have a minimum 25-year expected useful life. It is, however, important to plan for the disposal of solar systems at the end of their useful life. Currently, there are no regulations requiring the recycling of solar panels in New York State, but it is best practice to reuse or recycle system components. Solar panels are classified as "general waste," which means that they can be placed in a landfill. Solar panels can contain small amounts of toxic materials, but research shows that they generally do not pose a threat in landfills.[16]

Some solar energy system components, such as metal racking, can readily be reused or salvaged. Solar PV recycling is still in its infancy, though the ultimate goal is to recycle solar panels and recover any materials that may be reused or sold. At present, this is costly, but the industry is advancing; a 2016 study by the International Renewable Energy Agency (IRENA) estimates that recyclable materials in old solar modules will be worth $15 billion in recoverable assets by the year 2050.[17] Some examples of recycling opportunities in the United States include: Cascade Eco Minerals, Cleanlites, Echo Environmental, and First Solar.

2.3.9 Do solar PV systems generate noise?

Solar panels are noise-free, and residential solar inverters are quieter than a refrigerator. Large-scale, ground-mounted systems may have minor noise associated with the transformers and inverters within the array as well as the electrical equipment used as required for utility interconnection. Any system noise is typically at background levels at a distance of 50 to 150 feet from the site boundary.

2.3.10 How are endangered species protected?

Endangered species are accounted for and protected throughout the life of a large-scale solar project. First, solar projects must conduct an initial screening with the U.S. Fish and Wildlife Service to identify if endangered species are present in the area. In consultation with the New York State Department of Environmental Conservation (DEC) and U.S. Fish and Wildlife, developers must identify potential impacts to endangered or threatened species from facility construction, operation, or maintenance, and work with the DEC to mitigate impacts. Issues related to direct and indirect habitat loss, mortality, breeding, and wintering and migration patterns of bird and bats are all addressed during the process through which solar projects obtain their permits to construct, and inform the final design of the project and mitigation measures. Examples of potential mitigation measures include construction buffers around known bald eagle nests, avoiding disturbing sensitive habitat, and developing conservation funds to offset any unavoidable impacts.

2.3.11 Do solar panels contribute to bird loss?

The misconception that solar projects are a major contributor to bird loss has stemmed from issues with "concentrated solar thermal." This type of solar system, which constitutes a small percentage of US solar capacity and is located almost exclusively in the Southwest, uses mirrors to focus solar energy in order to power a steam generator. Bird loss in this situation occurs when birds fly through concentrated light reflection. Solar projects in New York, which use solar panels to convert sunlight into energy, do not reflect light or act as a mirrors. Due to this major design difference, there is a minimal impact on avian species.[19]

Questions?

If you have any questions regarding solar basics, please email questions to cleanenergyhelp@nyserda.ny.gov or request free technical assistance at nyserda.ny.gov/SolarGuidebook. The NYSERDA team looks forward to partnering with communities across the state to help them meet their solar energy goals.

[11] STUDY OF ACOUSTIC AND EMF LEVELS FROM SOLAR PHOTOVOLTAIC PROJECTS." Massachusetts Clean Energy Center, files.masscec.com/research/StudyAcousticEMFLevelsSolarPhotovoltaicProjects.pdf.

[12] https://www.mdpi.com/1996-1073/10/8/1194/pdf

[13] "Beneath Solar Panels, the Seeds of Opportunity Sprout." NREL, www.nrel.gov/news/features/2019/beneath-solar-panels-the-seeds-of-opportunity-sprout.html.

[14] "Clean Energy Results, Questions and Answers, Ground Mounted Solar Photovoltaic Systems." Energy Center, June 2015. http://www.mass.gov/eea/docs/doer/renewables/solar/solar-pv-guide.pdf

[15] "Analysis of the Potential for a Heat Island Effect in Large Solar Farms." Columbia University, http://www.clca.columbia.edu/13_39th%20IEEE%20PVSC_%20VMF_YY_Heat%20Island%20Effect.pdf

[16] Deign, Jason. "Landfilling Old Solar Panels Likely Safe for Humans, New Research Suggests." Greentech Media, Greentech Media, 3 Apr. 2020, www.greentechmedia.com/articles/read/solar-panel-landfill-deemed-safe-as-recycling-options-grow.

[17] "End-of-Life Management, Solar Photovoltaic Panels.", International Renewable Energy Agency, https://www.irena.org/DocumentDownloads/Publications/IRENA_IEAPVPS_End-of Life_Solar_PV_Panels_2016.pdf

[18] "STUDY OF ACOUSTIC AND EMF LEVELS FROM SOLAR PHOTOVOLTAIC PROJECTS." Massachusetts Clean Energy Center, files.masscec.com/research/StudyAcousticEMFLevelsSolarPhotovoltaicProjects.pdf.

[19] "A Review of Avian Monitoring and Mitigation Information at Existing Utility Scale Solar Facilities." Environmental Science Division, Argonne National Laboratory, Apr. 2015, http://www.evs.anl.gov/downloads/ANL-EVS_15-2.pdf.

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Solar PV – Permitting and Inspecting

Understanding the solar permitting and inspecting process for local governments and authorities having jurisdiction (AHJ)

NYSERDA

Solar Guidebook for Local Governments
NYSERDA 17 Columbia Circle Albany, NY 12203

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Overview

To allow officials to better understand the permitting and inspecting process, and ensure them an efficient, transparent, and safe beginning to their solar development project, this section reviews the solar photovoltaic (PV) permitting and inspection process for local government officials and authorities having jurisdiction (AHJs).

Tools and materials are provided to assist local officials and AHJs on evaluations of solar systems less than 25kW. Solar PV design issues, design reviews of construction documents, and field inspection checklists are among the topics discussed.

Within this chapter, we provide the following supplemental material for government officials and AHJs:

- NY State Unified Solar Permit Application
- Sample construction photos of correctly installed equipment
- Sample installation errors
- Labeling guidelines
- Sample wiring diagrams
- Sample site map for roof mounted solar PV systems

1. Intended Use

NYSERDA developed this tool in collaboration with the New York Department of State, solar contractors, and other stakeholders. It supports NYSERDA's efforts to implement a unified permitting process for residential solar PV systems. Standardizing the permitting and inspecting process across New York State will reduce costs for municipalities and solar customers, create local jobs, and advance New York's clean energy goals.

1.1 What the Tool Is

This tool is a free resource to help code enforcement officials review and evaluate solar electric systems for grid-tied residential solar PV installations of 25 kW or less. Off-grid and commercial-scale solar PV systems are more complex and warrant greater detail than this tool provides.

1.2 What the Tool is Not

This tool is not all-encompassing. Electric construction is a complicated process governed by the NYS Uniform Fire Prevention and Building Code (Uniform Code), which references other codes. This tool highlights many common and important design issues referenced in the National Electrical Code (NEC), but it should not be considered comprehensive.

1.3 Distribution

AHJs and other entities are welcome to use and distribute this tool. AHJs may wish to update the Unified Solar Permit Application itself and Submittal Instructions to reflect any unique requirements that apply to their municipality (such as a schedule of fees). The inspection and design review checklists can also be changed to reflect additional requirements.

AHJs should keep in mind that changing the Unified Solar Permit's contents may diminish consistency and increase the cost of solar energy for their constituents. Changes may not be obvious to contractors working across many local governments, so AHJs should highlight any changes made to the standard documents.

1.3.1 Disclaimer

This document and the New York Unified Solar Permit are provided to support and standardize the solar permitting process. These documents should not be used as a substitute for proper solar PV system design calculations. Users of these documents assume all responsibility for solar PV system design, installation, and permitting, as required by New York State law. NYSERDA and its contractors cannot be held liable for any errors or omissions in these documents.

2. Solar PV System Design Issues

This section provides an overview of issues involved in solar PV system design. It is critical that designers optimize safety and performance because systems have expected lifespans of 20-30 years.

2.1 Array Siting

Designing a solar PV system involves many factors, but the most important is siting the array to maximize sunlight. South-facing roofs are ideal, but PV modules ("panels") can be located on southwest- or southeast-facing roofs with minimal losses. North-facing roofs and heavily shaded roofs should be avoided. Prior to installation, solar PV contractors measure the amount of sunlight a location receives annually, either with a hand-held tool or aerial imagery software.

Residents planning to remove trees to increase solar access should clearly mark the trees on construction documents submitted with their permit application. The projected growth of vegetation should also be considered when designing a system, especially for ground-mounted arrays.

When a house does not have a clear south-facing roof, contractors can install on garages, outbuildings, or in the ground. Experienced designers will maximize solar access and minimize wire runs, building penetrations, and labor costs. Depending on the layout of a house, conductors can be run on exterior roofs and walls, through attic or basement spaces, or in wall cavities.

2.2 Irradiance and Temperature

Solar electric modules convert solar radiation into electric current. Their power output is variable, based on the intensity of sunlight (irradiance) and the temperature of the cells. All modules have a nameplate capacity, which states the power (Wattage) produced by the module under Standard Test Conditions (STC), defined as 1,000 Watts per square meter at 25 °C. The module's actual output at a specific point in time is typically lower than the nameplate capacity but can be higher under certain conditions.

Solar electric modules have the greatest power output when exposed to high levels of irradiance (intensity of sunlight) at low temperatures. There is a positive relationship between irradiance and the current (Amperes) solar PV modules produce: as irradiance increases, current increases (with little change in voltage). There is an inverse relationship between temperature and a PV module's voltage: at temperatures below 25 °C, modules produce voltage higher than during STC. At higher temperatures, voltage decreases (see NEC 690.7), with no significant change to amperage.

In addition to reducing voltage (and therefore Wattage), high temperatures have other detrimental effects on solar PV systems. Prolonged exposure to high temperatures accelerates the rate at which solar PV cells degrade. Therefore, most roof-mounted arrays are located on racking, which places the PV cells 3 to 6 inches above the roof surface and allows airflow under the array. Inverters may be installed outdoors but perform slightly better when not in direct sunlight. High temperatures must be considered when sizing conductors located on hot roofs, as the current carrying capacity of conductors decreases when exposed to heat. Conduit runs must also have expansion fittings (as required by code) to account for thermal expansion and contraction.

Because the output voltage of solar PV modules increases significantly in colder weather, installers must account for the lowest expected ambient temperature when determining the maximum number of solar PV modules per string (NEC 690.7).

2.3 System Sizing and Equipment Selection

Solar electric installations are highly customized. Installers must carefully design systems to meet site-specific conditions and choose equipment that satisfies detailed technical requirements. Solar electric modules have different STC electrical outputs (voltage and current), which vary with temperature and irradiance. At residential sites the NEC limits the maximum DC string voltage to 600 volts, so installers must determine the maximum number of modules per string, based on design low temperatures (i.e. when module voltage is highest). DC strings of modules must also have a minimum voltage (based on design high temperatures) greater than the minimum voltage required to activate the system's inverter. Certain technologies allow for increased flexibility in system design, such as multiple power point trackers (MPPTs), DC optimizers, and microinverters.

DC array sizes should not exceed an inverter's maximum input rating. If an inverter is significantly undersized for an array, solar PV production during peak hours will be limited. Generally, a solar PV system's DC Wattage should not exceed 1.3 times the AC rating of its inverter. Many inverter manufacturers have developed computer programs that assist in string sizing and optimizing system design, such as www.fronius.com/froniusdownload/tool.html

2.4 Grounding

One of the more challenging aspects of solar PV system design and installation is thoroughly grounding and bonding the system in accordance with the NEC.

The grounding electrode conductor (GEC) is the reference ground that establishes the voltage relationships between the ungrounded conductors and earth ground. The GEC must be run with irreversible splices from any separately derived power supply (i.e., inverters that contain transformers) to the grounding electrode. All solar PV systems with a transformer-based inverter will require a GEC from the inverter to the grounding electrode. Table 250.66 in the NEC governs the sizing of the GEC. The GEC must be a minimum of number six American Wire Gauge Building Wire (#6 AWG) when exposed and must be bare or covered with green insulation. When exposed and insulated, the wire must be UV-protected.

The grounded conductor (or "neutral" conductor) is intentionally grounded and carries current under normal conditions. It is always insulated and may be white or gray in color. Current flows out on the ungrounded conductors and returns on the grounded conductor, completing the circuit.

The equipment grounding conductor (EGC) does not carry current under normal conditions. It provides a path back to the grounded conductor (neutral) when a fault occurs. The EGC may include all bonded metal components, such as the racking, boxes, enclosures, building steel, and metal roofing materials. (Bonding is the physical connecting of metal components so that they are at equal potential. They may or may not be grounded. Bonding jumpers may be extensions of the GEC, EGC, or grounded conductor.) Table 250.122 in the NEC governs EGC sizing. The EGC is required on both grounded and ungrounded (transformer-less) systems. The EGC must be a minimum of #6 AWG when exposed and must be bare or insulated green. When exposed and insulated, the wire must be UV-protected.

The GEC, EGC, and grounded conductor must be bonded together at the main service disconnect(s) and at the overcurrent protection/disconnects when performing a supply-side connection.

2.5 Labeling

The NEC provides many unique labeling requirements for solar PV systems, located in Sections 690, 705, 706 and elsewhere. To assist contractors and inspections, NYSERDA has developed an extensive Labeling Guide, located as Section 8 of this document.

2.6 Zoning Considerations

Solar photovoltaic is a relatively new technology. Many municipalities are unsure how solar PV installations fit into their existing zoning and land-use regulations. Large-scale systems in particular raise land use, aesthetic, decommissioning, and disposal concerns.

Municipalities should review their existing zoning requirements to ensure they clearly describe how solar PV systems are classified, and what restrictions are placed upon them. For more information, please reference Chapter 10 - Model Solar Energy Law.

2.7 Wind and Snow Loads

Solar electric contractors are responsible for ensuring that their installations do not jeopardize the structural integrity of the buildings upon which they are mounted. Due to their large surface areas, solar PV arrays can catch updrafts and create significant amounts of uplift during windy conditions. Forces are especially strong when modules are located at the ridge of a roof, when they are mounted a significant distance above the roof surface, or when they are not mounted parallel to the roof surface. Ground-mounted arrays are also subject to large wind forces. Detailed calculations are required to determine the exact amount of pressure for which systems should be designed.

Solar electric arrays, including racking and mounting hardware, typically add 4-6 pounds per square foot of dead load to a structure. Although this amount is modest, it may become significant when combined with a roof's existing dead load and snow load. The International Residential Code provides snow load data, which range from 20-80 pounds per square foot in New York State.

A Professional Engineer or Registered Architect should perform detailed calculations to ensure solar PV designs meet all structural requirements, taking wind load and snow load into account.

Figure R301.2(5)A from the 2020 Residential Code of New York State: Ultimate Design Wind Speeds

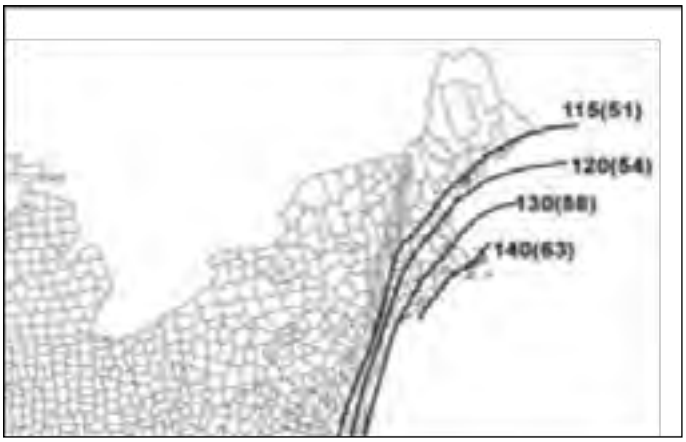


Figure R301.2(6) from the 2020 Residential Code of New York State: Ground Snow Loads

3. Design Review of Construction Documents

As part of their permit application, applicants must submit a site plan, an electrical wiring diagram, a structural analysis, and specification sheets for the modules, inverter, and racking system. This section includes a checklist of items for code officials to check as part of their design review.

The construction documents must be stamped by a New York State licensed professional engineer (PE) or registered architect (RA). The local code official will determine the depth of review necessary. The following three-part checklist may be expanded should the code official require examination at greater depth, such as checking wire sizing and other calculations.

3.1 Site Plan

Yes/No	Site Plan
	Construction document prepared and stamped by a New York State licensed professional engineer or registered architect, who incorporated the following into system design.
• Street address and tax map parcel number • All required setbacks, including rooftop access and ventilation requirements as applicable • Location of array, inverter, disconnects, and point of interconnection • Array azimuth and tilt • For ground mounted systems, length and location of trenches • Location and type of rapid shutdown device, if applicable (NEC 690.12)	

3.2 Electrical Diagram

Yes/No	Electrical Wiring Diagram
	Electrical wiring diagram prepared and stamped by a New York State-licensed Professional Engineer or Registered Architect, who incorporated the following into system design.

- Solar electric module array information – number of modules in series, number of strings.
- Quantity, make, and model of UL-listed solar PV modules.
- All conductor types, ratings, and conduit type (if applicable). Solar electric source circuit conductors are solar PV wire (NEC 690.31(B)).
- Max voltage of 600 VDC (NEC 690.7(C)) (1,000 VDC wire may be used on 600 VDC systems).
- Rating (voltage and current) for all disconnects.
- Voltage drop is minimized (NEC 210.19(A)Informational Note No. 4).
- Provision for Rapid Shutdown per NEC 690.12. Using microinverters or string inverters with DC Power optimizers is one way of meeting this requirement.
- DC disconnect is present (may be integral to inverter) (NEC 690.13).
- Quantity, make, and model of UL-listed inverter provided.
- AC disconnect appropriately sized for inverter output (NEC 690.8(A)(3), 690.8(B)(1)).
- Conductor type, rating, and conduit type (if applicable) provided for all conductors.
- If supply-side connection, meets all requirements of NEC 705.12(A), including:
  - Service-rated AC disconnect specified, at least 60 amps, with appropriate overcurrent protection device. If breaker used, must meet or exceed utility fault current kAIC rating.
  - Conductors between disconnect and point of interconnection are sized at least 60 amps (#6 or larger).
  - Supply side connection made between main service panel's main disconnect and utility meter.
- If load side connection, meets all requirements of NEC 705.12(B), including:
  - Inverter output connection is made at a dedicated circuit breaker or fusible disconnect.
  - The sum of 125% of the inverter(s) output current plus the main circuit breaker rating must be less than or equal to 120% of the bus or cable rating (NEC 705.12(B)(3)(b)).
  - Backfed breaker located at opposite end of busbar from main breaker (NEC 705.12(B)(2)(1)).
- Equipment grounding conductor (EGC) present at all components likely to become energized, and sized according to NEC 250.122.
- If not using an isolated/ungrounded/transformer-less inverter, grounding electrode conductor (GEC) present and continuous from inverter to service disconnect, sized according to NEC 250.66.

3.3 Structural Analysis

Yes/No	Structural Analysis
	Structural analysis prepared and stamped by a New York State licensed professional engineer or registered architect, who incorporated the following into their review.

- Weight of the existing roofing (composition shingle, metal, masonry, etc.).
- Number of layers of roof covering.
- Method of waterproofing penetrations (flashing is required by the 2020 NYS Uniform Code).
- Type of racking system (engineered product) and height of solar PV modules from surface of roof.
- Location-specific wind load and snow load.
- Type, dimensions, and spacing of roof structural framing.
- Calculations must be provided if any of the following apply:
  - Roofing is not lightweight, or roof has multiple layers of covering.
  - Racking system is not engineered for mounting of solar PV modules.
  - Modules will be mounted more than 18 inches above roof surface.
  - Modifications must be made to framing to strengthen roof structure.
  - Solar electric system and racking will add more than 5 pounds per square foot to dead load, or more than 45 pounds per attachment point, calculated as follows:
    - Total weight of solar PV modules, racking, and mounting hardware _____pounds.
    - Total number of attachment points to roof _____.
    - Weight per attachment point (A ÷ B) _____pounds.
    - Total area of solar PV array _____square feet.
    - Distributed weight of solar PV array on roof (A ÷ D) _____pounds/square foot.

4. Field Inspection Checklist

The Field Inspection Checklist in this chapter can be used directly by the AHJ or provided to a third-party inspection agency, where applicable. The checklist is intended to highlight key system characteristics and common installation errors. Completing the checklist should take approximately 20 minutes per field inspection. Not all sections may apply to a given installation.

A "rough inspection" (which occurs when all boxes and wires are installed to the point when walls or trenches are ready to be closed) is not necessary on most small residential installations with existing construction.

When a field inspection is necessary, inspectors should consider bringing the following items:

- Ladder with non-conductive sides.
- Binoculars for surveying inaccessible roof-mounted equipment.
- Screwdriver for opening enclosures.
- A copy of the contractor's submitted design.

Code enforcement officers should consider asking solar PV contractors for a set of construction photos. Contractors typically document their installation progress with photos, which are sometimes required by their internal quality assurance team or financing partners. NYSERDA also requires construction photos from participating contractors. Code enforcement officers can use such photos to review hard-to-access parts of the installation (such as roof-mounted racking).

4.1 Array

1. Circuit conductors are properly supported and are not touching the roof surface [NEC 338.30, 350.30, 376.30]	N	Y	N/A
2. Circuit conductors are same conductor type/size as on plan set	N	Y	N/A
3. Module count matches plan set. If no, investigate stringing configuration	N	Y	N/A
4. Module manufacturer/model matches plan set	N	Y	N/A
5. Modules are effectively grounded using lugs, WEEBs, or a racking integrated grounding method [NEC 690.43]	N	Y	N/A
6. Modules and racking are properly secured [NEC 110.3(B), 250.5, 250.8, 250.12, 690.43]	N	Y	N/A
7. DC optimizers or microinverters are properly grounded [NEC 110.3(B), 250.4(A)(5), 250.64(E), 250.97]	N	Y	N/A
8. Wire ties are UV-rated (generally black)	N	Y	N/A
9. All electrical connections are secured to ensure no arcing	N	Y	N/A
10. Racking system is properly grounded (EGC bonding the rails [NEC 690.43])	N	Y	N/A
11. Conductors are properly identified (ungrounded, grounded, grounding) [NEC 200.7, 200.6, 250.119]	N	Y	N/A
12. Outdoor components are UL-listed for the environment [NEC 110.3(B)]	N	Y	N/A
13. Roof vents are not covered by the modules [2020 NYS Uniform Code]	N	Y	N/A
14. DC conduit is labeled "WARNING: PHOTOVOLTAIC POWER SOURCE" every 10 feet, and is reflective, and meets color and size requirements [NEC 690.31(G)(3) and (4)]	N	Y	N/A
15. Conductors over 30V are guarded, installed in raceways, or otherwise inaccessible [NEC 690.31(G)(3)(4)]	N	Y	N/A
16. Equipment Grounding Conductor (EGC) is protected if smaller than #6 AWG [NEC 690.46, 250.120(C)]	N	Y	N/A
17. Source circuit conductors are not in contact with the roof [NEC 338.10, 334.30]	N	Y	N/A

4.2 DC Optimizer

1. DC Optimizer chassis is properly grounded per manufacturer's instructions [NEC 110.3(B), 250.4(A)(5), 250.64(E), 250.97]	N	Y	N/A
2. Rapid Shutdown label is present and meets the requirements of NEC 690.56(C)(1)(a)	N	Y	N/A

Note 1: Many violations from the "Array" section also apply to the "DC Optimizer" section.

Note 2: DC optimizer can have an integrated ground, or not. Bring the specifications sheet to the inspection for quick reference.

4.3 Structural (Roof-Mounted Only)

1. All roof penetrations are properly flashed and sealed per 2020 NYS Uniform Code and NEC 110.3(b)	N	Y	N/A
2. Lag bolts are properly installed, not over torqued deforming the flashing	N	Y	N/A
3. Rafter spacing/material matches construction documents	N	Y	N/A
4. Roof appears to be in good condition, with no signs of leaking or damage; Roof is free of debris	N	Y	N/A
5. All racking splices are properly supported per manufacturer requirements (generally splices must be supported on both sides of the joint by a structural attachment)	N	Y	N/A
6. Modules cannot be moved by pushing or pulling with one hand	N	Y	N/A

4.4 Junction Box

1. Wire nuts and splices are suitable for the environment [NEC 110.3(B)]	N	Y	N/A
2. Junction box is UL listed for the environment [NEC 110.3(B)]	N	Y	N/A
3. Junction box is properly grounded [NEC 110.3(B), 250.4, 250.8, 250.12, 690.43]	N	Y	N/A
4. Grounding equipment is properly installed [NEC 110.3(B), 250.4, 250.8, 250.12, 690.43]	N	Y	N/A

4.5 Inverter

1. The number of strings match the plan set	N	Y	N/A
2. The conductors have sufficient ampacity for each string	N	Y	N/A
3. DC conductors in metal when on or inside a building [NEC 690.31(G)]	N	Y	N/A
4. Conduit penetrations are properly sealed between conditioned and unconditioned space [NEC 300.7(A)]	N	Y	N/A
5. Conduit is properly supported e.g., [LFMC NEC 350.30, EMT NEC 358.30, PVC NEC 352.30]	N	Y	N/A
6. Conduit is not being used as conductor support [NEC 725.143]	N	Y	N/A
7. The enclosure is properly grounded [NEC 690.43, 250.8, 250.12]	N	Y	N/A
8. Grounding equipment is properly installed [NEC 690.43, 250.8, 250.12]	N	Y	N/A
9. Point of interconnection enclosure is labeled as a PV disconnect [NEC 110.21(B) and/or 690.13(B)]	N	Y	N/A
10. DC characteristics label is present [NEC 690.53]	N	Y	N/A
11. The ungrounded DC conductors are properly identified (shall not be white, gray, or white striped) [NEC 200.6(A)(B)]	N	Y	N/A
12. Max string voltage below inverter max [NEC 110.3(B), 690.7]	N	Y	N/A
13. Inverter string fuses are rated for use in application [NEC 110.3(B), 690.9]	N	Y	N/A
14. DC and AC disconnecting means are located within sight of or in each inverter [NEC 690.15]	N	Y	N/A
15. AFCI protection is present and enabled [NEC 690.11]	N	Y	N/A
16. System is equipped with Rapid Shutdown [NEC 690.12]	N	Y	N/A
17. Rapid Shutdown label is present and meets the requirements of NEC 690.56(C)(1)(a)	N	Y	N/A
18. System is marked with a permanent label with the following wording: “PHOTOVOLTAIC SYSTEM EQUIPPED WITH RAPID SHUTDOWN” [NEC 690.56(C)]	N	Y	N/A

4.6 Microinverter

1. Microinverter chassis is properly grounded per manufacturer’s instructions [NEC 690.43(A), 250.4, 110.3(B)]	N	Y	N/A
2. EGC is protected if smaller than #6 AWG [NEC 690.46, 250.120(C)]	N	Y	N/A
3. Rapid Shutdown label is present and meets the requirements of NEC 690.56(C)(1)(a)	N	Y	N/A

Note 1: Many items from the “Array” section also apply to the “Microinverter” section.

Note 2: Microinverters can have an integrated ground, or not. This information is found on the specification sheet.

Note 3: As long as the microinverters are listed, they are inherently equipped with rapid shutdown, which is required by NEC 690.12. This does not negate the label requirement in NEC 690.56(C)(1)(a).

4.7 AC Combiner

1. The number of branch circuits match the plan set.	N	Y	N/A
2. The conductors have sufficient ampacity for each branch circuit.	N	Y	N/A
3. The Overcurrent Protective Device (OCPD) for the conductors have a rating sufficient to protect them [NEC 240.4]	N	Y	N/A
4. Conduit penetrations are properly sealed between conditioned and unconditioned space [NEC 300.7(A)]	N	Y	N/A
5. Conduit is properly supported e.g., [LFMC NEC 350.30, EMT NEC 358.30, PVC NEC 352.30]	N	Y	N/A
6. Conduit is not being used as conductor support [NEC 300.11(B), 725.143]	N	Y	N/A
7. The enclosure is properly grounded [NEC 690.43, 250.8, 250.12]	N	Y	N/A
8. Grounding equipment is properly installed [NEC 690.43, 250.8, 250.12]	N	Y	N/A
9. Enclosure is labeled as a disconnect [NEC 690.13]	N	Y	N/A
10. AC characteristics label is present (voltage and amperage), [NEC 690.54]	N	Y	N/A
11. The main breaker is fastened in place [NEC 408.36(D)]	N	Y	N/A
12. Grounded conductors are isolated from enclosure [NEC 250.24(A)(5)]	N	Y	N/A

4.8 Load-Side Connection

1. Circuit conductors have sufficient ampacity [NEC 690.8, 310.15]	N	Y	N/A
2. The AC OCPD is properly sized for the expected output current of the PV system. [NEC 690.9]	N	Y	N/A
3. Grounded conductors properly identified [NEC 200.6(A), (B)]	N	Y	N/A
4. The Grounding Electrode Conductor (GEC) is present and sufficiently sized [NEC 690.47(C), 250.66, 250.122, 250.166]	N	Y	N/A
5. The GEC is continuous (or irreversibly spliced) [NEC 250.64(C), 690.47(C)]	N	Y	N/A
6. Ferrous conduit and the enclosure are appropriately bonded to the GEC [NEC 250.4, 250.8, 250.12, 690.43]	N	Y	N/A
7. PV breakers are properly identified [NEC 110.21(B), 705.10]	N	Y	N/A
8. AC characteristics label is present and suitable for the environment (voltage and amperage) [NEC 690.54, 110.21(B)]	N	Y	N/A
9. Dissimilar metals are separated and will not cause a galvanic reaction [(NEC 110.14, RMC NEC 344.14, EMT NEC 358.12(6)]	N	Y	N/A
10. Inverter directory present [NEC 705.10]	N	Y	N/A
11. Backfed breaker or fuse is sized to protect circuits [NEC 690.8(B)(1) and/or NEC 310.15]	N	Y	N/A
12. Source breakers follow 120% rule [NEC 705.12(D)(2)(3)(b)]	N	Y	N/A
13. Backfed breaker properly located in panel [NEC 705.12(B)(3)(b)]	N	Y	N/A
14. Clearances maintained/live parts secured [NEC 110.27(A), 110.26]	N	Y	N/A

4.9 Supply Side Connection

1. Disconnect is service-rated and has a current rating of at least 60 Amp [NEC 230.79(D)]	N	Y	N/A
2. Circuit conductors have sufficient ampacity [NEC 690.8, 310.15]	N	Y	N/A
3. New service entrance tap conductors are less than 10 feet [NEC 705.31]	N	Y	N/A
4. The AC OCPD is properly sized for the expected output current of the PV system [NEC 690.9]	N	Y	N/A
5. The disconnect utility conductors are on LINE terminals [NEC 110.3(B), 240.40(if fusible)]	N	Y	N/A
6. There is no OCPD in the grounded conductor [NEC 230.90(B)]	N	Y	N/A
7. The AIC rating on the OCPD meets, or exceeds the rating of other main OCPD on the premises [NEC 110.9, 110.10]	N	Y	N/A
8. The neutral (white or grey grounded conductor) is bonded to the PV disconnect enclosure/GEC [NEC 250.24(C)]	N	Y	N/A
9. The GEC is present and sufficiently sized [NEC 690.47, 250.66]	N	Y	N/A
10. The GEC is continuous (or irreversibly spliced) [NEC 250.64(C), 690.47(C)]	N	Y	N/A
11. Ferrous conduit and the enclosure are appropriately bonded to the GEC [NEC 250.64(E), 250.4(A)(5)]	N	Y	N/A
12. AC characteristics label is present and suitable for the environment (voltage and amperage) [NEC 690.54, 110.21(B)]	N	Y	N/A
13. Power source directory is present, denoting all locations of power sources and disconnects on premises, at each service equipment location [NEC 110.21, 705.10]	N	Y	N/A
14. AC disconnect label is present and suitable for the environment [NEC 690.13(B), 110.21]	N	Y	N/A
15. Dissimilar metals are separated and will not cause a galvanic reaction [NEC 110.14, RMC NEC 344.14, EMT NEC 358.14]	N	Y	N/A

4.10 General

1. Work is done in a neat and workmanlike manner [NEC 110.12]	N	Y	N/A
2. Working clearances are observed per NEC 110.26	N	Y	N/A
3. Equipment is visibility damaged	N	Y	N/A

5. Resources

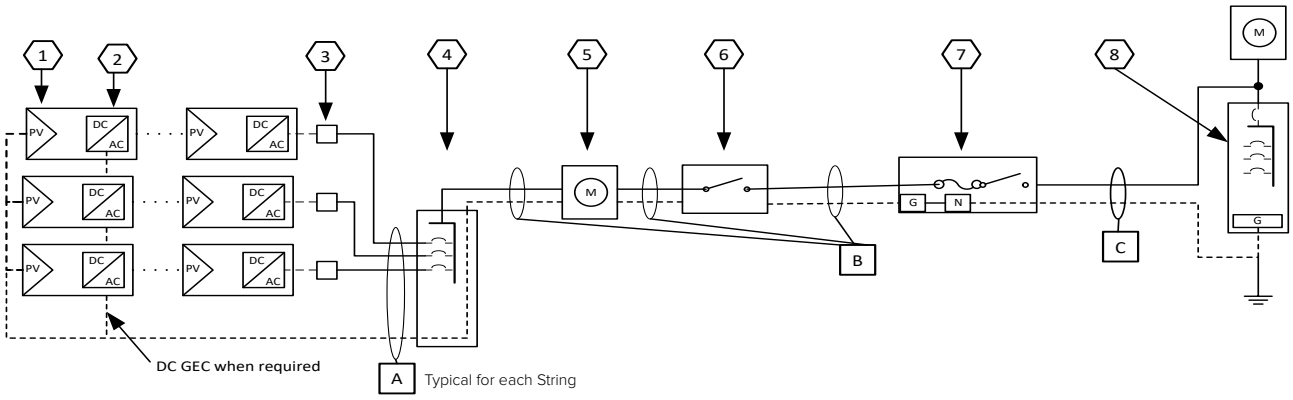
5.1 Sample Wiring Diagram 1: Microinverters with Supply Side Connection

Equipment Schedule	
TAG	DESCRIPTION: (Provide manufacturer and model number if applicable)
1	Solar PV Module or AC Module: (45) Trina TSM250PA05: (3) strings of (15)
2	Microinverter (if not ACM): (45) Enphase M250
3	Junction Box(es): (3) Soladeck NEMA 3R, on roof
4	Solar Load Center, Yes / No: YES, 60 amps with (3) 20 amp breakers.
5	Performance Meter Yes / No: YES, online monitoring through Enphase Envoy unit
6	*Utility External Disconnect Switch Yes / No: Yes
7	Supply Side Disconnect with OCPD: Disconnect rating 60 amps. OCPD Rating 60 amps
8	Main Electrical Service Panel: Cutler-Hammer 200-amp bus, 200-amp main breaker

Single Line Diagram for Microinverters, Optimizers or AC Modules

Refer to NEC 250.120 for EGC installation & Table 250.122 for sizing.

DC Rapid Disconnect (NEC 690.12) not required for microinverter systems, as DC conductors are under 5 feet.



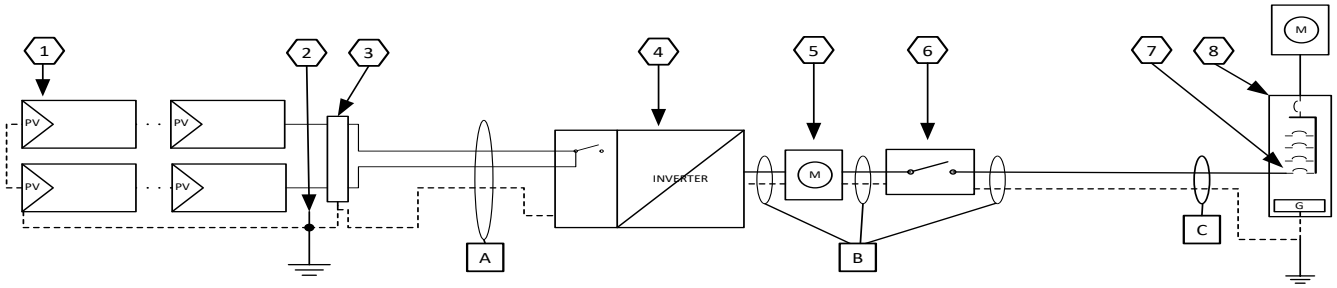
Conductor, Cable, and Conduit Schedule					
Tag	**Description and Conductor Type: (Table 3)**	**Conductor Size**	**Number of Conductors**	**Conductor/Cable Type**	**Conduit Size and Type**
A	Current carrying conductors (for each branch circuit):	#10	2	THWN-2	½ inch EMT
	EGC:	#8AWG Cu	(1)		
	GEC (when required):	n/a			
B	Current carrying conductors:	#6AWG Cu	(2) plus (1) Neutral	THWN-2	¾ inch PVC
	EGC:	#8AWG Cu			
	GEC (when required):	n/a			
C	Current carrying conductors:	#6AWG Cu	(2) plus (1) Neutral	THWN-2	¾ inch EMT
	EGC:	#8AWG Cu	(1)		
	GEC (when required):	n/a			

5.2 Sample Wiring Diagram 2: String Inverter with Supply Side Connection

Equipment Schedule	
TAG	DESCRIPTION: (Provide manufacturer and model # if applicable)
1	Solar PV Module: (24) SolarWorld SW280 Mono, (2) strings of (12)
2	Grounding Electrode for Array
3	Junction Box(es): Soladeck NEMA 3R, on roof
4	Inverter Model: (1) Fronius Primo 6.0-1, Transformerless
5	Performance Meter Yes / No
6	*Utility External Disconnect, or AC disconnect grouped with inverter if not grouped with main service panel
7	Backfed AC breaker in Main Service Panel rating: 35 amps
8	Main Service Panel Main Breaker rating:200 amps; Bus Bar rating: 200 amps

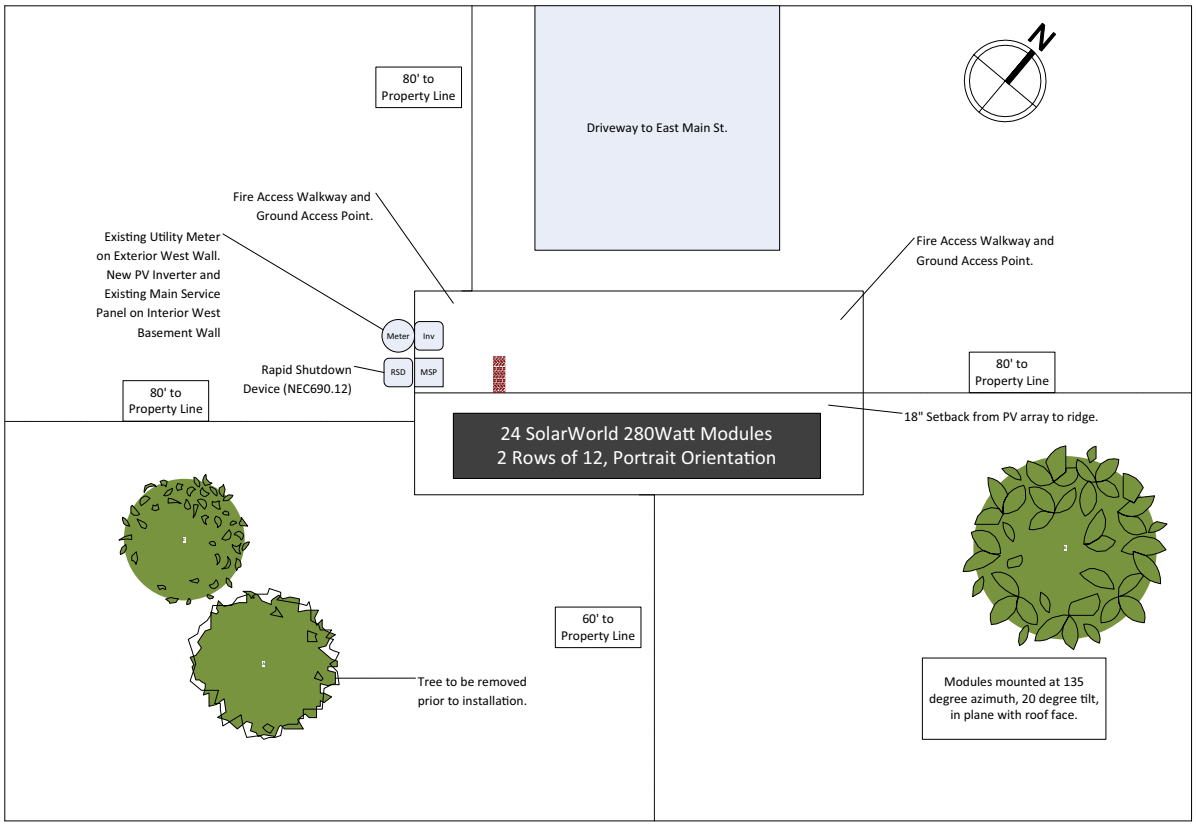
Single Line Diagram for String Inverter

Refer to NEC 250.120 for EGC installation & Table 250.122 for sizing.



Conductor, Cable, and Conduit Schedule					
Tag	**Description and Conductor Type:**	**Conductor Size**	**Number of Conductors**	**Conductor/Cable Type**	**Conduit Size and Type**
A	Current carrying conductors:	#10AWG Cu	2	THWN-2	½ inch EMT
	EGC:	#10AWG Cu	1		
	GEC (when required):	n/a			
B	Current carrying conductors:	#8AWG Cu	(2) plus (1) Neutral	THWN-2	¾ inch PVC
	EGC:	#10AWG Cu			
	GEC (when required):	n/a			
C	Current carrying conductors:	#8AWG Cu	(2) plus (1) Neutral	THWN-2	¾ inch EMT
	EGC:	#10AWG Cu	(1)		
	GEC (when required):	n/a			

5.3 Sample Site Map



6. Sample Photos

NYSERDA requires contractors participating in the NY-Sun program to provide construction photos. The photos in this chapter are illustrative examples only. Not all photos will apply to a given installation. Code enforcement officers may require construction photos from solar PV contractors to supplement or replace an in-person inspection. These example photos also help give a sense of solar PV system components and installation methods, and how they look when installed correctly.

6.1 Required Construction Photos for NY-Sun Incentive Program

6.1.1 Overview Photos

Home Address Verification

Guidance: Must show street number and be taken from a street view.

Inspection Items: Site address must match site address reported

Example Photos:

South Facing Horizon

Guidance: View of Horizon facing South (or whatever direction an array is facing) taken from behind the array illustrating presence or lack of potential shading issues.

Inspection Items: Site shading must match what was reported

Example Photos:

6.1.2 General Array Photographs

Pull Back Image of Array

Guidance: Wide angle shot or multiple images with clear reference point of each array so module count can be verified.
Inspection Items: Module and array count and must match what was reported
Example Photos:

Module Label Documentation

Guidance: Close up module label with model label legible.
Inspection Items: Module model must match what was reported
Example Photos:

6.1.3 Array Racking Photographs

Module Racking System Documentation

Guidance: Multiple angles of racking being used. Must provide pictures of complete array and sub-arrays. Pictures should be taken just before panels are installed to show all grounding and wire management.

Inspection Items: Racking system mechanical connections must be installed to manufacturer specifications

Example Photos:

Racking Roof Mounting System Documentation

Guidance: Photos must illustrate adequate flashing and sealing of racking attachments, that no vents or pipes are obstructed, and that roof is free of damage. For flat roofs, photos must include example of how vertical posts are secured to roof.

Inspection Items:

- Roof penetrations must be sealed and flashed to prevent moisture problems
- PV module and/or racking system must not obstruct open vent pipe(s) on roof
- No visible roof damage must be present

Example Photos:

Racking End Clip Documentation

Guidance: Photos should demonstrate the end clips are properly installed.

Inspection Items: Modules must be properly secured to the end of the racking system with end clips and sufficient clearance

Example Photos:

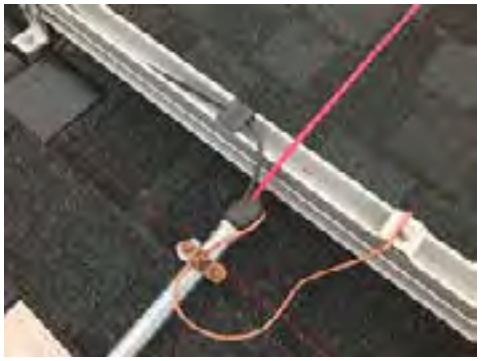
Racking System Grounding

Guidance: Photos should show there is a continuous ground path from all rails, sub-arrays, conduits, etc. Provide documentation for any self bonding rail systems. Provide a close up shot of EGC for size verification.

Inspection Items:

- Racking system and support structure must be grounded per manufacturer instructions
- Equipment grounding conductor must be larger than #6AWG or be protected from physical damage
- Electrical bonding means (e.g., bonding jumpers) must be present between rail sections

Example Photos:



6.1.4 Module Installation Photos

Module Grounding

Guidance: Demonstrate the bond between the module and rails by means of approved rail components or appropriate grounding hardware at each array. Provide documentation if necessary.

Inspection Items:

- Module grounding hardware must be present
- Module grounding hardware must be properly installed to effectively ground module frames; including solid contact between grounding device and metal of the module frames, at designated grounding points

Example Photos:

Wire Management of Modules (Under Array)

Guidance: Supply multiple pictures from all arrays showing proper wire management under arrays and entering conduit or junction boxes. Provide image of wire management device (clips, UV rated zip ties, etc.).

Inspection Items:

- Circuit conductors cannot be in contact with the roof and supported and secured at least every 4.5’ and within 12” of every termination
- Wire ties/clips must be UV and/or outdoor rated
- Conductors cannot be installed with a bend radius less than 5 times the conductor diameter

Example Photos:

6.1.5 Conductor Conduit Photos

Conductor Support and Management

Guidance: Take pictures showing all conduit is properly supported. Include photos to illustrate thermal expansion fittings and frost sleeves are used when required. Include close-ups of fittings and connectors.

Inspection Items: Thermal expansion fitting must be present on raceways to compensate for expansion and contraction

- PV circuit conduit or raceway must be properly supported and secured
- Conduit below grade must be installed with provisions for movement (e.g., frost sleeve)
- Conduit fittings and connectors must be designed and listed for use

Example Photos:

Conduit Roof Top Penetrations

Guidance: Include photos that illustrate any roof penetrations for conduit pass through or securing are adequately sealed.

Inspection Items:

- Roof penetrations must be sealed and flashed to prevent moisture problems
- PVSC indoors in metal conduit

Example Photos:

Conduit Penetrations into Conditioned Space

Guidance: Include photos of conduit pass through into building to illustrate it is sealed.

Inspection Items: Conduit must have an approved internal sealant between conditioned and unconditioned spaces

Example Photos:

6.1.6 Junction/Combiner Box Photos

Internal Photo (cover off)

Guidance: Pictures should show proper grounding and components used for splices and transitions (i.e. terminal blocks, wire nuts etc.). Also show proper use of strain relief and submit pics of all Junction boxes on site

Inspection Items:

- Electrochemically dissimilar metals cannot be in direct physical contact
- Ferrous conduit and enclosures containing the grounding electrode conductor (GEC) must be electrically continuous or appropriately bonded to GEC
- Junction Box circuit conductors must be properly sized for expected current load
- Conduit fittings and connectors must be designed and listed for their use
- Thermal expansion fittings must be installed on raceways and conduit
- Grounded conductor must be identified properly as white or gray
- Junction Box splices and connections must be secure and of high integrity
- Junction Box splice components must be rated for environment
- Grounded conductor(s) must be insulated from metal enclosure surfaces and the ground terminal
- Equipment grounding conductor must be properly identified
- Junction Box must be properly grounded

Example Photos:

External Photo (cover on)

Guidance: Pictures should show proper labels close enough to verify language, wires are secured no more than 12” from junction box and should show proper use of strain relief. Include images for all junction/combiner boxes onsite.

Inspection Items:

- Junction Box must be properly guarded against accidental contact and/or physical damage and have proper working clearances
- Junction Box must be properly identified and listed
- Junction Box must be suitable for wet locations
- Junction Box must be properly secured in place

Example Photos:

6.1.15 - Inverter Photos (Internal Photo (inside view))

Guidance: Inverter showing correct wiring (AC and DC side) and grounding of inverter as well as conduits.

Inspection Items:

- Electrochemically dissimilar metals cannot be in direct physical contact
- Ferrous conduit and enclosures containing the grounding electrode conductor (GEC) must be electrically continuous or appropriately bonded
- Inverter DC grounded conductors and AC grounded conductors (neutral wires) must be correctly identified
- Conduit fittings and connectors must be designed and listed for use
- Inverter PV source conductors’ ampacity must meet or exceed expected current load
- Inverter PV system AC output conductors ampacity must meet or exceed expected current load
- Inverter string fuses must be 600 or 1000 VDC (if applicable)
- Inverter metal enclosure must be properly grounded
- Inverter grounding electrode conductor must be present and sufficiently sized
- Equipment grounding conductor must be properly identified

Example Photos:

6.1.7 Inverter Photos

External Photo (with lid on)

Guidance: Photos showing proper labels installed, and proper working and manufacturer clearances are provided.

Inspection Items:

- Inverter detailed system information label must be present
- The completed installation appears to be neat and of good workmanship
- Inverter must be mounted in accordance with manufacturer instructions and its listing
- Inverter mounting location provides clearance required by the manufacturer
- Inverter Ground Fault warning label must be present

Example Photos:

Inverter Label Picture

Guidance: Close up photo clearly showing all data clearly legible

Inspection Items:

- Inverter model number must match what must be submitted to Salesforce
- PV array maximum DC string voltage complies with inverter maximum input voltage rating

Example Photos:

6.1.8 Balance of System

Balance of System Wall Photos

Guidance: A pulled back shot showing all BOS equipment. Take multiple shots if necessary.

Inspection Items:

- AC disconnect switch must be labeled with AC output information
- AC disconnect switch must be properly labeled as a photovoltaic system disconnect
- The completed installation appears to be neat and of good workmanship
- PV Service Disconnect must be installed in accordance with its listing and manufacturer instructions
- Installed with appropriate working clearances and guarding from accidental contact
- AC Disconnect must be in a readily accessible location
- Service Disconnects must be properly grouped
- Permanent plaque or directory must be properly installed

Example Photos:

GEC Path Photos

Guidance: Sequence of photos showing the path of the GEC from the inverter(s) to the structure's GEC. Must show use of bond bushings and irreversible splices when used.

Inspection Items:

- Grounding electrode conductor must be present and sufficiently sized
- Grounding electrode conductor must be properly bonded to the main premise grounding electrode system
- Grounded conductor(s) must be bonded to the enclosure of the PV service disconnect through a listed grounding terminal or bus

Example Photos:

6.1.9 A/C Combiner

Internal Photos (cover off)

Guidance: Include photos to show correct wiring and grounding at all terminals. Include close ups of any breakers with rating visible.

Inspection Items:

- Ferrous conduit and enclosures must be either electrically continuous or bonded to the grounding electrode conductor
- Enclosure must be properly grounded using a listed grounding method
- AC Combiner overcurrent protection must be sufficient
- Grounded conductor(s) must be insulated from metal enclosure surfaces and the ground terminal inside combiner box
- Grounded conductor must be properly identified
- Ungrounded conductor must be properly identified
- Equipment grounding conductor must be properly identified
- Conduit or raceway must have adequate support
- AC Combiner circuit conductors must be properly sized for expected current load
- PV backfeed breaker must be sufficiently sized to prevent nuisance tripping
- Electrochemically dissimilar metals must not be in direct physical contact, which may lead to a galvanic reaction

Example Photos:

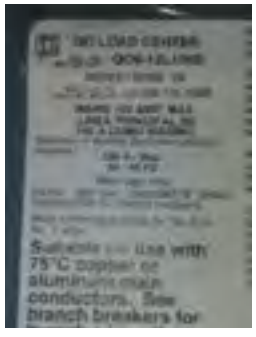
External Photo

Guidance: Include photos to show all labeling and enclosure ratings, with photos provided to allow wording and value verification.

Inspection Items:

- Integrated AC combiner/disconnect switch must be labeled with AC output information
- AC Combiner must be labeled to indicate presence of multiple sources
- The completed installation appears to be neat and of good workmanship
- AC Combiner must be suitable for wet locations
- AC Combiner must be properly secured in place
- AC Combiner must be installed with the appropriate clearances

Example Photos:



6.1.10 A/C Disconnect Photos

Interior Photo

Guidance: Show correct wiring and grounding. Make sure OCPD rating is clear and readable.

Inspection Items:

- AC Disconnect must be properly rated for expected current load
- Electrochemically dissimilar metals must not be in direct physical contact
- Disconnect terminals must be properly wired
- Ferrous conduit and enclosures must be either electrically continuous or appropriately bonded to GEC
- AC Disconnect Switch must be breaking the ungrounded conductor and keep the grounded conductor properly grounded and unenergized
- Ungrounded conductor must be properly identified
- Outdoor conductor insulation type must be rated for 90C and wet conditions
- Grounded conductor(s) must be insulated from metal enclosure surface and ground terminal inside Disconnect enclosure
- Equipment grounding conductor must be properly identified
- Enclosure must be properly grounded by a listed means
- AC Disconnect must be grounded
- Equipment grounding conductor must be properly sized
- Equipment grounding conductor must be larger than #6AWG or else it must be protected from physical damage
- Grounding electrode conductor must be sufficiently sized
- Grounding electrode conductor must be continuous
- AC Disconnect must be present when required to isolate equipment for service

Example Photos:

Exterior Photo

Guidance: Photos should allow for factory installed listings, and field installed label wording and values to be assessed.

Inspection Items:

- AC Disconnect switch must be properly labeled as a photovoltaic system Disconnect
- AC Disconnect switch must be labeled with AC output information
- The completed installation appears to be neat and of good workmanship
- AC Disconnect must be installed with the appropriate clearances
- AC Disconnect enclosure must be suitable for wet locations

Example Photos:

6.1.11 Main Panel Tie-In Pictures

Interior of Main Service Panel

Guidance: Take both close up and pulled back shots to correct wiring, grounding, and overcurrent protection (solar and main). Include clear shots of all splices for load and line side taps. Include a back-up photo showing circuit run to illustrate interconnection point/method.

Inspection Items:

- Main panel overcurrent protection must be sufficient
- PV system AC output conductors must be appropriately sized for expected current load
- Grounded conductor must be identified properly
- PV back feed breaker rating size must be properly sized to protect circuit conductors
- PV backfeed breaker must be sufficiently sized to prevent nuisance tripping
- Sum of back feed breaker(s) and main breaker must be less than or equal to 120% of busbar rating
- Inverter output connection must be properly located in main panel
- PV system AC output conductors must be appropriately sized for expected current load
- Enclosure must be properly grounded using a listed grounding method
- Equipment grounding conductor must be properly identified
- Grounding electrode conductor must be sufficiently sized
- Grounding electrode conductor must be properly bonded to the main premise's grounding electrode system
- GEC must be continuous/irreversibly spliced
- The completed installation appears to be neat and of good workmanship
- Grounded conductor(s) terminal lug must be properly installed in accordance with its listing

Example Photos:

Busbar label

Guidance: Include a clear photo(s) of the busbar rating of the main service panel or other enclosure where PV is connected.
Inspection Items: Sum of backfeed breaker(s) and main breaker must be less than or equal to 120% of busbar rating
Example Photos:

Exterior of Main Service Panel

Guidance: Include photos to show all labeling (manufacturer enclosure rating and field installed labels). Include photos with cover on, cover off, door open, and door closed.
Inspection Items:
• PV system backfeed breaker must be properly labeled as a photovoltaic system Disconnect
• AC Disconnect switch must be labeled with AC output information
• Main panel busbar must be labeled to indicate presence of multiple sources
• PV backfeed breaker(s) must be correctly labeled
• Permanent plaque or directory must be properly installed
• The completed installation appears to be neat and of good workmanship
• Main Panel must be properly secured in place
• Main Panel must be installed with the appropriate clearances
Example Photos:

6.1.12 If Applicable Photos

Pole Mounted Systems Photo

Inspection Items:

- All array conductors must be properly connected
- Thermal expansion fittings must be installed on raceways
- Conduit below grade must be installed with provisions for movement
- PV source and output circuits operating in readily accessible locations must be installed in a raceway
- Racking system and support structure must be properly grounded per manufacturer instructions
- The completed installation appears to be neat and of good workmanship
- Ground/pole mount support structure, anchor system, and or footings must be installed and used according to manufacturer instructions
- Outdoor wire ties/clips must be UV and outdoor rated

Metal Roof Grounding

Inspection Items: Metal roof beneath PV Array must be properly grounded

Battery Back-Up Photos

Inspection Items:

- Quantity of batteries present must match report quality to Salesforce
- Model of batteries must match model reported to Salesforce
- Working clearance maintained above and around battery bank
- Batteries must be properly ventilated
- Battery backup system voltage must be limited to 50VDC nominal
- Battery DC conductors must be protected from accidental contact
- Battery DC conductors must be properly sized for expected current load
- Battery DC conductor type complies code requirements
- Electrical equipment in all adjacent circuits must be protected from battery bank short circuit current
- Conduit fittings and connectors must be designed and listed for this use
- DC Disconnect must be present for ungrounded conductors of battery banks over 30V
- Batteries must be installed on non-conductive supports
- Grounded conductor must be properly identified

6.1.13 Overall Observation

Program

Inspection Items: Existing Panelboard does not meet Program Compliance

7. Sample Installation Errors

The following photos are examples of common yet serious installation errors. Each item presents a safety concern, a system performance issue, or both. For each of these installations, a certificate of completion had been issued by the AHJ.

Photo 1: Main service panel overloaded per NEC 705.12(B)(3)(b).
(100 amp main circuit breaker + 40 amps of PV) ÷ 100 amp bus rating >120%.

Photo 2: Backfed PV breaker not installed at opposite end of buss bar from main breaker: NEC 705.12(B)(3)(b)

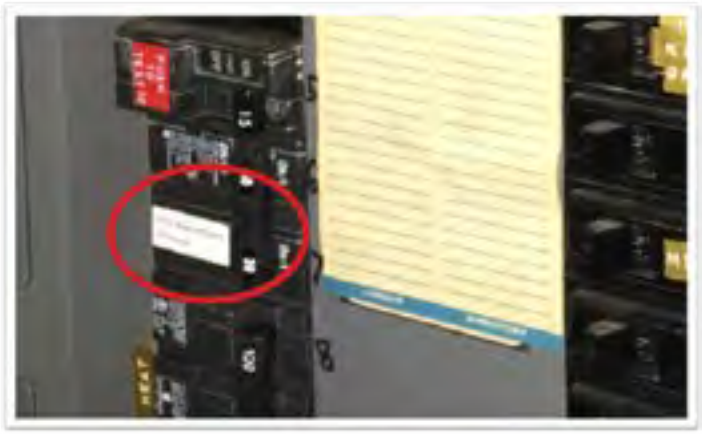


Photo 3: Working clearance not maintained: NEC 110.26

Photo 4: Equipment visibly damaged

Photo 5 - Conductors over 30V not guarded, installed in raceway, or otherwise inaccessible: NEC 690.31(A)

Photo 6: Roof penetrations and anchors not flashed, or improper flashing and sealing: 2020 NYS Uniform Code including applicable 2020 Building Code of NYS and NEC 110.3(B)

Photo 7: Where not protected from physical damage, equipment grounding conductor must be #6 or larger: NEC 690.46, 250.120(C). Conductors laying on asphalt shingles will become damaged and will not last a PV system's expected 30-year lifespan.

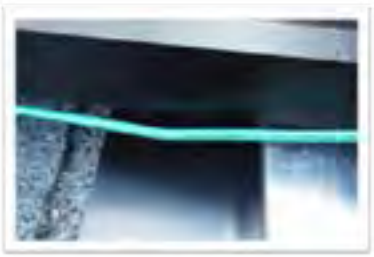


Photo 8: Source circuit conductors in contact with roof: NEC 338.10, 334.30

Photo 9: Equipment is not rated for location. In this case, a non-GFCI outlet for PV monitoring equipment is located in a wet location: NEC 110.3(B), 210.8(A)(3)

Photo 10: DC Conductor in contact with sharp edge: NEC 334.15(B)

Photo 11: AC disconnect/load center manufacturer's label obscured: NEC 110.21

Photo 12: Conductors entering conditioned space must be sealed: NEC 300.7

Photo 13: Two Hole conduit strap, with only one point of attachment, and no strain relief on conductors: NEC 110.3(B)

Photo 14: Failure to torque the lugs to the manufacturers specification: NEC 110.14(D)

8. Solar PV System Labeling Guidelines

Technical Bulletin: NYSERDA Solar Photovoltaic System Labeling Guidelines

8.1 Scope and Purpose

This document was prepared as part of NYSERDA's ongoing quality assurance (QA) for the NY-Sun Solar Photovoltaic (PV) program.

As part of this QA program, NYSERDA and their contractors have performed thousands of inspections on solar PV systems installed in New York State since January 1, 2012. Many of these inspections have found issues related to incorrect, incomplete, or missing labels on installed equipment. The NEC, OSHA and ANSI provide guidelines for required labels. However, these guidelines are not necessarily organized in an easy to use manner and make it difficult for system installers to get a clear understanding of labeling requirements for solar PV systems.

The purpose of this document is to provide participating installers and other stakeholders with a summary of the required labels for the most common PV system configurations.

Unless otherwise noted, this bulletin is based on the 2017 edition of the NEC.

8.2 Overview of Label Locations and Requirements

System Component	Required Labels
Combiner Box / Circuits / Conduit Combiner Box / Enclosures / EMT Enclosures	PV Disconnect [NEC 690.13(B)]
	Guarding of Live Parts [NEC 110.27(C)]
Building / Structure	Power Source Directory [NEC 705.10, 690.56(B)]
EMT / Conduit Raceways	Wiring Methods [NEC 690.13(G)(3)(4)]
	Embedded in Building Surfaces [NEC 690.31(G)(1)]
Inverter	Bipolar PV Systems [NEC 690.31(I)]
	Interactive System Point of Interconnection [NEC 690.54]
Production / Net Meter (Bi-directional)	Point of Connection [NEC 690.59]
AC Disconnect / Breaker / Points of Connection	PV Disconnect [NEC 690.13(B)]
	Identification of terminals [NEC 690.52]
	AC Characteristics [NEC 690.54]
Break Panel / Pull Boxes	PV Disconnect [NEC 690.13(B)]
	Guarding of Live Parts [NEC 110.27(C)]
	Interactive System Point of Interconnection [NEC 690.54]
Main Service Disconnect	Single 120-Volt Supply / Overcurrent Protection [NEC 710.15(C), 692.9(C)]
	Connector Disconnect Warning [NEC 690.15(C), 690.33(E)(2)]
	Type of Disconnect [NEC 690.13(F), 705.12(B)(3-4), 690.59]
	Dual Power Source [NEC 705.12(B)(3-4), 690.59]
	PV Disconnect [NEC 690.13(B)]
	Guarding of Live Parts [NEC 110.27(C)]

8.3 Label Construction, Placement, Color, and Marking

8.3.1 Materials and Construction

Labeling used outdoors must be of durable construction and intended to withstand conditions including high temperatures, UV exposure, and moisture as required by NEC 110.21(B)(3). Heavy duty UV resistant vinyl, metal, or plastic may all be suitable materials, depending on the specific product ratings. Installers should also consider the label attachment method (e.g., adhesive) when considering longevity and are encouraged to review ANSI Z535.4-2011 for guidance on selecting the appropriate labeling and adhesive materials.

8.3.2 Placement

It is a violation of an enclosure's UL listing (and NEC 110.3(B)) to cover any existing manufacturer applied labels with installation specific labels, so this should be avoided. Additionally, it is highly recommended that the installer attaches a label or magnet with the company name and contact information at the inverter or interconnection point for easy reference.

8.3.3 Colors

Label colors are chosen per OSHA 29 CFR 1910.145 direction that the requirements of ANSI Z535.4-2011 be used.

NFPA 70 (NEC) is driven by NFPA 1 (Fire Code) which provides specific colors and characteristics for certain labels as required by the NEC, so these requirements over rule the referenced ANSI standards in these cases, as noted in this Technical Bulletin and the text of the NEC.

8.3.4 Marking

Marking on labels for system specific values, such as short circuit current, shall not be hand-written and must be legible, as required by NEC 110.21(B)(2). Marking may be achieved by means of engraving or use of a long-lasting ink or paint as part of the printing process.

8.4 Label Descriptions and NEC References

There are various articles in the NEC that require labeling for PV systems. Many of the specific requirements are found in Article 690, Solar Photovoltaic Systems. Additional requirements are found in Article 110: Requirements for Electrical Installations; Article 200: Use and Identification of Grounded Conductors; Article 225: Outside Branch Circuits and Feeders; Article 230: Services; and Article 705: Interconnected Electric Power Production Sources.

8.4.1 Arc-Flash Hazard Warning

NEC 110.16 Flash Protection

Electrical equipment such as switchboards, panel boards, industrial control panels, meter socket enclosures, and motor control centers that are in other than dwelling occupancies and are likely to require examination, adjustment, servicing, or maintenance while energized shall be field marked or factory marked to warn qualified persons of potential electric arc flash hazards. The marking shall meet the requirements in 110.21(B) and be located so as to be clearly visible to qualified persons before examination, adjustment, servicing, or maintenance of the equipment.

Figure 1
Note: does not apply to residential PV systems

Directory / Identification of Power Sources

A directory identifying the solar system and other power sources on site should be placed at service equipment and state the location of system disconnecting means. The NEC stipulates this requirement in the following articles:

NEC 705.10 Directory

A permanent plaque or directory, denoting all electric power sources on or in the premises, shall be installed at each service equipment location and at locations of all electric power production sources capable of being interconnected.

Exception: installations with large numbers of power production sources shall be permitted to be designated by groups.

Figure 2

NEC 230.2(E) Identification

Where a building or structure is supplied by more than one service, or any combination of branch circuits, feeders, and services, a permanent plaque or directory shall be installed at each service disconnect location denoting all other services, feeders, and branch circuits supplying that building or structure and the area served by each. Note that NEC 225.37 has similar requirements.

Figure 3

NEC 705.70 Utility-Interactive Inverters Mounted in Not-Readily-Accessible Locations

Utility-interactive inverters shall be permitted to be mounted on roofs or other exterior areas that are not readily accessible. In these cases, inverter location must be noted in the directory required by NEC 705.10, described above.

8.4.2 Conductor Identification and Grouping

NEC 310.110 Conductor Identification

This Article specifies the acceptable conductor marking methods for:

- Grounded conductors: NEC 200.6 (see below)
- Equipment grounding conductors: NEC 250.119 (see below)
- Ungrounded conductors: Shall be distinguishable from grounded and grounding conductors, with reference to NEC 310.120 for manufacturer-applied markings

NEC 690.31(B) Identification and Grouping

PV system conductors shall be identified and grouped as required by 690.31(B). The means of identification shall be permitted by separate color coding, marking tape, tagging, or other approved means.

1. **PV Source Circuits**. PV source circuits shall be identified at all points of termination, connection, and splices.
2. **Grouping**. Where the conductors of more than one PV system occupy the same junction box or raceway with a removable cover(s), the AC and DC conductors of each system shall be grouped separately by wire ties or similar means at least once, and then shall be grouped at intervals not to exceed 1.8 m (6 feet).

   Exception: The requirement for grouping shall not apply if the circuit enters from a cable or raceway unique to the circuit that makes the grouping obvious.

NEC 690.31 (G) (1) Embedded in Building Surfaces

Where circuits are embedded in built-up, laminate, or membrane roofing materials in roof areas not covered by PV modules and associated equipment, the location of circuits shall be clearly marked using a marking protocol that is approved as being suitable for continuous exposure to sunlight and weather.

NEC 200.6 Means of Identifying Grounded Conductors

(A) **Sizes 6 AWG or Smaller**. An insulated grounded conductor 6 AWG or smaller shall be identified by one of the following means:

1. A continuous white outer finish.
2. A continuous gray outer finish.
3. Three continuous white stripes along the conductor's entire length on other than green insulation.
4. Wires that have their outer covering finished to show a white or gray color but have colored tracer threads in the braid identifying the source of manufacture shall be considered as meeting the provisions of this section.

(B) **Sizes 4 AWG or Larger**. An insulated grounded conductor 4 AWG or larger shall be identified by one of the following means:

1. A continuous white outer finish.
2. A continuous gray outer finish.
3. Three continuous white stripes along the conductor's entire length on other than green insulation.
4. At the time of installation, by a distinctive white or gray marking at its terminations. This marking shall encircle the conductor or insulation.

Note: Tape or similar marking means are only code-compliant on large (4 AWG or larger) conductors. Smaller diameter conductors cannot be field-identified in this way.

NEC 200.7 Use of Insulation of a White or Gray Color or with Three Continuous White or Gray Stripes

The following shall be used only for the grounded circuit conductor, unless otherwise permitted in 200.7(B) and (C):

1. A conductor with continuous white or gray covering
2. A conductor with three continuous white or gray stripes on other than green insulation
3. A marking of white or gray color at the termination

Note: PV systems utilizing transformerless (ungrounded) inverters do not ground either polarity of the PV array conductors. Therefore, conductors in these circuits cannot have insulation colored white or gray.

Figure 4

NEC 250.119 Identification of Equipment Grounding Conductors

Unless otherwise required, equipment grounding conductors shall be permitted to be bare, covered, or insulated. Individually covered or insulated equipment grounding conductors shall have a continuous outer finish that is either green or green with one or more yellow stripes. Conductors with these color schemes shall not be used for grounded or ungrounded circuit conductors.

8.4.3 Identification of PV Disconnects

NEC 690.13(B) Marking

Each PV system disconnecting means shall plainly indicate whether in the open (off) or closed (on) position and be permanently marked “PV SYSTEM DISCONNECT” or equivalent.

Note: This requirement applies to both AC and DC disconnects. The International Fire Code (IFC) recommends labels that identify the main service disconnect or critical disconnects with reflective, red and white labels (IFC 605.11).

Figures 5

8.4.4 Terminals Energized on Line and Load Sides of Disconnect in Open Position

NEC 690.13(B) Switch or Circuit Breaker

Each PV system disconnecting means shall plainly indicate whether in the open (off) or closed (on) position and be permanently marked “PV SYSTEM DISCONNECT” or equivalent. Additional markings shall be permitted based upon the specific system configuration. For PV system disconnecting means where the line and load terminals may be the open position, the device shall be marked with the following words or equivalent:

WARNING
ELECTRIC SHOCK HAZARD.
DO NOT TOUCH TERMINALS.
TERMINALS ON BOTH THE LINE AND LOAD SIDES
MAY BE ENERGIZED IN THE OPEN POSITION.

Figure 6

Note: This requirement does not apply to AC disconnects for any inverter Listed to UL 1741

8.4.5 DC PV Source and Output Circuits Inside a Building

NEC 690.31(G) (3) Marking and Labeling Required

The following wiring methods and enclosures that contain PV system dc circuit shall be marked with the wording “WARNING: PHOTOVOLTAIC SOURCE” by means of permanently affixed labels or other approved permanent marking:

1. Exposed raceways, cable trays, and other wiring methods
2. Covers or enclosures of pull boxes and junction boxes
3. Conduit bodies in which any of the available conduit opening are unused

Figure 7

NEC 690.31 (G) (4) Marking and Labeling Methods and Locations

The labels or markings shall be visible after installation. The labels shall be reflective, and all letters shall be capitalized and shall be minimum height of 9.5mm (3/8in) in white on a red background. PV system dc circuit labels shall appear on every section of the wiring system that is separated by enclosures, walls, partitions, ceilings, or floors. Spacing between labels or makings, or between a label and a marking, shall not be more than 3 m (10 feet). Labels required by this section shall be suitable for the environment where they are installed.

Note: Although the ANSI standard directs that these types of labels have different coloring, the NEC has been driven by fire codes and thus specifies characteristics explicitly for these applications.

Figure 8

8.4.6 DC Photovoltaic Power Source

NEC 690.53 Direct-Current Photovoltaic Power Source

A permanent label for the dc PV power source indicating the information in (1) through (3) shall be provided by the installer at dc PV system disconnecting means and at each dc equipment disconnect means required by NEC 690.15. Where disconnecting means has more than one dc PV power source, the values in NEC 690.53(1) through (3) shall be specified for each source.

(1) Maximum voltage

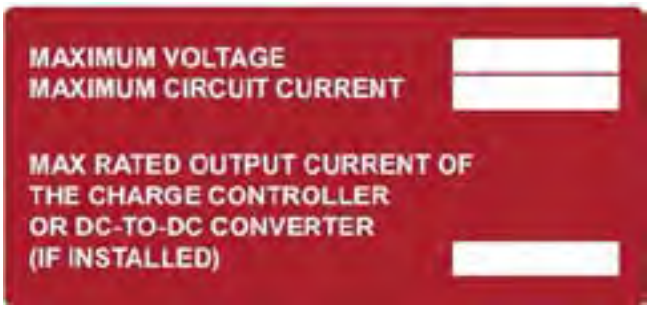
(2) Maximum circuit current

(3) Maximum rated output current of the charge controller or dc-to-dc converter (if installed)

Informational Note to (1): See 690.7 for voltage

Informational Note to (2): See 690.8(A) for calculation of maximum circuit current

Figure 9



8.4.7 Identification of PV System Interconnection

NEC 690.54 Interactive System Point of Interconnection

All interactive system(s) points of interconnection with other sources shall be marked at an accessible location at the disconnecting means as a power source and with the rated AC output current and the nominal operating AC voltage.

Note: Examples of points of interconnection are AC combining panels, AC disconnects, backfed breakers at point of utility interconnection, etc. This requirement does not apply only to the point of common coupling for the PV system and the utility grid.

Figure 10

8.4.8 Identification of Power Sources

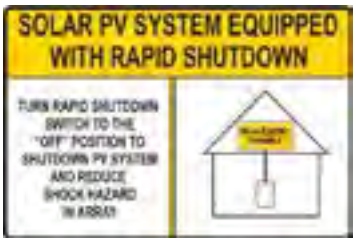
NEC 690.56 Identification of Power Sources

(A) Facilities with Stand-Alone Systems. Any structure or building with a PV power system that is not connected to a utility service source and is a stand-alone system shall have a permanent plaque or directory installed on the exterior of the building or structure at a readily visible location acceptable to the authority having jurisdiction. The plaque or directory shall indicate the location of system disconnecting means and that the structure contains a stand-alone electrical power system.

(B) Facilities with Utility Services and PV Systems. Buildings or structures with both utility service and a PV system shall have a permanent plaque or directory in accordance with NEC 705.

(C) Buildings with Rapid Shutdown. Buildings with PV systems shall have permanent labels as described in 690.56 (C)(1) through (C)(3).

Figure 11



The plaque or directory shall be reflective, with all letters capitalized and having a minimum height of 9.5 mm (3/8 inch), in white on red background.

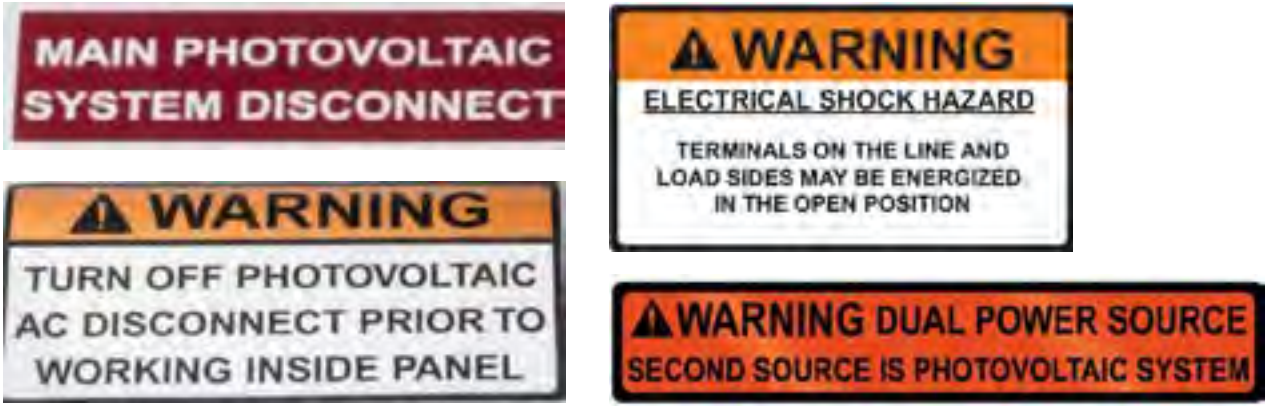
Note: Although the NEC does not explicitly define a location for this labeling, it is suggested that one be located at the main service disconnect for the utility, and one at the inverter location, or the location of the 'rapid shutdown' initiator if different.

8.4.9 Point of Connection Identification

NEC 705.12(A) or (B)

The output of an interconnected electric power source shall be connected as specified in NEC 705.12(A) or (B).

Figure 12



8.4.10 NEC 408 Switchboards, Switchgear, and Panelboards

408.4 Field Identification Required

(A) Circuit Directory or Circuit Identification.

It is important to properly complete the circuit directory, as required by NEC 408.4(A). These directories are generally found on the inside of panelboard cover doors and if there is not one present prior to the PV installation, it is the installer's responsibility to add one and properly document the relevant PV system-associated breakers.

Figure 13

8.5 Common Labeling Mistakes to Avoid

Do not cover manufacturer's labeling with other labels (NEC 690.13(B), 110.21(B)).

Figure 14

Figure 15

Make sure labels are permanent and suitable for use in the environment to which it will be exposed. In this example, these light duty adhesive labels will not withstand 20+ years of wind, sun and rain, and are in violation of NEC 110.21.

Figure 16

Label Not of Permanent Construction, nor conforming with NEC 690.31(G)(4).

Figure 17

9. Example Labels

The following pages provide example NEC-compliant labels based on NEC required/recommended text as well as their related code articles.

While the use of these labels on NY-Sun-funded solar PV projects is encouraged; final selection, preparation, and placement of labels in compliance with the NEC and other relevant codes is the responsibility of the installer.

1) All labeling used outdoors must be engraved metal, UV stabilized engraved plastic or of a material sufficiently durable to withstand the environment involved. Values hand written or in written in marker are not acceptable per NEC.

2) Labels used indoors may be made of durable vinyl or paper

3) Do not cover any existing manufacturer applied labels with installation specific labels

4) Label colors chosen per NEC directs that ANSI Z535-2011 be used

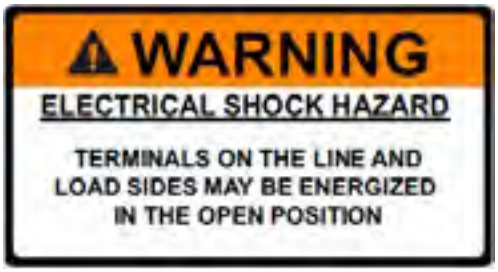
5) Requirements comply with the NEC

6) Additionally, it is highly recommended that the installer attach a label with the company name and contact information at the inverter

7) All warning signs or labels shall comply with NEC 110.21(B)

Label #1

NEC 690.13(B)

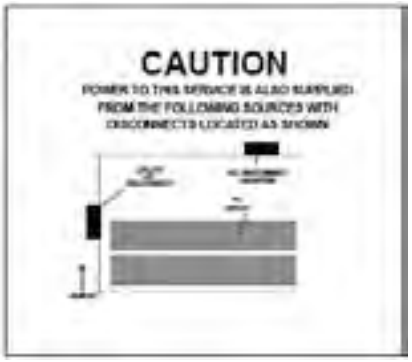


Label #2

NEC 110.27(C)

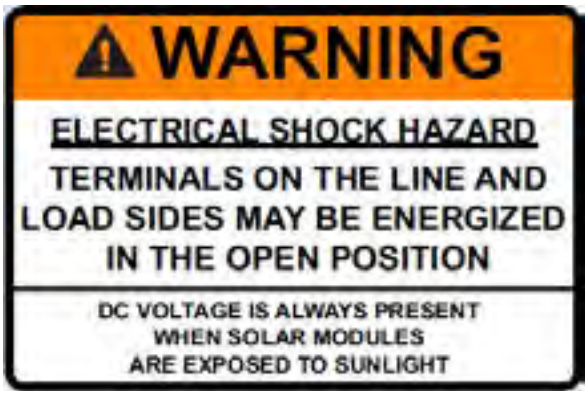
Label #3

NEC 705.10 & 690.56(B)



Label #4

NEC 690.13(B)

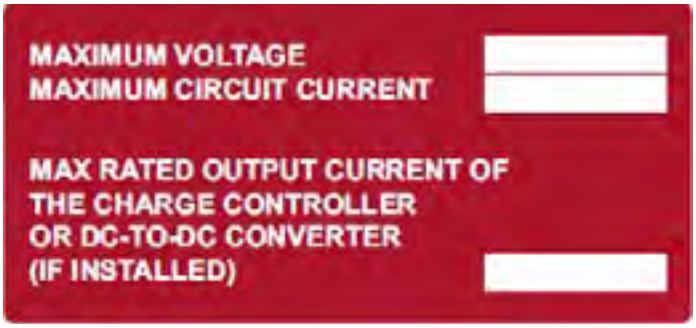


Label #5

NEC 690.13(B)

Label #6

NEC 690.53



Label #7

NEC 690.31(G)(3)(4)

Label #8

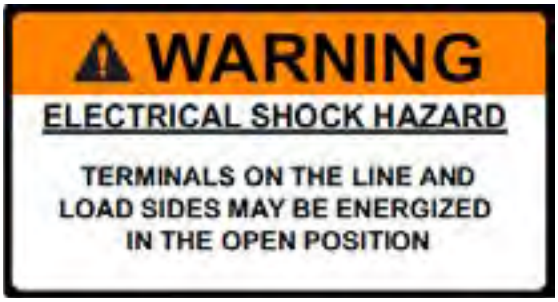
NEC 705.12(D)(3) & 690.59

Label #9

NEC 690.13(B)

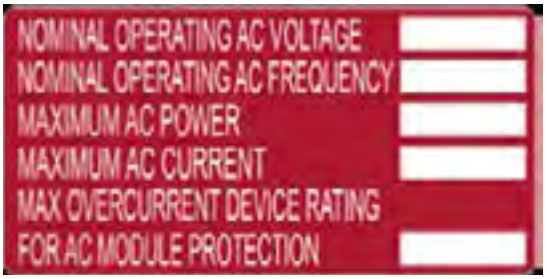
Label #10

NEC 690.13(B)



Label #11

NEC 690.52



Label #12

NEC 690.54

Label #13

NEC 690.3(I)

Label #14

NEC 710.15(C) & 692.9(C)

Label #15

NEC 690.15(C) & 690.33(E)(2)

Label #16

NEC 690.13(F), 705.12(B)(3-4), & 690.59

Label #17

NEC 705.12(B)(3-4) & 690.59

Label #18

NEC 705.12(B)(2)(c)

Label #19

NEC 690.13(B)

10. Top Deficiencies in Solar Electric Systems

In order to provide a summary of common PV system installation issues and help the New York solar industry prioritize education and process improvement, the NY-Sun program has compiled the results of 287 recent PV system inspections. The summaries below are generated from PV installations within a three-month time period based on the 2014 National Electrical Code (NEC). The chart shows that the most frequent violation is Labeling. The table provides an overview of the 9 most common deficiencies found with the top five categories being, Labeling, Grounding, Conductors, Conduit, and Structural. For each category, the list shows the most prevalent violations.

10.1 Likelihood of Finding Installation Issues

In order to prioritize inspection issues, we have calculated what percent of sites have one or more issues in each of the categories below. For example, 78% of inspected sites had at least one Labeling issue.

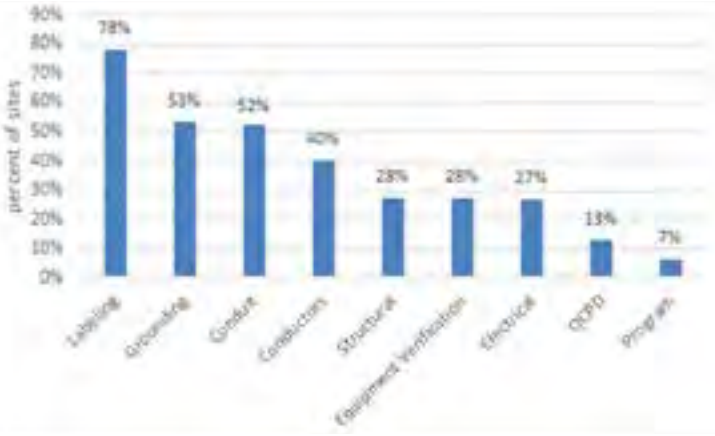
10.2 Deficiency Description

In order to prioritize efforts to improve quality, we have categorized the types of installation deficiencies found into several descriptive categories. As shown in Figure 1, labeling violations are by far the most common deficiency. This is most likely due to the complexity of the NEC, changing code articles, and new requirements (cannot be hand-written, exact size/coloring of certain labels, reflectivity, etc.). Grounding issues were the next most common violation. After the labeling and grounding issues, conduit and conductor violations are the most prevalent.

Table 1. Deficiency Description Categories

Deficiency	Includes
Labeling	Methods and materials for marking PV system components to provide nearby personnel with pertinent system information and warnings
Grounding	Portions of the installation used to reference system components to earth potential, including metallic components such as racking
Conduit	Methods and materials related to installation of conduit
Conductors	Methods and materials related to conductor installation
Structural	Non-electrical installation issues related to mechanical execution of work on equipment mounting, building penetrations
Equipment Verification	Confirmation that equipment installed matches equipment included in project application materials to NYSERDA
Electrical	Uncategorized electrical installation issues
OCPD	Installation issues related to overcurrent devices, such as fuses and circuit breakers
Program	Installation methods and materials that are not compliant with NY-SUN program requirements but not necessarily non-compliant with pertinent codes or standards

Figure 1. Likelihood of PV System Installation Issues by Category



10.2.1 Labeling Deficiencies: 78% of Systems Inspected

Below, we have summarized the top 5 deficiencies found related to labeling.

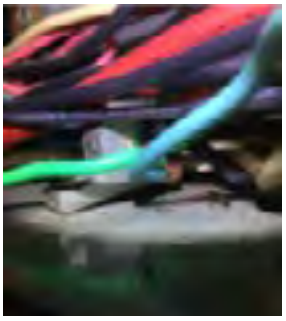
Table 2. Top Labeling Deficiencies

Rank	System Component	Deficiency Description	Example
1	Supply Side Connection	Service Disconnect label with AC output information is missing, incomplete, or not suitable for the environment, in violation of NEC Article 690.54 and/or 110.21. Label: Rated AC output current: _____AAC Nominal operating AC voltage: _____VAC	
2	Inverter	Inverter information label is missing, incomplete, or unsuitable for the environment, in violation of NEC Article 690.53. Label: Rated maximum power-point current (Imp): _____ADC Rated maximum power-point voltage (Vmp): _____VDC Maximum system voltage (Voc): _____VDC Short-circuit current (Isc): _____ADC Maximum rated output current of charge controller (if installed): _____ADC	
3	AC Combiner	Integrated AC combiner/disconnect switch label with AC output information is missing, incomplete, or not suitable for the environment in violation of NEC Article NEC 690.54. Label: Rated AC output current: _____AAC Nominal operating voltage: _____VAC	
4	Supply Side Connection	Permanent plaque or directory denoting location of all power sources and location of disconnects on premise at each service equipment location is missing, incomplete, or unsuitable for the environment, in violation of NEC Articles 705.10, 690.56 and/or 110.21.	
5	AC Disconnect	AC Disconnect label with AC output information is missing, incomplete, or not suitable for the environment, in violation of NEC Article 690.54. Label: Rated AC output current: _____AAC Nominal operating voltage: _____VAC	

10.2.2 Grounding Deficiencies: 53% of Systems Inspected

Below, we have summarized the top 5 deficiencies found related to Grounding.

Table 3. Top Grounding Deficiencies

Rank	System Component	Deficiency Description	Example
1	Supply Side Connection	Grounded (neutral) conductor is not properly bonded to PV service disconnect enclosure using a listed grounding bus or terminal, or the grounded conductors are not properly bonded to the Grounding Electrode Conductor (GEC), in violation of NEC Article 250.24(C).	
2	Supply Side Connection	The top of the grounding electrode is not flush with, or below, ground level in violation of NEC Article 250.53(G).	
3	AC Disconnect	Enclosure is not properly grounded using a listed grounding method, in violation of NEC Articles 690.43, 250.8, and 250.12. Enclosure must be grounded with equipment listed for the purpose and that is solidly connected to the enclosure body.	
4	Supply Side Connection	The GEC is not continuous or irreversibly spliced, in violation of NEC Articles 250.64(C) and 690.47(C). Allowable means of splicing the GEC include compression crimp and exothermic welding processes.	
5	AC Combiner	Enclosure is not properly grounded using a listed grounding method, in violation of NEC Articles 690.43, 250.8, and 250.12. Enclosure must be grounded with equipment listed for the purpose and that is solidly connected to the enclosure body.	

10.2.3 Conduit Deficiencies: 52% of Systems Inspected

Below, we have summarized the top 5 deficiencies found related to Conduits.

Table 4. Top Conduit Deficiencies

Rank	System Component	Deficiency Description	Example
1	Supply Side Connection	Conduit is missing an approved internal sealant at penetrations between conditioned and unconditioned spaces to prevent condensation, in violation of NEC Article 300.7(A).	
2	Inverter	Conduit is improperly used to support conductors, in violation of NEC Article 300.11(B).	
3	AC Disconnect	Conduit is missing an approved internal sealant at penetrations between conditioned and unconditioned spaces to prevent condensation in violation of NEC Article 300.7(A).	
4	Supply Side Connection	Circuit conduit or raceway lacks adequate support, in violation of NEC (LFMC-350.30, EMT-358.30, Metal Trough-376.30).	
5	Array	Conduit is missing an approved internal sealant at penetrations between conditioned and unconditioned spaces to prevent condensation, in violation of NEC Article 300.7(A).	

10.2.4 Conductor Deficiencies: 40% of Systems Inspected

Below, we have summarized the top 5 deficiencies found related to Conductors.

Table 5. Top Conductor Deficiencies

Rank	System Component	Deficiency Description	Example
1	Supply Side Connection	Service Entrance conductor splice is not installed in accordance with its listing, in violation of NEC Article 110.3(B) and 110.14.	
2	Junction Box	The receptacle is not GFCI-WR rated or listed for use in wet locations in violation of NEC Article 210.8(A)(2) & (A)(3).	
3	Supply Side Connection	The neutral conductor is terminated at an individual terminal that already contains another conductor in violation of NEC Article 408.41.	
4	Array	Ungrounded conductors are not properly identified, in violation of NEC Article 200.7.	
5	Feeder Tap Connection	Feeder tap conductor splice is not installed in accordance with its listing, in violation of NEC Article 110.3(B) and 110.14.	

10.2.5 Structural Deficiencies: 28% of Systems Inspected

Below, we have summarized the top 5 deficiencies found related to Structural issues.

Table 6. Top Structural Deficiencies

Rank	System Component	Deficiency Description	Example
1	Array	Racking system mechanical connections not made correctly and/or racking not installed per manufacturer instructions, in violation of NEC Article 110.3(B).	
2	Inverter	Inverter is not mounted in accordance with manufacturer instructions, in violation of NEC Article 110.3(B).	
3	Inverter	Moisture or evidence of moisture was found inside the inverter, an approved method of moisture accumulation prevention appears to be missing in violation of NEC Article 314.15.	
4	Array	Roof penetrations are not properly sealed and flashed to prevent moisture ingress.	
5	AC Combiner	AC Combiner does not have sufficient working clearances as required by NEC Article 110.26.	

Table 7. Deficiency as a Percent of All Deficiencies Found

Frequency	System Component	Defect Category	Deficiency Description
44%	All	Labeling	This deficiency includes all labeling violations found within all the Regions.
2.3%	Supply Side Connection	Grounding	Grounded (neutral) conductor is not properly bonded to PV service disconnect enclosure using a listed grounding bus or terminal, or the grounded conductors are not properly bonded to the Grounding Electrode Conductor (GEC), in violation of NEC Article 250.24(C).
2.2%	Supply Side Connection	Grounding	The top of the grounding electrode is not flush with, or below, ground level in violation of NEC Article 250.53(G).
1.8%	AC Disconnect	Grounding	Enclosure is not properly grounded using a listed grounding method, in violation of NEC Articles 690.43, 250.8, and 250.12. Enclosure must be grounded with equipment listed for the purpose and that is solidly connected to the enclosure body.
1.6%	Supply Side Connection	Conduit	Conduit is missing an approved internal sealant at penetrations between conditioned and unconditioned spaces to prevent condensation, in violation of NEC Article 300.7(A).
1.5%	Supply Side Connection	Conductors	Service Entrance conductor splice is not installed in accordance with its listing, in violation of NEC Article 110.3(B) and 110.14.
1.4%	Supply Side Connection	Grounding	The GEC is not continuous or irreversibly spliced, in violation of NEC Articles 250.64(C) and 690.47(C). Allowable means of splicing the GEC include compression crimp and exothermic welding processes.
1.1%	Array	Structural	Racking system mechanical connections not made correctly and/or racking not installed per manufacturer instructions, in violation of NEC Article 110.3(B).
1.1%	AC Combiner	Grounding	Enclosure is not properly grounded using a listed grounding method, in violation of NEC Articles 690.43, 250.8, and 250.12. Enclosure must be grounded with equipment listed for the purpose and that is solidly connected to the enclosure body.
1.0%	Array	Electrical	Electrochemically dissimilar metals are in direct physical contact, which may lead to a galvanic reaction, in violation of NEC Article 110.14 (for conductors/splice components) and/or RMC-NEC 344.14, EMT-NEC 358.12(6) (for conduit and surrounding materials).
1.0%	Inverter	Conduit	Conduit is improperly used to support conductors, in violation of NEC Article 300.11(B).
0.9%	AC Disconnect	Conduit	Conduit is missing an approved internal sealant at penetrations between conditioned and unconditioned spaces to prevent condensation in violation of NEC Article 300.7(A).
0.9%	Supply Side Connection	Conduit	Circuit conduit or raceway lacks adequate support, in violation of NEC (LFMC-350.30, EMT-358.30, Metal Trough-376.30).
0.9%	Supply Side Connection	Grounding	Enclosure is not properly grounded using a listed grounding method, in violation of NEC Articles 690.43, 250.8, and 250.12. Enclosure must be grounded with equipment listed for the purpose and that is solidly connected to the enclosure body.
0.9%	Array	Conduit	Conduit is missing an approved internal sealant at penetrations between conditioned and unconditioned spaces to prevent condensation, in violation of NEC Article 300.7(A).

11. Unified Residential Solar PV Permit Application

The workable version of this document can be found at nyserda.ny.gov/SolarGuidebook, under the Solar Permitting and Inspecting tab.

PERMIT APPLICATION

NY State Unified Solar Permit

Unified solar permitting is available statewide for eligible solar photovoltaic (PV) installations. Municipal authorities that adopt the unified permit streamline their process while providing consistent and thorough review of solar PV permitting applications and installations. Upon approval of this application and supporting documentation, the authority having jurisdiction (AHJ) will issue a building and/or electrical permit for the solar PV installation described herein.

PROJECT ELIGIBILITY FOR UNIFIED PERMITTING PROCESS

By submitting this application, the applicant attests that the proposed project meets the established eligibility criteria for the unified permitting process (subject to verification by the AHJ). The proposed solar PV system installation:

☐ Yes ☐ No 1. Has a rated DC capacity of 25 kW or less.

☐ Yes ☐ No 2. Is not subject to review by an Architectural or Historical Review Board. (If review has already been issued answer YES and attach a copy)

☐ Yes ☐ No 3. Does not need a zoning variance or special use permit. (If variance or permit has already been issued answer YES and attach a copy)

☐ Yes ☐ No 4. Is mounted on a permitted roof structure, on a legal accessory structure, or ground mounted on the applicant's property. If on a legal accessory structure, a diagram showing existing electrical connection to structure is attached.

☐ Yes ☐ No 5. The Solar Installation Contractor complies with all licensing and other requirements of the jurisdiction and the State.

☐ Yes ☐ No 6. If the structure is a sloped roof, solar panels are mounted parallel to the roof surface.

For solar PV systems not meeting these eligibility criteria, the applicant is not eligible for the Unified Solar Permit and must submit conventional permit applications. Permit applications may be downloaded here: [BUILDING DEPARTMENT WEBSITE] or obtained in person at [BUILDING DEPARTMENT ADDRESS] during business hours [INDICATE BUSINESS HOURS].

SUBMITTAL INSTRUCTIONS

For projects meeting the eligibility criteria, this application and the following attachments will constitute the Unified Solar Permitting package.

- This application form, with all fields completed and bearing relevant signatures.
- Permitting fee of $[ENTER FEE HERE], payable by [ENTER VALID PAYMENT METHODS, If checks are allowed INCLUDING WHO CHECKS SHOULD BE MADE PAYABLE TO]
- Required Construction Documents for the solar PV system type being installed, including required attachments.

Completed permit applications can be submitted electronically to [EMAIL ADDRESS] or in person at [BUILDING DEPARTMENT ADDRESS] during business hours [INDICATE BUSINESS HOURS].

APPLICATION REVIEW TIMELINE

Permit determinations will be issued within [TIMELINE] calendar days upon receipt of complete and accurate applications. The municipality will provide feedback within [TIMELINE] calendar days of receiving incomplete or inaccurate applications.

FOR FURTHER INFORMATION

Questions about this permitting process may be directed to [MUNICIPAL CONTACT INFORMATION].

PROPERTY OWNER

Property Owner's First Name	Last Name	Title	
Property Address			
City		State	Zip
Section	Block	Lot Number	

EXISTING USE

☐ Single Family ☐ 2-4 Family ☐ Commercial ☐ Other

PROVIDE THE TOTAL SYSTEM CAPACITY RATING (SUM OF ALL PANELS)

Solar PV System: _____ kW DC

SELECT SYSTEM CONFIGURATION

Make sure your selection matches the Construction Documents included with this application.

☐ Supply side connection with microinverters
☐ Supply side connection with DC optimizers
☐ Supply side connection with string inverter
☐ Load side connection with DC optimizers
☐ Load side connection with microinverters
☐ Load side connection with string inverter

SOLAR INSTALLATION CONTRACTOR

Contractor Business Name			
Contractor Business Address	City	State	Zip
Contractor Contact Name		Phone Number	
Contractor License Number(s)		Contractor Email	
Electrician Business Name			
Electrician Business Address	City	State	Zip
Electrician Contact Name		Phone Number	
Electrician License Number(s)		Electrician Email	

Please sign below to affirm that all answers are correct and that you have met all the conditions and requirements to submit a unified solar permit.

Property Owner's Signature	Date
Solar Installation Company Representative Signature	Date

SUBMITTAL REQUIREMENTS SOLAR PV 25KW OR LESS (ATTACHMENTS)

NY State Unified Solar Permit

This information bulletin is published to guide applicants through the unified solar PV permitting process for solar photovoltaic (PV) projects 25 kW in size or smaller. This bulletin provides information about submittal requirements for plan review, required fees, and inspections.

Note: Language in [ALL CAPS] below indicates where local jurisdictions need to provide information specific to the jurisdiction. Language in italics indicates explanatory notes from the authors of this document that may be deleted from the distributed version.

PERMITS AND APPROVALS REQUIRED

The following permits are required to install a solar PV system with a nameplate DC power output of 25 kW or less:

a) Unified Solar Permit

b) [LIST TYPE OF PERMIT(S) REQUIRED BY THE LOCAL JURISDICTION, i.e., ELECTRICAL OR BUILDING PERMIT]. Planning review [IS/IS NOT] required for solar PV installations of this size.

Fire Department approval [IS/IS NOT] required for solar PV installations of this size.

SUBMITTAL REQUIREMENTS

In order to submit a complete permit application for a new solar PV system, the applicant must include:

a) Completed Standard Permit Application form which includes confirmed eligibility for the Unified Solar Permitting process. This permit application form can be downloaded at [WEBSITE ADDRESS].

b) Construction Documents, with listed attachments [SAMPLES ARE AVAILABLE IN Understanding Solar PV Permitting and Inspecting in New York State AT WEBSITE ADDRESS]. Construction Documents must be by stamped and signed by a New York State Registered Architect or New York State Licensed Professional Engineer.

[MUNICIPALITY NAME], through adopting the Unified Solar Permitting process, requires contractors to provide construction documents, such as the examples included in the Understanding Solar PV Permitting and Inspecting in New York State document. Should the applicant wish to submit Construction Documents in another format, ensure that the submittal includes the following information:

- Manufacturer/model number/quantity of solar PV modules and inverter(s).
- String configuration for solar PV array, clearly indicating the number of modules in series and strings in parallel (if applicable).
- Combiner boxes: Manufacturer, model number, NEMA rating.
- From array to the point of interconnection with existing (or new) electrical distribution equipment: identification of all raceways (conduit, boxes, fittings, etc.), conductors and cable assemblies, including size and type of raceways, conductors, and cable assemblies.
- Sizing and location of the EGC (equipment grounding conductor).
- Sizing and location of GEC (grounding electrode conductor, if applicable).
- Disconnecting means of both AC and DC including indication of voltage, ampere, and NEMA rating.
- Interconnection type/location (supply side or load side connection)
- For supply side connections only, indication that breaker or disconnect meets or exceeds available utility fault current rating kAIC (amps interrupting capacity in thousands).
- Ratings of service entrance conductors (size insulation type AL or CU), proposed service disconnect, and overcurrent protection device for new supply side connected solar PV system (reference NEC 230.82, 230.70).
- Rapid shutdown device location/method and relevant labeling.

c) (For Roof Mounted Systems) A roof plan showing roof layout, solar PV panels and the following fire safety items: approximate location of roof access point, location of code-compliant access pathways, code exemptions,
solar PV system fire classification, and the locations of all required labels and markings.

d) Provide construction drawings with the following information:

- The type of roof covering and the number of roof coverings installed.
- Type of roof framing, size of members, and spacing.
- Weight of panels, support locations, and method of attachment.
- Framing plan and details for any work necessary to strengthen the existing roof structure.
- Site-specific structural calculations.

e) Where an approved racking system is used, provide documentation showing manufacturer of the racking system, maximum allowable weight the system can support, attachment method to roof or ground, and product evaluation information or structural design for the rack.

PLAN REVIEW

Permit applications can be submitted to [DEPARTMENT NAME] in person at [ADDRESS] and [IF APPLICABLE] electronically through: [WEBSITE/EMAIL/FAX].

FEES

[PROVIDE CLEAR FEE SCHEDULE]

INSPECTIONS

Once all permits to construct the solar PV installation have been issued and the system has been installed, it must be inspected before final approval is granted for the solar PV system. On-site inspections can be scheduled by contacting [DEPARTMENT] by telephone at [PHONE NUMBER] or electronically at [WEBSITE OR EMAIL ADDRESS]. Inspection requests received within business hours are typically scheduled for the next business day. If next business day is not available, inspection should happen within a five-day window. [IF MUNICIPALITY ACCEPTS THIRD PARTY INSPECTIONS, INDICATE THIS AND PROVIDE A LIST OF APPROVED INSPECTORS].

In order to receive final approval, the following inspections are required:

Delete Rough/Final inspection descriptions if not applicable in your jurisdiction

[ROUGH INSPECTION, IF REQUIRED] During a rough inspection, the applicant must demonstrate that the work in progress complies with relevant codes and standards. The purpose of the rough inspection is to allow the inspector to view aspects of the system that may be concealed once the system is complete, such as:

- Wiring concealed by new construction.
- Portions of the system that are contained in trenches or foundations that will be buried upon completion of the system.

It is the responsibility of the applicant to notify [ENTER CONTACT INFORMATION] before the components are buried or concealed and to provide safe access (including necessary climbing and fall arrest equipment) to the inspector. The inspector will attempt, if possible, to accommodate requests for rough inspections in a timely manner.

[FINAL INSPECTION] The applicant must contact [INSERT CONTACT INFORMATION] when ready for a final inspection. During this inspection, the inspector will review the complete installation to ensure compliance with codes and standards, as well as confirming that the installation matches the records included with the permit application. The applicant must have ready, at the time of inspection, the following materials and make them available to the inspector:

- Copies of as-built drawings and equipment specifications, if different than the materials provided with the application.
- Photographs of key hard to access equipment, including;
  - Example of array attachment point and flashing/sealing methods used.
  - Opened rooftop enclosures, combiners, and junction boxes.
  - Bonding point with premises grounding electrode system.
  - Supply side connection tap method/device.
  - Module and microinverter/DC optimizer nameplates.
  - Microinverter/DC optimizer attachment.

[MUNICIPALITY NAME] has adopted a standardized inspection checklist, which can be found in the Understanding Solar PV Permitting and Inspecting in New York State document, found here: [WEBSITE ADDRESS].

The inspection checklist provides an overview of common points of inspection that the applicant should be prepared to show compliance. If not available, common checks include the following:

- Number of solar PV modules and model number match plans and specification sheets number match plans and specification sheets.
- Array conductors and components are installed in a neat and workman-like manner.
- Solar PV array is properly grounded.
- Electrical boxes and connections are suitable for environment.
- Array is fastened and sealed according to attachment detail.
- Conductor's ratings and sizes match plans.
- Appropriate signs are property constructed, installed and displayed, including the following:
  - Sign identifying PV power source system attributes at DC disconnect.
  - Sign identifying AC point of connection.
  - Rapid shutdown device meets applicable requirements of NEC 690.12.
- Equipment ratings are consistent with application and installed signs on the installation, including the following:
  - Inverter has a rating as high as max voltage on PV power source sign.
  - DC-side overcurrent circuit protection devices (OCPDs) are DC rated at least as high as max voltage on sign.
  - Inverter is rated for the site AC voltage supplied and shown on the AC point of connection sign.
  - OCPD connected to the AC output of the inverter is rated at least 125% of maximum current on sign and is no larger than the maximum OCPD on the inverter listing label.
  - Sum of the main OCPD and the inverter OCPD is rated for not more than 120% of the buss bar rating.

UNIFIED SOLAR PERMITTING RESOURCES

The jurisdiction has adopted the following documents from the New York Unified Solar Permit process:

Delete any documents not adopted by the jurisdiction.

- Standard Application [WEB ADDRESS]
- Understanding Solar PV Permitting and Inspecting in New York State document, which includes sample construction documents, inspection checklist, design review checklist, and labelling guide [WEB ADDRESS]

DEPARTMENTAL CONTACT INFORMATION

For additional information regarding this permit process, please consult our departmental website at [WEBSITE] or contact [DIVISION NAME] at [PHONE NUMBER].

Questions?

If you have any questions regarding the solar permitting and inspecting process, please email questions to cleanenergyhelp@nyserda.ny.gov or request free technical assistance at nyserda.ny.gov/siting.
The NYSERDA team looks forward to partnering with communities across the state to help them meet their solar energy goals.

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Roof Top Access And Ventilation

Understanding the 2020 NYS Uniform Code as it relates to roof top access and ventilation for residential and nonresidential solar energy systems

NEW YORK STATE OF OPPORTUNITY. | NYSERDA

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Overview

Through the 2020 New York State Uniform Fire Prevention and Building Code (Uniform Code), specific codes are set in place regarding rooftop access and ventilation when installing a solar photovoltaic (PV) system. This section provides information on the parts of the 2020 Residential Code of New York State (2020 RCNYS) and the 2020 Fire Code of New York State (2020 FCNYS) that are applicable to solar PV installers and Authorities Having Jurisdiction (AHJ), when installing and inspecting PV systems. Additionally, figures are shown in this chapter to visualize and explain scenarios where rooftop access and ventilation will be needed to adhere with the 2020 Uniform Code.

We encourage you to have a discussion with your local code official to determine the specific requirements for your solar installation. In New York State, it is the responsibility of the local AHJ to administer and enforce the Uniform Code as well as any applicable local zoning and land use laws.

Always consult with your local code official to determine code compliance.

2020 RCNYS Code text is black.

Additional commentary is blue.

1. Residential Roof Top Access – 2020 Residential Code of NYS

1.1 Section 324 - Solar Energy Systems

R324.1 General. Solar energy systems shall comply with the provisions of this section.

R324.2 Solar thermal systems. Solar thermal systems shall be designed and installed in accordance with Chapter 23 and Fire Code of New York State.

(This is a reference to the 2020 Fire Code of New York.)

R324.3 Photovoltaic systems. Photovoltaic systems shall be designed and installed in accordance with Sections R324.3.1 through R324.7.1 and NFPA 70 and the manufacturer's installation instructions.

(NFPA 70 is also known as the National Electrical Code.)

R324.3.1 Equipment Listings. Photovoltaic panels and modules shall be listed and labeled in accordance with UL1703. Inverters shall be listed and labeled in accordance with UL 1741. Systems connected to the utility grid shall use inverters listed for utility interaction.

R324.4 Rooftop-mounted photovoltaic systems. Rooftop-mounted photovoltaic systems installed on or above the roof covering shall be designed and installed in accordance with this section.

R324.4.1 Structural requirements. Rooftop-mounted photovoltaic panel systems shall be designed to structurally support the system and withstand applicable gravity loads in accordance with Chapter 3. The roof on which these systems are installed shall be designed and constructed to support the loads imposed by such systems in accordance with Chapter 8.

R324.4.1.1 Roof load. Portions of roof structures not covered with photovoltaic panel systems shall be designed for dead loads and roof loads in accordance with Sections R301.4 and R301.6. Portions of roof structures covered with photovoltaic panel systems shall be designed for the following load cases:

1. Dead load (including photovoltaic panel weight) plus snow load in accordance with Table R301.2(1).

2. Dead load (excluding photovoltaic panel weight) plus roof live load or snow load, whichever is greater, in accordance with Section R301.6

R324.4.1.2 Wind load. Rooftop-mounted photovoltaic panel or module systems and their supports shall be designed and installed to resist the component and cladding loads specified in Table R301.2(2), adjusted for height and exposure in accordance with Table R301.2(3).

R324.4.2 Fire classification. Rooftop-mounted photovoltaic panel systems shall have the same fire classification as the roof assembly required in Section R902.

R324.4.3 Roof penetrations. Roof penetrations shall be flashed and sealed in accordance with Chapter 9.

(The adequacy of the roof structure should always be determined by a New York State Licensed Professional Engineer or Registered Architect)

R324.5 Building–integrated photovoltaic systems. Building–integrated photovoltaic systems that serve as roof covering shall be designed and installed in accordance with Section R905

R324.5.1 Photovoltaic shingles. Photovoltaic shingles shall comply with Section R905.16

(R905 is the 2020 Residential Code's section for "Roof Assemblies." R905.16 specifically addresses photovoltaic shingles, which references back to R324 and NFPA 70)

R324.5.2 Fire classification. Building-integrated photovoltaic systems shall have a fire classification in accordance with Section R902.3

R324.6 Roof access and pathways. Roof access, pathways and setback requirements shall be provided in accordance with Sections R324.6.1 through R324.6.2.1. Access and minimum spacing shall be required to provide emergency access in the roof, to provide pathways to specific areas of the roof, provide for smoke ventilation opportunity areas, and to provide emergency egress from the roof.

Exceptions:

1. Detached, nonhabitable structures, including but not limited to detached garages, parking shade structures, carports, solar trellises and similar structures, shall not be required to provide roof access.
2. Roof access, pathways and setbacks need not be provided where the building official has determined that rooftop operations will not be employed.
3. These requirements shall not apply to roofs with slopes of two units vertical in 12 units horizontal (17-percent slope) or less.

[NY] R324.6.1 Pathways. Not fewer than two pathways, on separate roof planes from the lowest roof edge to ridge and not less than 36 inches (914mm) wide, shall be provided on all buildings. Not fewer than one pathway shall be provided on the street or driveway side of the roof. For each roof plane with a photovoltaic array, a pathway not less than 36 inches wide (914 mm) shall be provided from the lowest roof edge to ridge on the same roof plane as the photovoltaic array, on an adjacent roof plane, or straddling the same and adjacent roof planes. Pathways shall be over areas capable of supporting fire fighters accessing the roof. Pathways shall be located in areas with minimal obstructions such as vent pipes, conduit, or mechanical equipment. Pathways on opposing roof slopes shall not be located along the same plane as the truss, rafter, or other such framing system that supports the pathway.

Exception: Access pathways shall not be required on roof slopes containing photovoltaic modules, panels, or an array where the opposing or adjacent roof slope is an access roof.

[NY] R324.6.2 Setback at ridge. Photovoltaic arrays shall not be located less than 18 inches (457 mm) from a horizontal ridge.

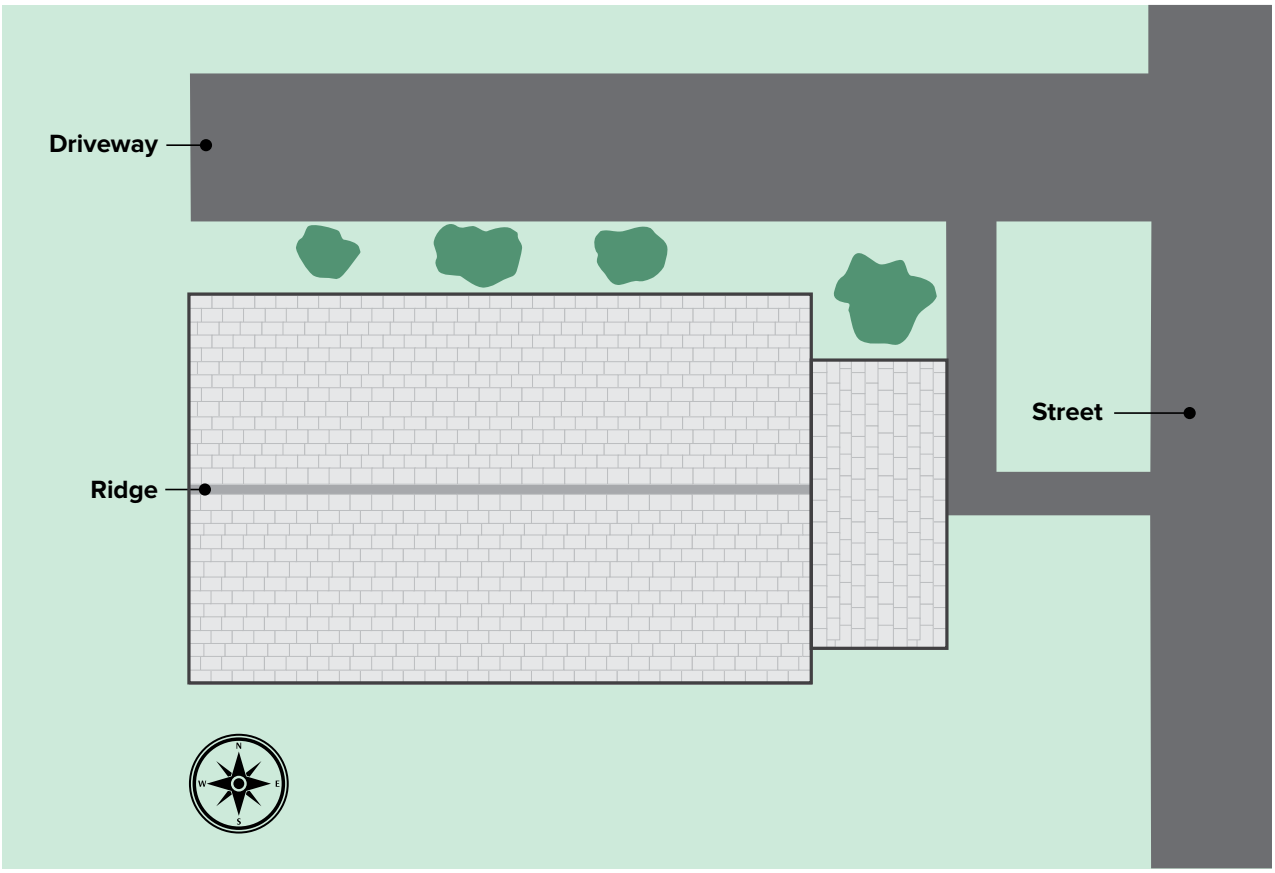
[NY] R324.6.2.1 Reserved.

R324.6.2.2 Emergency escape and rescue opening. Panels and modules installed on dwellings shall not be placed on the portion of a roof that is below an emergency escape and rescue opening. A pathway not less than 36 inches (914mm) wide shall be provided to the emergency escape and rescue opening.

R324.7 Ground-mounted photovoltaic systems. Ground-mounted photovoltaic systems shall be designed and installed in accordance with Section R301.

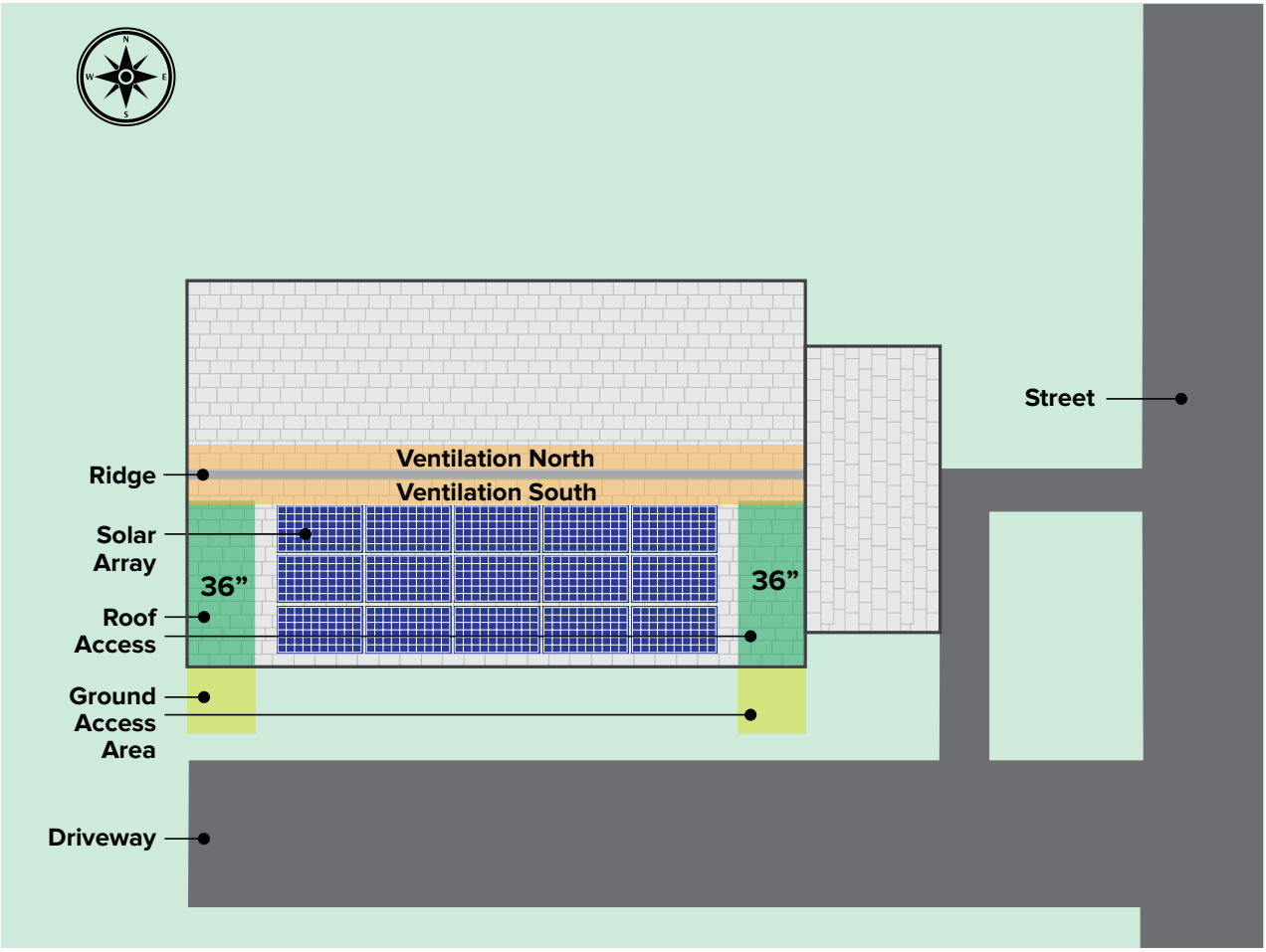
1.2. Possible Scenarios for Rooftop Access & Residential PV Installations

Typical single ridge residence (Figure 1)



This is a typical residential single ridge residential structure. We will use this as an example to further evaluate and explain the various options.

Typical single ridge residential (Figure 2)

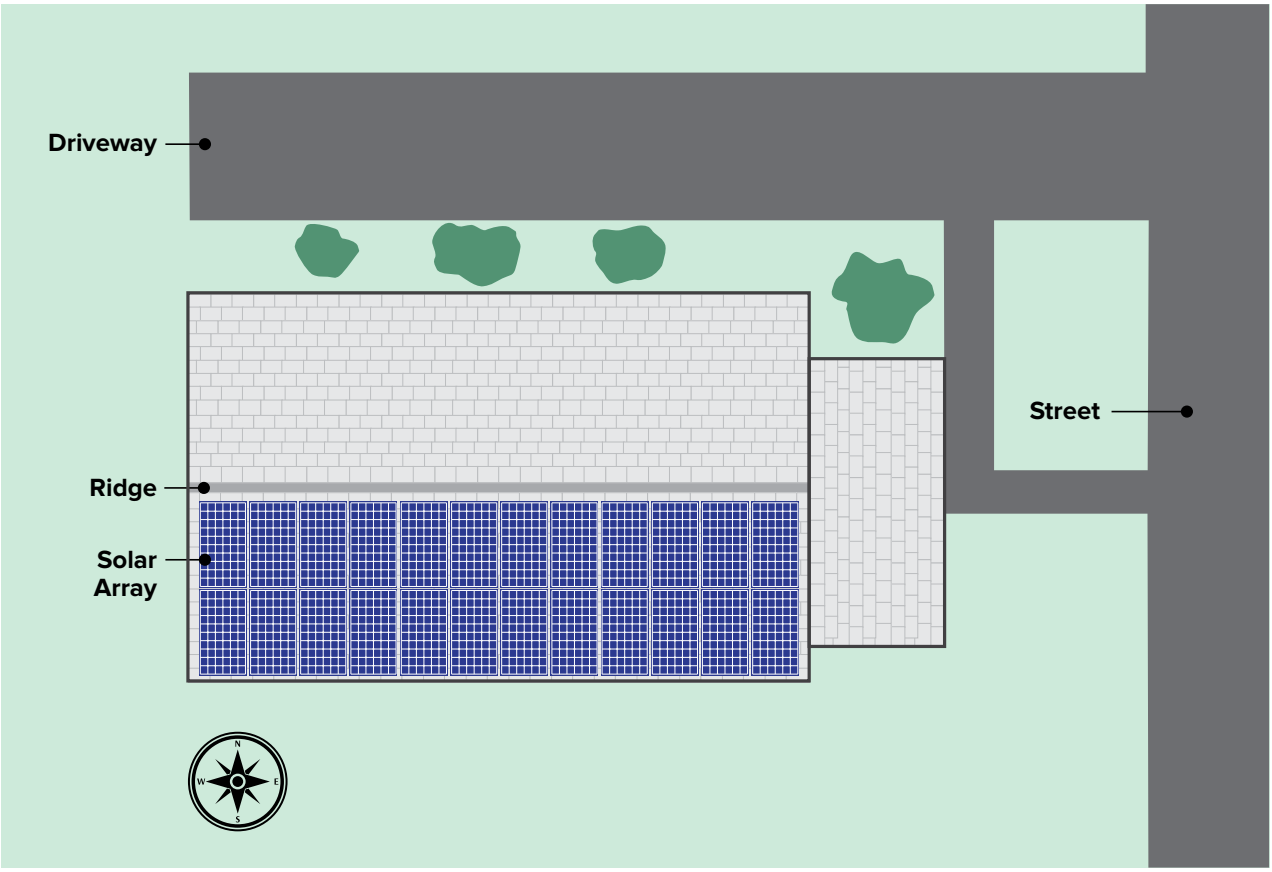


This is a typical single ridge residential structure that complies with the required setbacks, pathways and ventilation with no exceptions. The Emergency Escape and Rescue Opening (EERO) is on gable end.

Basic Requirements being met:

1. ***Not fewer than two pathways***
2. ***Not fewer than one pathway shall be provided on the street or driveway side of the roof***
3. ***For each roof plane with a photovoltaic array, a pathway not less than 36 inches wide (914 mm) shall be provided from the lowest roof edge to ridge***

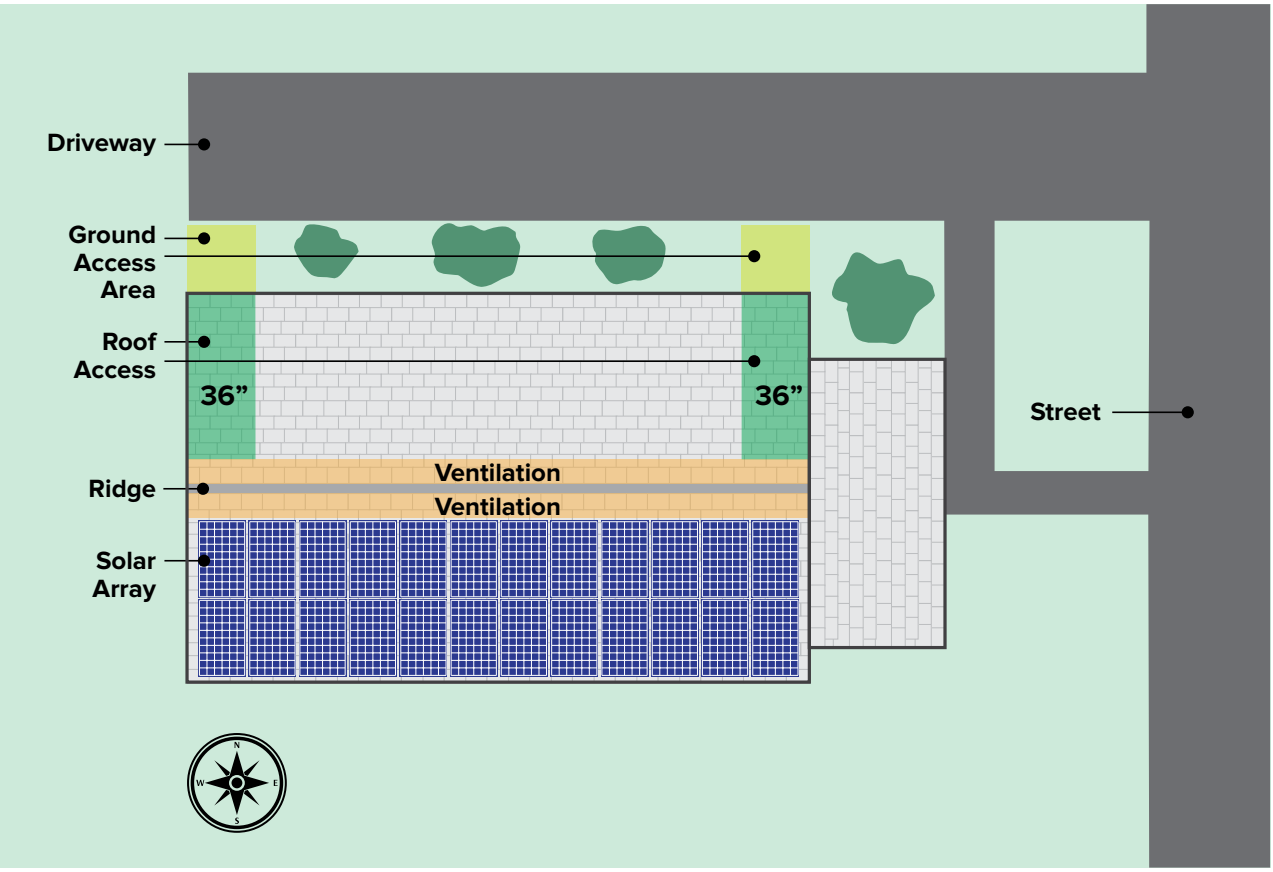
Typical single ridge structure where one or more exceptions apply (Figure 3)



The following exceptions apply to all residential structures:

1. ***Detached, nonhabitable structures, including but not limited to detached garages, parking shade structures, carports, solar trellises, and similar structures shall not be required to provide roof access***
2. ***Roof access, pathways and setbacks need not be provided where the building official has determined that rooftop operations will not be employed***
3. ***These requirements shall not apply to roofs with slopes of two units vertical in 12 units horizontal (17-percent slope) or less***

Single ridge residential access from opposing roof slopes (Figure 4)

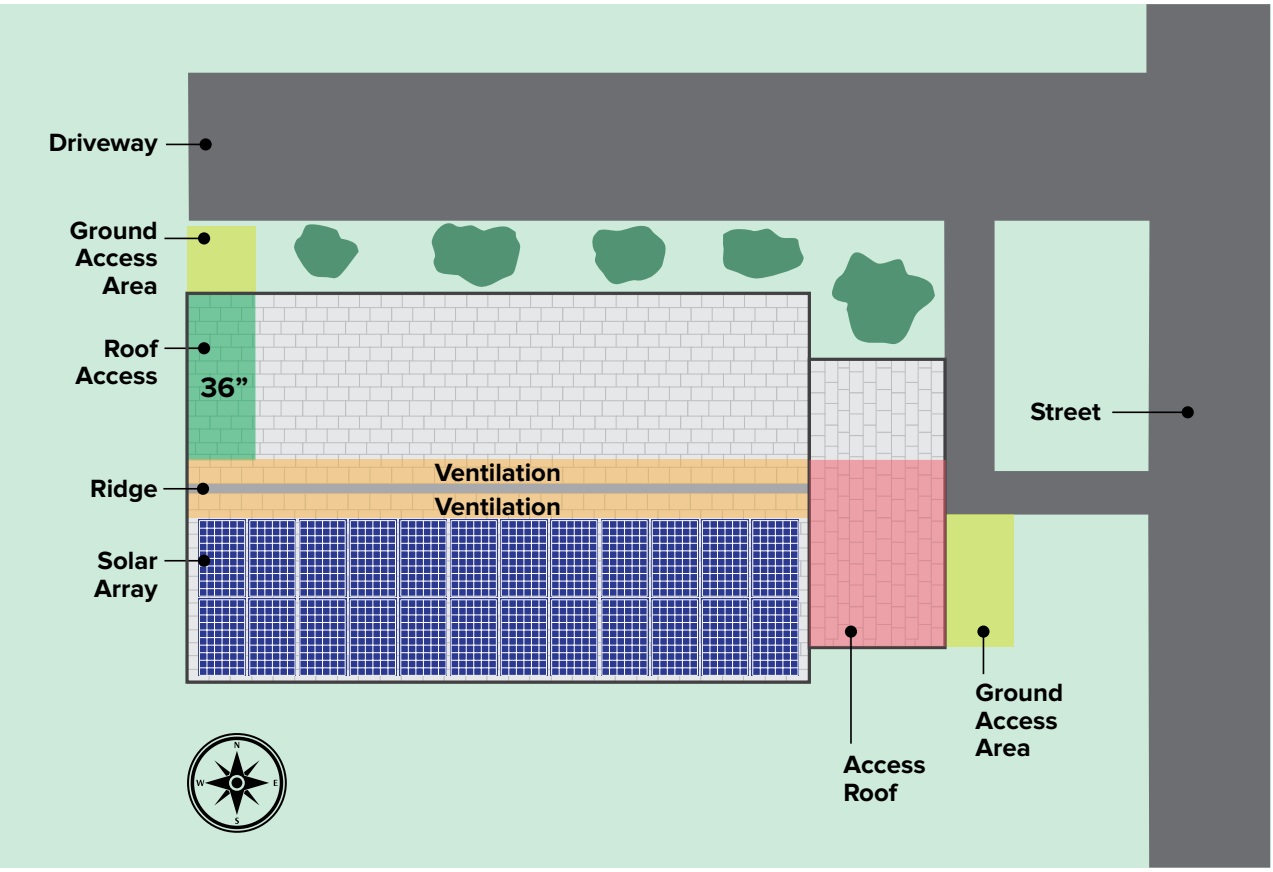


This is showing a single ridge with access from an opposing roof slope. The two access points and pathways allow two directions of access and egress which do not share a common truss or rafter.

Basic Requirements being met:

1. ***Not fewer than two pathways; one opposing roof slope***
2. ***Not fewer than one pathway shall be provided on the street or driveway side of the roof***
3. ***For each roof plane with a photovoltaic array, a pathway not less than 36 inches wide (914 mm) shall be provided from the lowest roof edge to ridge***

Single ridge residential roof access from adjacent roof (Figure 5)

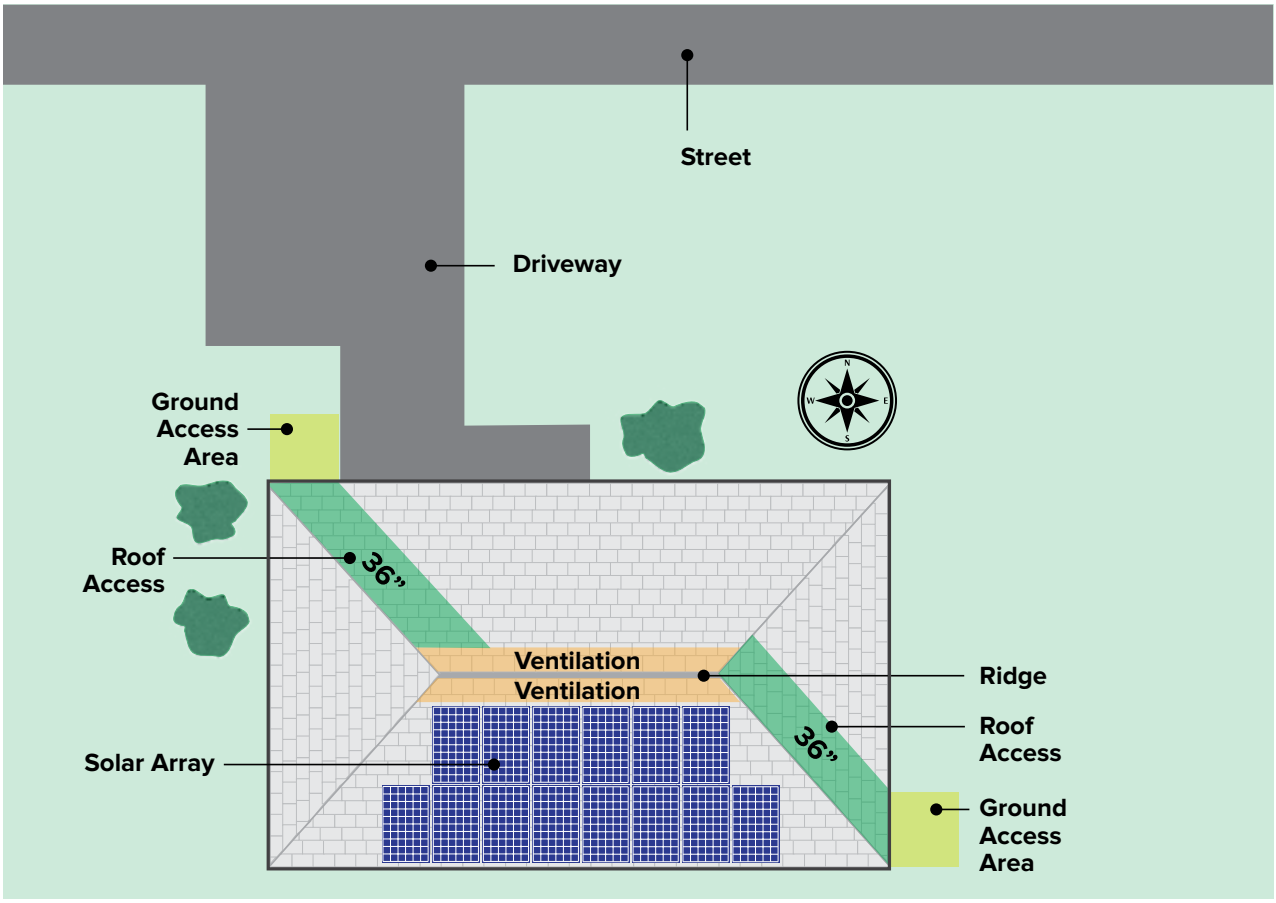


Similar to the previous figure, but with adjacent roof providing 36” wide minimum access to the ridge or peak of an adjoining roof surface containing solar panels, modules, or array. This figure shows that access is provided by the opposing and adjacent roof planes, but not the same roof plane as the array. This demonstrates how to use opposing and adjacent roofs to meet the requirements

Basic Requirements being met:

1. ***Not fewer than two pathways; one opposing roof slope, one adjacent roof***
2. ***Not fewer than one pathway shall be provided on the street or driveway side of the roof***
3. ***For each roof plane with a photovoltaic array, a pathway not less than 36 inches wide (914 mm) shall be provided from the lowest roof edge to ridge***

Hip Roof — venting with two roof pathways and ground access (Figure 6)



Typical hip roof showing venting location on both sides of the ridge and clear access pathway extending from the roof access point to the ridge or peak. Access and egress are from opposite sides and does not rely on the same roof truss or rafter and clear ground access.

Basic Requirements being met:

1. ***Not fewer than two pathways; one opposing roof slope, one adjacent roof***
2. ***Not fewer than one pathway shall be provided on the street or driveway side of the roof***
3. ***For each roof plane with a photovoltaic array, a pathway not less than 36 inches wide (914 mm) shall be provided from the lowest roof edge to ridge***

2. Nonresidential Roof Top Access – 2020 Fire Code of New York State

The following explains the 2020 Fire Code of New York requirements for access, pathways and ventilation for other than Group R-3. Many of the requirements are similar to those for residential structures (Group R-3) yet there are some differences as explained below.

2.1 Section 1204 Solar Photovoltaic Power Systems

1204.1 General. Solar Photovoltaic systems shall be installed in accordance with Sections 1204.2 through 1204.5, and the Building Code of New York State or Residential Code of New York State. The electrical portion of solar PV shall be installed in accordance with NFPA 70.

1204.2 Access and pathways. Roof access, pathways, and spacing requirements shall be provided in accordance with Sections 1204.2.1 through 1204.3.3. Pathways shall be over areas capable of supporting fire fighters accessing the roof. Pathways shall be located in areas with minimal obstructions, such as vent pipes, conduit or mechanical equipment.

Exceptions:

1. Detached, non-habitable Group U structures including, but not limited to, detached garages serving Group R-3 buildings, parking shade structures, carports, solar trellises, and similar structures.
2. Roof access, pathways and spacing requirements need not be provided where the fire code official has determined that rooftop operations will not be employed.

1204.2.1 Solar photovoltaic systems for Group R-3 buildings. Solar photovoltaic systems for Group R-3 buildings shall comply with Sections 1204.2.1.1 through 1204.2.1.3.

Exceptions:

1. These requirements shall not apply to structures designed and constructed in accordance with the Residential Code of New York State.
2. These requirements shall not apply to roof with slopes of 2 units vertical in 12 units horizontal or less.

1204.2.1.1 Pathway to Ridge. Not fewer than two 36-inch -wide (914mm) pathways on separate roof planes, from lowest roof edge to ridge, shall be provided on all buildings. Not fewer than one pathway shall be provided on the street or driveway side of the roof. For each roof plane with a photovoltaic array, not fewer that 36-inch-wide (914mm) pathway from lowest roof edge to ridge shall be provided on the same roof plan as the photovoltaic array, on an adjacent roof plane or straddling the same adjacent roof planes.

1204.2.1.2 Setback at ridge. For photovoltaic arrays occupying 33 percent or less of the plan view total roof area, a setback of not less than 18 inches (457mm) wide is required on both sides of a horizontal ridge. For photovoltaic arrays occupying more than 33 percent of the plan view total area, a setback of not less than 36 inches (457 mm) wide is required on both sides of a horizontal ridge.

1204.2.1.3 Alternate setback at ridge. Where an automatic sprinkler system is installed within the dwelling in accordance with Section 903.3.1.3, setbacks at the ridge shall conform to one of the following:

1. For photovoltaic arrays occupying 66 percent or less of the plan view total roof area, a setback of not less than 18 inches (457 mm) wide is required on both sides of a horizontal ridge.
2. For photovoltaics arrays occupying more than 66 percent of the plan view total roof area a setback of not less than 36 inches (914mm) wide is required on both sides of a horizontal ridge.

1204.2.2 Emergency escape and rescue openings. Panels and modules installed on Group R-3 buildings shall not be placed on the portion of a roof that is below an emergency escape and rescue opening. A pathway of not less than 36 inches (914mm) wide shall be provided to the emergency escape rescue opening.

1204.3 Other than Group R-3 Buildings. Access to systems for buildings, other than those containing Group R-3 occupancies, shall be provided in accordance with Sections 1204.3.1 through 1204.3.3

Exception: Where it is determined by the fire code official that the roof configuration is similar to that of a Group R-3 occupancy the residential access and ventilation requirements in section 1204.2.1.1 through 1204.2.1.3 are a suitable alternative.

1204.3.1 Perimeter Pathways. There shall be a minimum 6-foot-wide (1829 mm) clear perimeter around the edges of the roof.

Exception: Where either axis of the building is 250 feet (76 200 mm) or less, the clear perimeter around the edges of the roof shall be permitted to be reduced to a minimum width of 4 feet (1219 mm).

1204.3.2 Interior pathways. Interior pathways shall be provided between array sections to meet the following requirements:

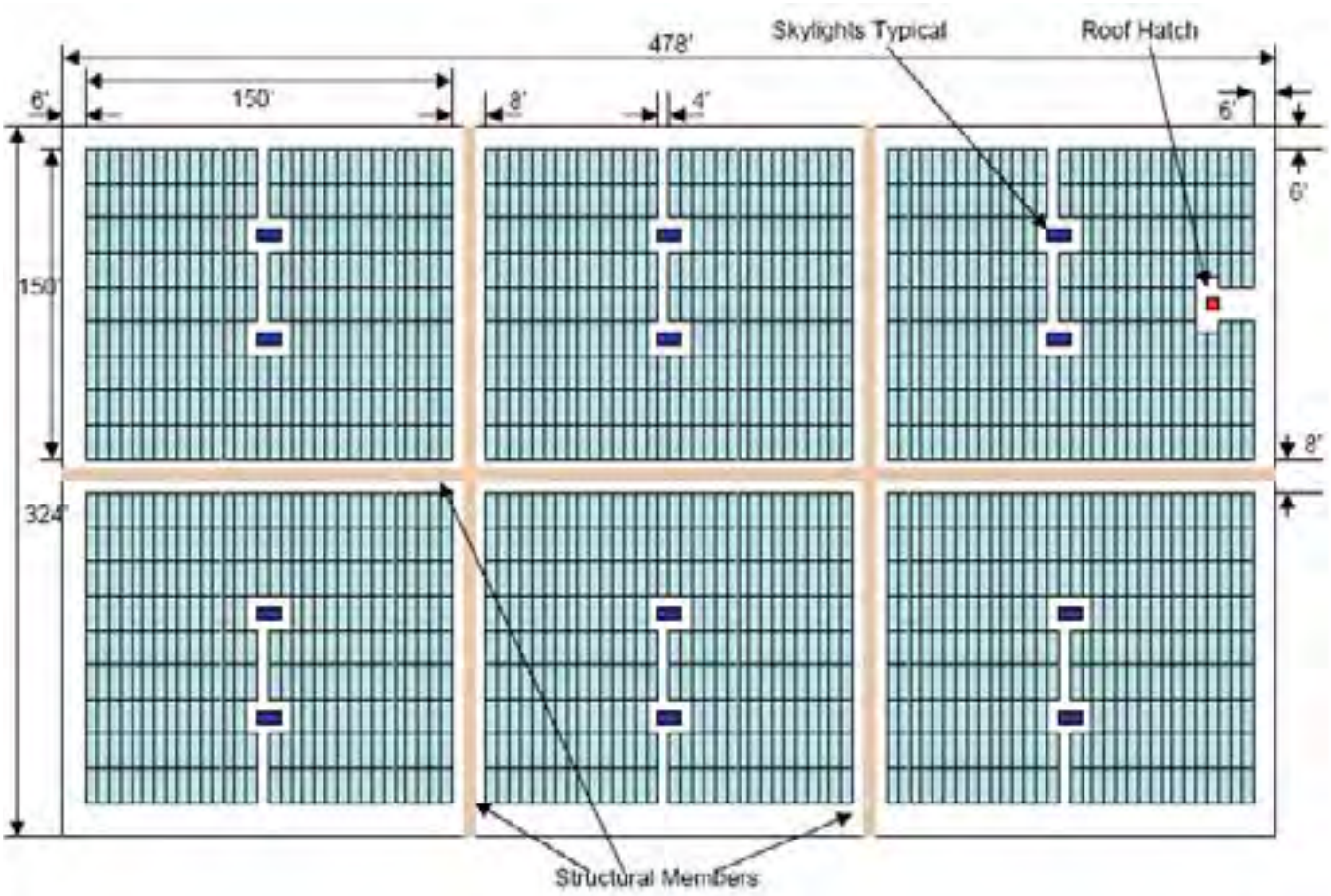
1. Pathways shall be provided at intervals not greater than 150 feet (45 720 mm) throughout the width and length of the roof.
2. A pathway not less than 4 feet (1219 mm) wide in a straight line to roof standpipes or ventilation hatches.
3. A pathway not less than 4 feet (1219 mm) wide around roof access hatches, with not fewer than one such pathway to a parapet or roof edge.

1204.3.3 Smoke ventilation. The solar installation shall be designed to meet the following requirements:

1. Where nongravity-operated smoke and heat vents occur, a pathway not less than 4 feet (1219 mm) wide shall be provided bordering all sides.
2. Smoke ventilation options between array sections shall be one of the following:
    2.1. A pathway not less than 8 feet (2438 mm) wide.
    2.2. Where gravity-operated dropout smoke and heat vents occur, a pathway not less than 4 feet (1219 mm) wide on not fewer than one side.
    2.3. A pathway not less than 4 feet (1219 mm) wide bordering 4-foot by 8-foot (1219 mm by 2438 mm) venting cutouts every 20 feet (6096 mm) on alternating sides of the pathway.

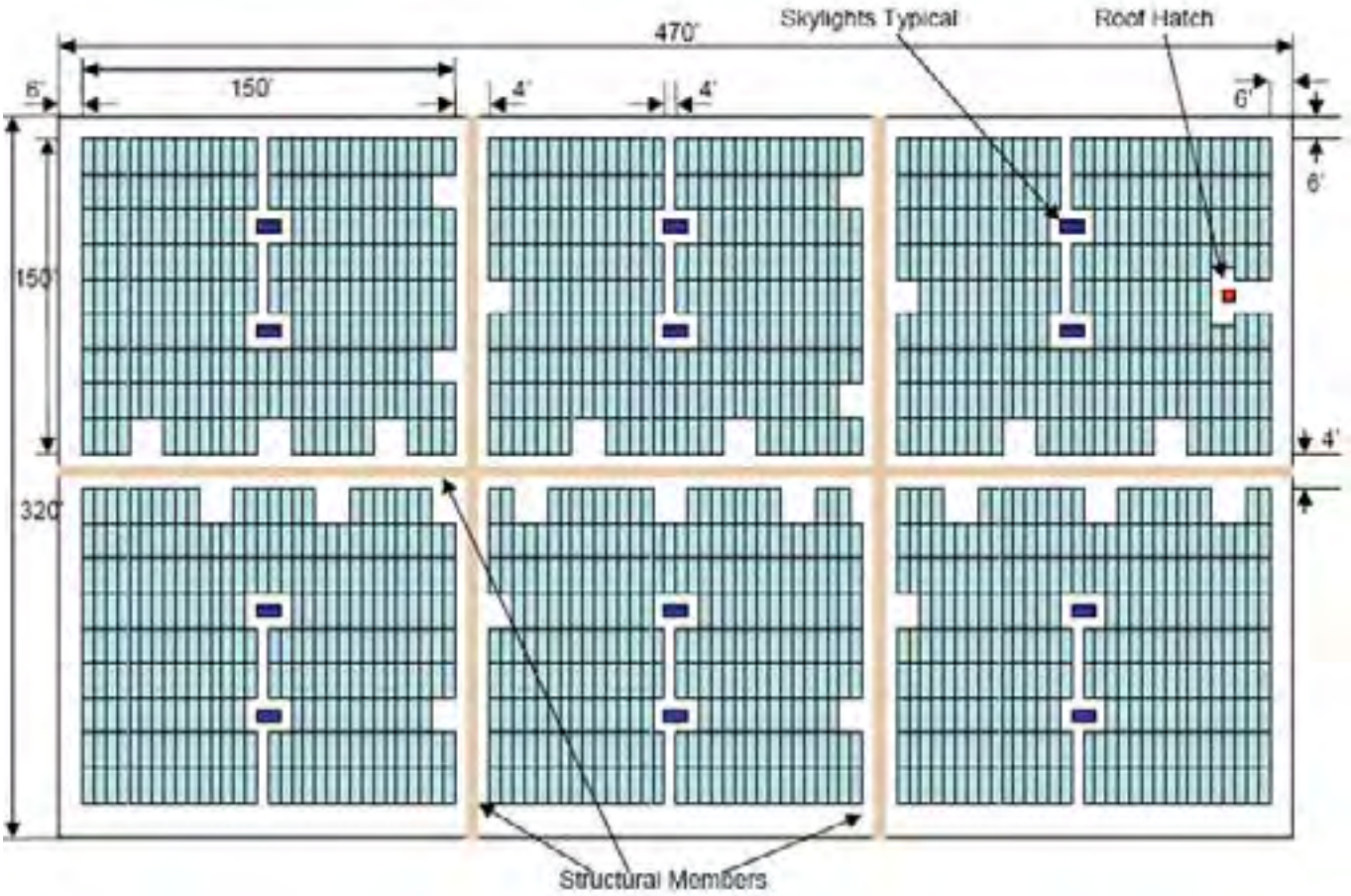
2.2 Possible Scenarios for Rooftop Access & Nonresidential PV Installations

Typical Nonresidential roof access greater than 250 feet (Figure 1)



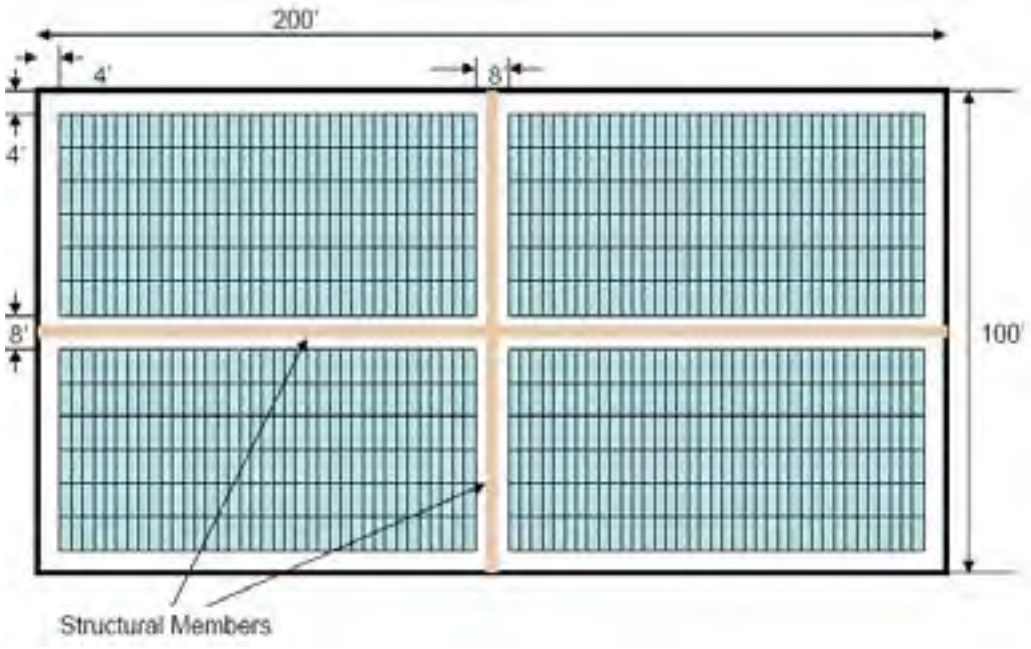
Nonresidential building with either axis greater than 250 feet, minimum perimeter pathway of 6 feet. Interior pathway not less than 8 feet, arrays of 150 feet maximum spacing with a 4-foot walkway to ventilation skylights. (not drawn to scale)

Typical Nonresidential roof access greater than 250 feet with 4 foot by 8-foot ventilation skylight space (Figure 2)



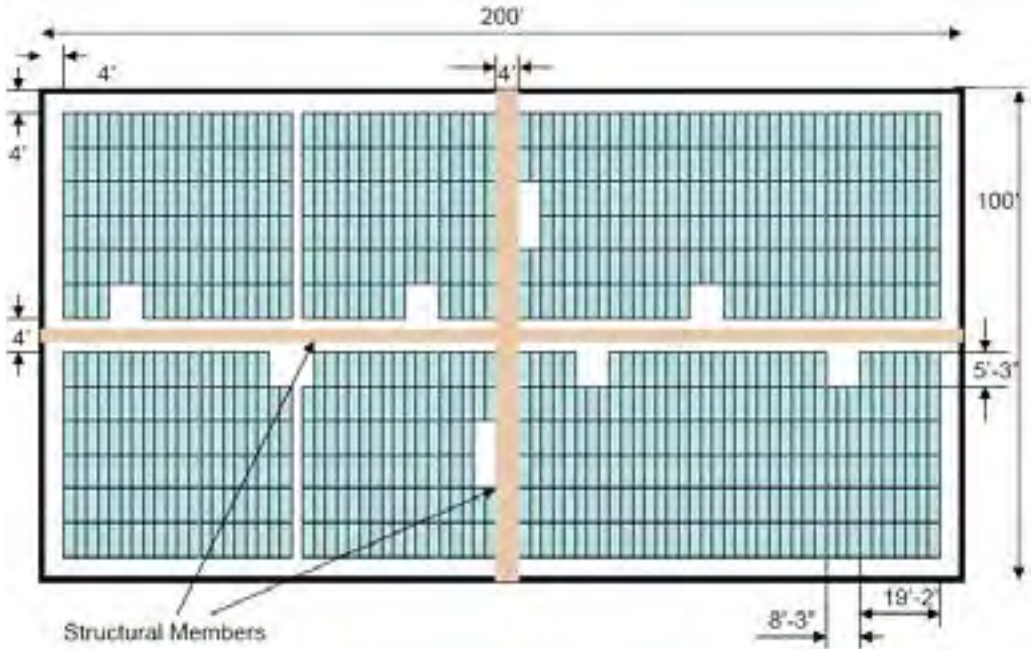
Nonresidential building with either axis greater than 250 feet, minimum perimeter pathway of 6 feet. Interior pathway not less than 8 feet, array of 150 feet maximum spacing between pathways, with a 4-foot by 8-foot walkway to ventilation space. (not drawn to scale)

Typical Nonresidential roof access less than 250 feet (Figure 3)



Nonresidential building with either axis less than 250 feet, minimum perimeter pathway of 4 feet. Interior pathway not less than 8 feet, array of 150 feet maximum spacing between pathways. (not drawn to scale)

Typical Nonresidential roof access less than 250 feet, with 4 foot by 8-foot ventilation space (Figure 4)



Nonresidential building with either axis less than 250 feet, minimum perimeter pathway of 4 feet. Interior pathway not less than 4 feet, array of 150 feet maximum spacing between walkways with 4 foot by 8-foot ventilation space. (not drawn to scale)

3. NYSERDA's Conclusion

The 2020 NYS Uniform Code allows the designers of photovoltaic systems several options and alternatives with regard to access, pathways and ventilation. These illustrations are offered as possible examples. It is not possible to show every possible scenario. It is however up to the judgment of the local code official to determine final compliance with the codes. Contractors, design professionals, and AHJ's must consider many ventilation scenarios and consider that:

1. A fire can break out **anywhere** in a building. Methods should consider fires occurring in less than ideal locations and during less than ideal conditions.
2. Emergency responders do not have x-ray vision. When approving an alternate ventilation method, AHJ's should consider the presence of attic storage atop a plywood base, finished attic space, or other such conditions that could deter ventilation operations.
3. Contractors and AHJ must remember that the direction and magnitude of a prevailing wind can affect the location of the ventilation opening.

   For example, a wind from the north places positive pressure on the northern roof slope and negative pressure on the southern slope. Under ideal conditions, a fire occurring in the northern portion of the building could necessitate a ventilation opening on the northern roof slope. A moderate wind from the north, however, could reduce the effectiveness of this opening due to positive wind pressures. In this case, it may be more effective to take advantage of the negative roof pressures and place the ventilation opening on the southern roof slope.
4. Design professionals, contractors, and AHJ must consider how the building is framed.

   For example, a building with a cathedral ceiling and a dividing wall along its peak would appear to necessitate ventilation openings on both slopes to accommodate fresh air in less than ideal locations.

State Environmental Quality Review (SEQR) for Solar

Background information and step-by-step instructions for municipalities in the SEQR process for large-scale solar energy systems

NEW YORK STATE OF OPPORTUNITY. | NYSERDA

Solar Guidebook for Local Governments
NYSERDA 17 Columbia Circle Albany, NY 12203

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Overview

When beginning solar development in your respective community, municipalities must participate in a State Environmental Quality Review (SEQR) for rooftop and ground-mount solar photovoltaic (PV) energy systems. Throughout this section, we provide readers with an overview on the SEQR process, with step-by-step instructions for large solar projects and the background on SEQR regulations.

Additionally, we include sections on preparing the environmental assessment form (EAF), agency coordination, solar developer guidance and a list of frequently asked questions (FAQs) regarding the process.

Intended Use

This document is intended to be used in conjunction with the New York State Department of Environmental Conservation (NYSDEC) SEQR Handbook, and has been reviewed by NYSDEC. References to specific sections of the SEQR Handbook are included as hyperlinks throughout this document. Users are encouraged to click on hyperlinked words to access relevant sections of the SEQR Handbook and other resources, such as the SEQR Regulations.[8]

To make this guidance document more relevant for solar energy projects supported by NYSERDA, it assumes that projects would be sited and designed in a manner that will avoid any significant environmental impacts. This by no means reduces the level of evaluation that is required to make a determination of significance. Rather, it assumes that the outcome of the rigorous process of review, coupled with good site selection on the part of the project developer and good guidance from the municipal board, will result in the avoidance of significant environmental impacts.

Users of this document are encouraged to first review Section 1, "SEQR Quick Reference Guide," which summarizes the steps a municipal board completing the SEQR process for a solar energy project must complete. This section includes references to other sections of this document if readers require more information. Other sections of this document provide step-by-step instructions to fill out SEQR forms and answer questions that are specific to solar energy systems.

NYSERDA offers free technical assistance to municipalities completing the SEQR process for solar energy systems. To request assistance, email cleanenergyhelp@nyserda.ny.gov.

1. SEQR Quick-Reference Guide

This quick-reference guide summarizes the SEQR process steps a Lead Agency must complete for a typical large-scale solar project. (This guidance document assumes a municipal board will serve as Lead Agency.)

Most solar projects in NY-Sun's Commercial and Industrial programs are 2-5 MW AC ground-mount systems. Ground-mount installations require approximately five acres of land per megawatt. As a result, these systems tend to be located in rural areas on flat to gently sloping farmland. Due to the limited area of impact associated with solar panel support structures, much of the land can be maintained as grassland between and beneath the panels.

Since solar developers prefer the most economical projects, they are incentivized to avoid significant impacts to wetlands, threatened and endangered species habitat, and archeological/historic sites. Solar installations do not require lighting and water and sewer services. They do not increase population and school-age children that can impact services provided by the community, county and State. Once constructed, the amount of traffic entering or leaving a solar installation is minimal. As a result, many of the environmental impacts are avoided by design or simply do not exist due to the nature of the installations. However, municipalities may still struggle with issues of land use compatibility, protection of agricultural lands and visual impacts.

[8] For example, the hyperlink "6 NYCRR 617.7(d)" in this document references Title 6, Chapter VI, Part 617, Section 7, Paragraph (d) of the New York Codes, Rules and Regulations.

1.1 Step-by-Step Instructions for Large-Scale Solar Projects

The following list describes the steps a municipal board serving as Lead Agency must complete for a large-scale solar project.

1.1.1 Step 1: Is the Project Subject to SEQR?

See Section 4.1 for more information

- There must be a discretionary action by a municipal board or council, such as a site plan review, to trigger the SEQR process (Actions subject to SEQR)
- If subject to SEQR, determine if the solar project is a:
  - > Type I Action (SEQR Handbook; NYS regulation)
  - > Type II Action (SEQR Handbook; NYS regulation)
  - > Unlisted Action (SEQR Handbook)
- The municipal board should undertake an initial review of the Applicant's site plan to look for obvious problems with environmental impacts and/or missing information.

1.1.2 Step 2: Prepare Environmental Assessment Form

See Section 4.3.2 for more information

- The Applicant prepares Part 1 of the Environmental Assessment Form (EAF) and provides it to the Lead Agency for review. Use the online version of the EAF linked to the NYSDEC database. Workbooks, which provide instructions and examples for preparing the EAF, are on the NYSDEC website.
- For Type I Actions, a Full EAF is required (FEAF, Part 1). If more than one agency is involved, coordinated review for the establishment of the Lead Agency is required.
- For Unlisted Actions, a Short EAF may be used, but the municipal board may require the use of a Full EAF if it feels that it will provide more complete information to evaluate possible impacts. Coordinated review is not required but may be advisable to facilitate the environmental review process and to obtain permits or approvals quickly.

1.1.3 Step 3: Initiate Coordinated Review

See Section 4.3.3 for more information

- To initiate coordinated review, the municipal board submits to all Involved Agencies Part 1 of the EAF, along with project plans and a coordination letter indicating the municipal board's intent to serve as Lead Agency.
- Lead Agency must be agreed upon within 30 days of transmitting this information.

1.1.4 Step 4: Identify and Evaluate Environmental Impacts

See Section 4.4.1 for more information

- The municipal board, serving as Lead Agency, prepares Parts 2 and 3 of the EAF. The Lead Agency may request technical assistance from the applicant to complete Part 2, but completion of Parts 2 and 3 are the responsibility of the Lead Agency.
- Parts 2 and 3 of the Short EAF (SEAF, Parts 2 & 3).
- Parts 2 and 3 of the Full EAF (FEAF, Part 2) and (FEAF, Part 3).

1.1.5 Step 5: Discuss Project Changes to Reduce Impacts

See Section 4.4.1 for more information

- This step is only required if the evaluation in Step 4 reveals "at least one significant adverse environmental impact." 617.4(a)(1)
- The municipal board reviews significant environmental impacts with the Applicant to determine if project changes can be incorporated to minimize or eliminate the impacts.

1.1.6 Step 6: Determine Significance of Environmental Impacts

See Section 4.4.2 for more information

- The municipal board determines the significance of the remaining environmental impacts identified in Step 4 by applying the criteria in the SEQR regulations and guidance in the SEQR Handbook.
- The municipal board makes a Determination of Significance, issuing a negative or positive declaration (Part 3 of the Short or Full EAF).

1.1.7 Step 7: File Negative Declaration

See Section 4.4.3 for more information

- Negative Declaration for an Unlisted Action - Filed with the Lead Agency

  > Conditioned Negative Declaration (See 6 NYCRR 617.7(d))

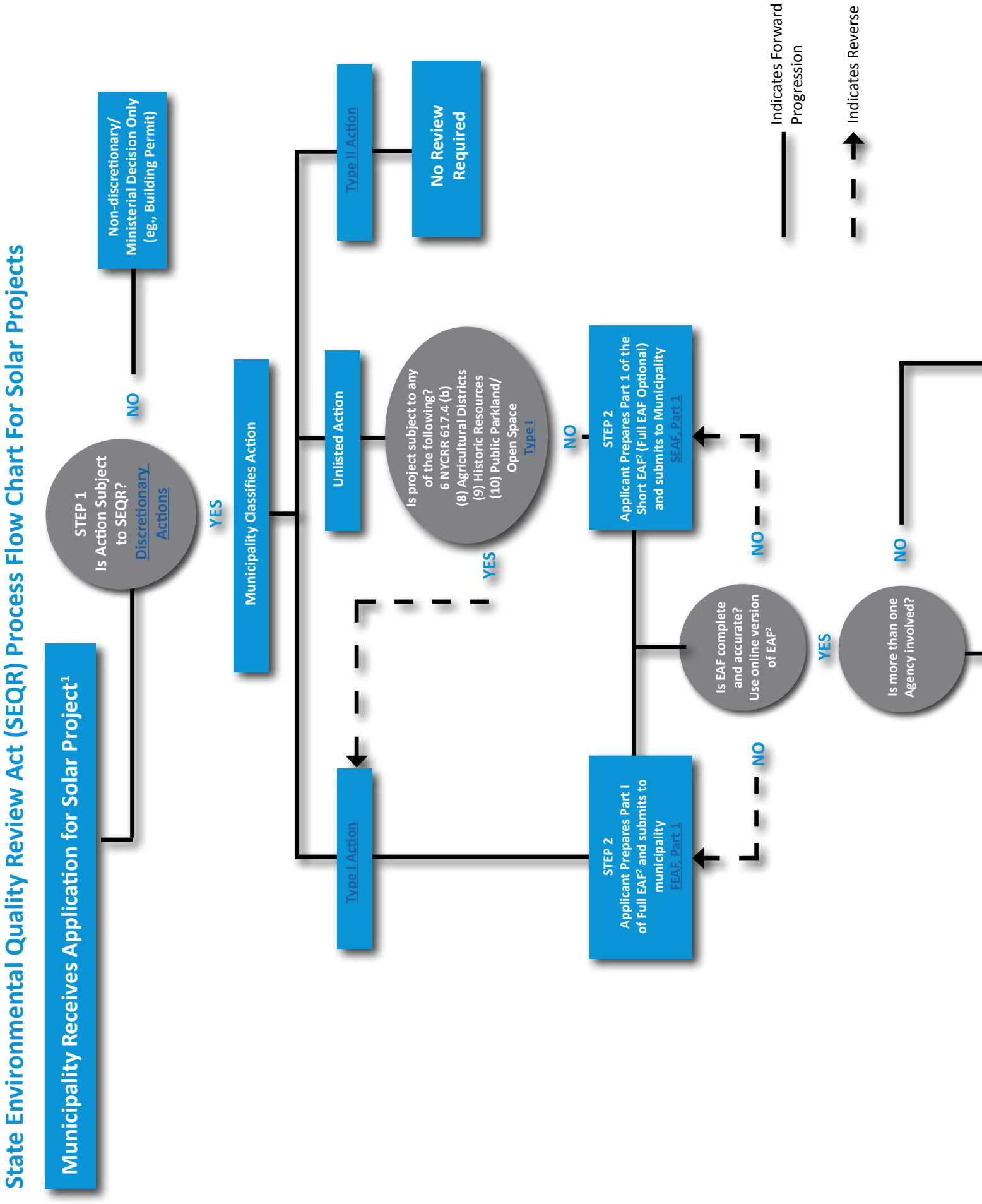
- Negative Declaration for a Type I Action

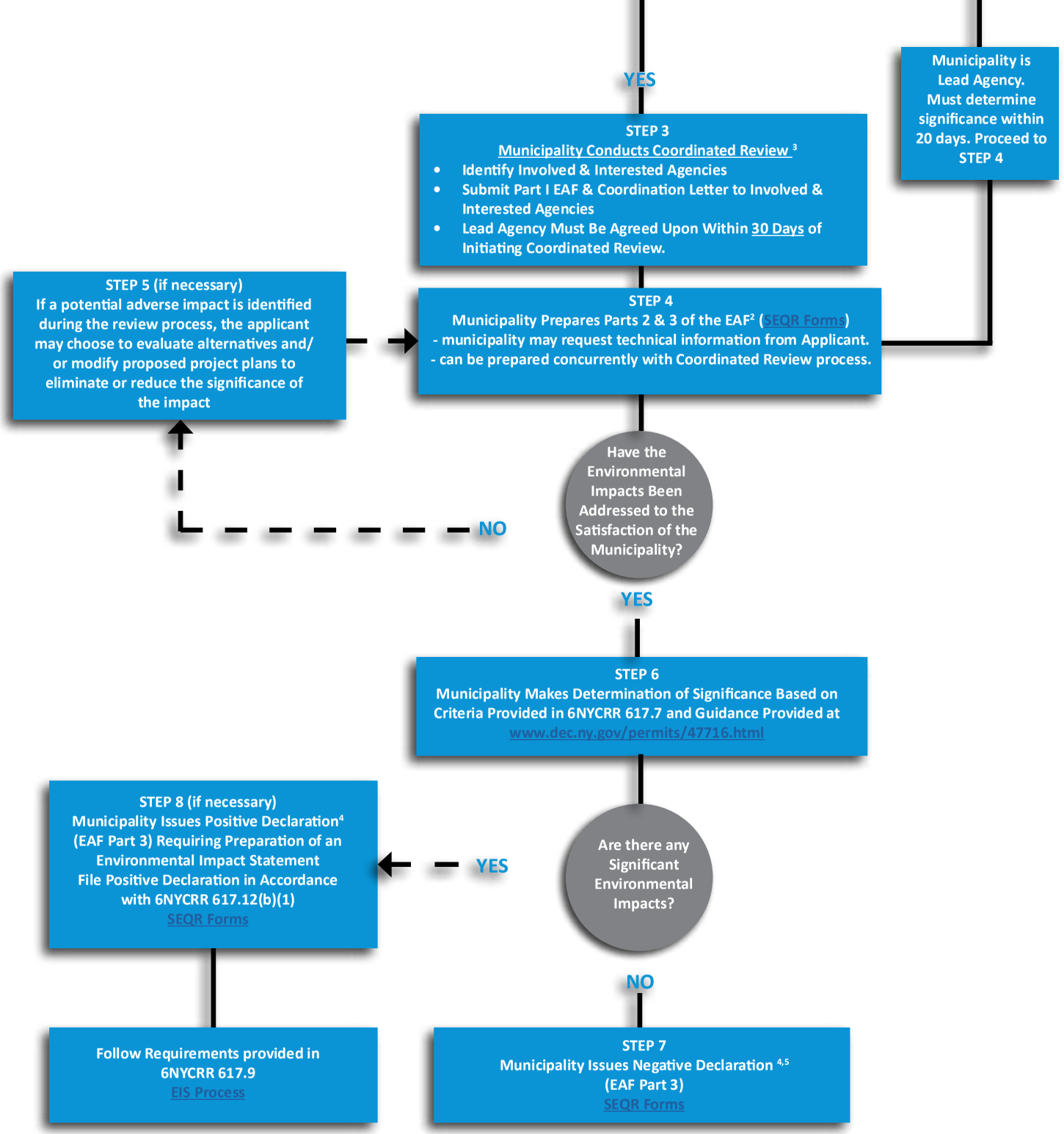
1.1.8 Step 8: Positive Declaration

See Section 4.4.3 for more information

- Issuing a Positive Declaration requires the preparation of an Environmental Impact Statement (EIS).
- Information on preparing an EIS is provided in the SEQR Handbook.

1.2 SEQR Flowchart for Large-Scale Solar Projects





SEQR Flow Chart Footnotes

1.) This process assumes that the municipality within which the project occurs will serve as Lead Agency.

2.) Environmental assessment forms and the EAF workbooks that provide guidance on preparing the forms can be found at http://www.dec.ny.gov/permits/6191.html

3.) Coordinated review is required for all Type I Actions involving more than one involved agency (6 NYCRR 617.6 (b) (2) (i). Although the SEQR regulations provide an option for Uncoordinated Review of Unlisted Actions, it is recommended that Coordinated Review be conducted for both Type I and Unlisted Actions involving more than one Involved Agency to complete SEQR in a timely manner. Uncoordinated review requires each agency to conduct their own SEQR process that can result in unnecessary delays.

4.) Memorialized by resolution during a meeting of the involved municipal board taking action on the project. Typically, the Board will prepare a resolution that declares Lead Agency and makes the Determination of Significance (Positive or Negative Declaration). This can all be done at the same meeting.

5.) Municipality Files Negative Declaration for a Type I Action with:

- Chief Executive Officer of the Political Subdivision in Which the Action is Located
- Lead Agency
- All Involved Agencies
- Any Person Requesting a Copy
- The Applicant
- Published in the Environmental Notice Bulletin

For Unlisted Actions, Negative Declaration is filed with the Lead Agency and Must be Made Available to the Public Upon Request

2. Background on the SEQR Regulations

2.1 Background

SEQR applies whenever a State or local government agency (including districts and special boards and authorities) must approve or fund a privately or publicly sponsored action. It also applies whenever an agency directly undertakes an action. For large-scale solar installations, the relevant agency is likely to be the local planning board or zoning board of appeals where a site plan application, or special use permit, is involved. The relevant agency may be the local legislative body if the project needs rezoning or that body has reserved for itself the authority to review particular applications.

SEQR requires all State and local government agencies to consider the environmental impacts and social and economic factors of specified actions. The State and local agencies must consider the environmental significance of any action they have discretion to approve, fund or directly undertake. SEQR regulations provide a systematic process to identify and consider environmental factors early in the planning of an action, allowing the opportunity to modify projects to avoid adverse impacts.

The SEQR process begins as soon as an agency or local government receives an application for an action or funding. The relevant municipal board must first determine if an action is a Type I, Type II or Unlisted Action. Type I and Unlisted Actions require further review under SEQR; Type II Actions require no further action under SEQR.

2.2 Types of SEQR Actions

Type I Actions are defined in SEQR regulations as those likely to have "at least one significant adverse environmental impact." Type I Actions are listed in the statewide SEQR regulations, or can be listed in an Involved Agency's SEQR procedures. The Type I list contains numeric thresholds; any actions that equal or exceed one or more of the thresholds results in a Type I designation. A Type I Action always requires the completion of a Full EAF and coordinated review if more than one agency is involved, but a Type I designation does not mean that an Environmental Impact Statement must be prepared.

Type II Actions are those with no significant adverse environmental impact, or ones that have been statutorily exempted from SEQR review. Type II Actions do not require preparation of an EAF, a negative or positive declaration, or an EIS. Any action or class of actions listed as Type II in the SEQR regulations requires no further processing under SEQR.

Unlisted Actions are those that do not appear on the Type I nor Type II lists. In many instances, this requires interpretation of the regulation because not all projects fit neatly into the classifications provided in the regulations but may still meet the intent. This interpretation is at the discretion of the Lead Agency and Involved Agencies. However, because these interpretations can be legally challenged, municipalities should review the SEQR Handbook guidance (Type I Actions and Type II Actions) and seek legal counsel as necessary.

Unlisted Actions represent the largest category of actions to be reviewed under SEQR. Although these actions are less likely to have a significant adverse environmental impact than Type I actions, this does not imply that an Unlisted Action will never have such an impact.

Review of an Unlisted Action may proceed using a Short EAF (see Section 5.0 for tips on preparing the EAF). A reviewing agency may require at its discretion that a Full EAF be completed and coordinated review procedures be followed. Examples include:

- There are potential adverse impacts that could be more thoroughly investigated by using a Full EAF and coordinating review; or
- An agency has special concerns regarding a sensitive resource within its jurisdiction; or
- An agency is uncertain about the concerns of other Involved Agencies and decides to coordinate review; or
- The action falls just below the applicable Type I threshold; or
- Anytime the agency judges that the Type I procedures would be more helpful.

2.3 NYSDEC Amendments to the SEQR Regulations Effective January 1, 2019

Under current SEQR regulations, the majority of commercial, ground-mount solar projects are considered Unlisted or Type I Actions. NYSDEC has adopted amendments to SEQR to be effective January 1, 2019 that impact the review procedures of solar projects. The Department adopted a new Type II category, to be codified at 6 NYCRR § 617.5 (c) (14) & (15), to read as follows:

2.3.1 627.5(14)

Installation of solar energy arrays where such installation involves 25 acres or less of physical alteration on the following sites:

(i) closed landfills;

(ii) brownfield sites that have received a Brownfield Cleanup Program certificate of completion ("COC") pursuant to ECL § 27-1419 and 6 NYCRR § 375-3.9 or Environmental Restoration Project sites that have received a COC pursuant to 6 NYCRR § 375-4.9, where the COC under either program for a particular site has an allowable use of commercial or industrial, provided that the change of use requirements in 6 NYCRR § 375-1.11(d) are complied with;

(iii) sites that have received an inactive hazardous waste disposal site full liability release or a COC pursuant to 6 NYCRR § 375-2.9, where the Department has determined an allowable use for a particular site is commercial or industrial, provided that the change of use requirements in 6 NYCRR § 375-1.11(d) are complied with;

(iv) currently disturbed areas at publicly-owned wastewater treatment facilities;

(v) currently disturbed areas at sites zoned for industrial use; and

(vi) parking lots or parking garages;

2.3.2 617.5(15)

Installation of solar energy arrays on an existing structure provided the structure is not:

(i) listed on the National or State Register of Historic Places;

(ii) located within a district listed in the National or State Register of Historic Places;

(iii) been determined by the Commissioner of the Office of Parks, Recreation and Historic Preservation to be eligible for listing on the State Register of Historic Places pursuant to sections 14.07 or 14.09 of the Parks, Recreation and Historic Preservation Law; or

(iv) within a district that has been determined by the Commissioner of the Office of Parks, Recreation and Historic Preservation to be eligible for listing on the State Register of Historic Places pursuant to sections 14.07 or 14.09 of the Parks, Recreation and Historic Preservation Law.

Projects that meet the criteria will require no further SEQR review.

3. SEQR Process Overview

This section provides additional information on how to direct solar projects through the SEQR process. The SEQR regulations and the SEQR Handbook provide detailed guidance on the entire SEQR process and should be referenced for any specific questions regarding applicability, process and legal concerns.

3.1 Defining the SEQR Action

Upon receiving an application for a solar project, the relevant municipal board must determine whether SEQR applies to the project (will there be discretionary decision-making on the part of the municipal board) and, if so, the "type" of SEQR action that will be undertaken. This part of the process is Step 1 in the Quick-Reference Guide.

3.1.1 SEQR Action

The first step in the SEQR process is to determine whether the solar project is subject to SEQR. For SEQR to apply, there must be an action on the part of a State, county or local governmental agency to approve, permit, fund, or directly undertake a project. Relative to the approval of solar projects, it must be determined if the project requires a discretionary action (SEQR Actions) on the part of the local board having jurisdiction. For most commercial ground- mount facilities, the action would be a site plan review by the local planning board. The process could also involve a special use permit or even a zoning change, which is less likely. For rooftop installations and residential projects, which are common non-discretionary actions, a building permit may be the only approval required. Non-discretionary actions are not subject to SEQR, but all discretionary actions are subject to SEQR. There may be a circumstance where the project requires only a building permit and, therefore, no requirement for SEQR review by local government, but requires a permit from the State (for example, a wetland permit). Under these circumstances, the State agency would have to address SEQR, but the local municipal board would not.

3.1.2 Classifying the SEQR Action

As identified in Section 3.2, there are three types of SEQR actions: Type I, Type II and Unlisted. Classifying actions by type focuses largely on the size of the project and to some extent the proximity to sensitive environmental or social-cultural resources. Thresholds are defined for Type I and Type II actions. Actions not falling under one of these categories are referred to as Unlisted.

Thresholds that would classify a solar project as a Type I action include:

- The physical alteration of 10 acres or the expansion of any existing solar facility by 5 acres or more.
- An Unlisted Action that includes a nonagricultural use occurring wholly or partially within an Agricultural District (certified pursuant to Agriculture and Markets Law, article 25-AA, sections 303 and 304) and exceeds 25 percent of any threshold established in this section. (For example, the threshold for physical alteration of 10 acres would be reduced to 2.5 acres in an Agricultural District, so any solar installation within an Agricultural District requiring more than 2.5 acres of land would be elevated to a Type I action.)
- An Unlisted Action (unless the action is designed for the preservation of the facility or site) occurring wholly or partially within, or substantially contiguous to, any historic building, structure, facility, site or district or prehistoric site that is listed on the National Register of Historic Places, or that has been proposed by the New York State Board on Historic Preservation for a recommendation to the State Historic Preservation Officer for nomination for inclusion in the National Register, or that is listed on the State Register of Historic Places. See the definition of "substantially contiguous."
- An Unlisted Action, that exceeds 25 percent of any threshold in this section, occurring wholly or partially within or substantially contiguous to any publicly owned or operated parkland, recreation area or designated open space, including any site on the Register of National Natural Landmarks pursuant to 36 CFR part 62, 1994 (see section 617.17 of this Part). See the definition of 'substantially contiguous'.

See a full list of Type I actions at 617.4.

It is anticipated that most commercial ground-mount solar projects will be classified as Unlisted or Type I Actions. Rooftop projects that involve discretionary decision-making (more than a building permit) are likely to be Unlisted Actions, unless an historic structure is involved. However, the following Type II action might apply:

- Construction or expansion of a primary or accessory/appurtenant, nonresidential structure or facility involving less than 4,000 square feet of gross floor area and not involving a change in zoning or a use variance and consistent with local land use controls, but not radio communication or microwave transmission facilities (6 NYCRR 617.5(c)(7)).

Small residential projects may meet the thresholds for the following Type II action:

- Construction, expansion or placement of minor accessory/appurtenant residential structures, including garages, carports, patios, decks, swimming pools, tennis courts, satellite dishes, fences, barns, storage sheds or other buildings not changing land use or density (6 NYCRR 617.5(c)(10)).

The complete list of Type II actions is found at 6 NYCRR 617.5. While not required, it is a recommended practice that the Lead Agency add a note to the project file indicating that the project was considered under SEQR and met all the requirements for a Type II action.

3.2 SEQR Roles and Responsibilities

3.2.1 Lead Agency

This guidance document assumes that the municipal board exercising a discretionary approval for a large-scale solar project will serve as Lead Agency. The Lead Agency has the greatest control over the environmental review process and the greatest responsibility for ensuring SEQR procedures are thoroughly and appropriately followed. More information on Lead Agency responsibilities is available in Chapter 3 of the SEQR Handbook. Decisions based on limited or incomplete information can lead to legal challenges, especially for controversial projects, based on claims of an arbitrary and capricious decision. The potential for a "bad" decision on the part of the Lead Agency can be minimized by following accepted industry standards for investigations, requiring the preparation of the EAF using NYSDEC's on- line version (that is linked to important environmental data bases that auto-fill portions of the form (see Section 5 for more information on preparing EAFs)), and seeking the review or advice of resource agencies, such as NYSDEC and other State, regional and local agencies, some of which may be involved in the project.

The Lead Agency is also responsible for the following:

- Classifying the project (Type I, Type II, or Unlisted Action).
- Selecting the appropriate EAF for evaluation of the impacts.
- Conducting Coordinated Review with Involved and Interested Agencies, if applicable.
- Preparation of Parts 2 and 3 of the EAF. (The applicant may provide technical assistance to the Lead Agency, but completion of Parts 2 and 3 are the responsibility of the Lead Agency.)
- Issuance of a Determination of Significance (a Positive or Negative Declaration).
- Filing notices.
- If a Positive Declaration is issued, follow requirements in 6 NYCRR 617.9 regarding the preparation of an Environmental Impact Statement.

3.2.2 Involved Agency

An Involved Agency is any agency directly undertaking the project, or one that is responsible for approval, permitting or funding. In the case of solar projects subject to SEQR, the municipal board would likely have the greatest review authority over the project. Other Involved Agencies could include NYSERDA, given its role providing financial incentives, and other State and county agencies that would need to approve, permit or fund the project. If coordinated review is required, the municipal board would likely initiate the coordinated review process with the Involved Agencies to confirm its role as the Lead Agency. It is the responsibility of the Involved Agencies to review Part 1 of the EAF and provide their guidance on potential impacts. See Section 4.3.1 for a list of common Involved Agencies.

If the SEQR process proceeds under Uncoordinated Review, each Involved Agency must conduct their own environmental review (preparation of an EAF) and make a Determination of Significance. No Involved Agency may undertake an action (approval, funding, permitting) without completing SEQR. If any Involved Agency issues a Positive Declaration, a coordinated review will be required.

3.2.3 Interested Agency

An Interested Agency is any agency that may have an interest in a project or its environmental review process outcome, but is not directly undertaking, approving, permitting or funding the project. Interested Agencies do not have a

required role in the coordinated review process and cannot be a Lead Agency. Interested Agencies will often provide information pertinent to the resource with which they are concerned and serve as a valuable resource in the Lead Agency's process of determining the significance of impacts

Interested Agencies may have a permit or related approval to issue for the project, but it is non-discretionary. Examples of this might include a NYS Department of Transportation Highway Work Permit, or county planning board review under Section 239-m of the general municipal code. Another common Interested Agency is the NYS Office of Parks, Recreation and Historic Preservation (also referred to as the State Historic Preservation Office, or SHPO). This office reviews projects for their impacts on cultural resources and issues their determination, which is not binding on the Lead Agency. Although the SEQR process does not apply to federal agencies, they can be Interested Agencies if the project involves federal permits. The U.S. Army Corps of Engineers is a well-known Interested Agency due to its jurisdiction over wetlands and Waters of the United States. See Section 6 for more information on agency coordination and Section 4.3.1 for a list of common Interested Agencies.

3.2.4 The Public

The SEQR regulations do not require public input, but the SEQR process provides an opportunity for public input when a Positive Declaration is issued. Local laws determine the level of public input. SEQR documentation (EAF, Positive or Negative Declaration) must at least be filed with the Lead Agency and be available for public review upon request. The public will have a limited role in the SEQR process for most solar projects. If the SEQR review for a project results in a Negative Declaration, there is no specific step in the SEQR process that provides an opportunity for public review and feedback on the environmental impacts of the project, other than the Determination of Significance being filed with the Lead Agency and made publicly available upon request. However, all projects that require site plan review typically require a public hearing. The public can then review the environmental impacts and other documentation and provide comments. Since a municipal board usually serves as Lead Agency, this process may help to shape the Determination of Significance.

3.2.5 Applicant

The Applicant's role in the SEQR process for a solar project is extensive. It is the Applicant's responsibility to provide complete and accurate information on project impacts. This may require numerous studies and coordination with agencies and other experts. The Applicant must prepare Part 1 of the EAF and provide it to the Lead Agency for its review. In cases where the Lead Agency does not possess the necessary expertise to complete Parts 2 and 3 of the EAF, it may request technical assistance from the Applicant, or contract with a third-party consultant to assist in this review. However, the Lead Agency is ultimately responsible for its own analysis and all decisions made.

The Applicant should also remain flexible and creative in the site design process to avoid significant environmental impacts. This may require upfront work such as a wetland delineation, habitat assessment, and cultural resources survey. A pre-application meeting with municipal officials is recommended to identify any concerns of the municipality early-on in the process. Applicants can then remove from their plans any problems that would lead to one or more significant environmental impacts and a Positive Declaration, which would require the completion of the EIS.

3.3 Establishing Lead Agency

For all Type I actions involving more than one Involved Agency and Unlisted Actions where coordination with the Involved Agencies is desired, Lead Agency must be established through the Coordinated Review process (Step 3 of the SEQR process). When there is only one Involved Agency or when the Uncoordinated Review option is chosen for Unlisted Actions, there is no coordination process. This section discusses these processes in more detail.

3.3.1 Identify Involved and Interested Agencies

Regardless of whether Coordinated or Uncoordinated Review is required or chosen, it is good practice to identify all the Involved Agencies along with their roles in the permitting, funding, or approval process for the project. Preparation of Part 1 of the EAF and the associated research is helpful in identifying what additional permits and approvals might be needed. It is the Applicant's responsibility to assist the municipal board in identifying the involved and Interested Agencies. A typical list of involved and Interested Agencies includes the following:

- NYSDEC – permits for wetlands, streams and threatened and endangered species.
- NYS Department of Transportation – work on State roads and right of way.
- NYS Department of Agriculture and Markets – impacts to farmland within an Agricultural District.
- NYS Department of State – work within the Coastal Zone.
- NYS Office of Parks, Recreation and Historic Preservation (State Historic Preservation Office): consultation for historic and archeological resources.
- U.S. Army Corps of Engineers: permits for wetlands and waters of the U.S. (Note: federal agencies not subject to SEQR but may serve as an Interested Agency)
- U.S. Fish and Wildlife Service: consultation for threatened and endangered species.
- County Planning & Farmland Protection Board: Section 239-m referral and Agricultural District impacts.
- New York City Department of Environmental Protection: work within the NYC Watershed.
- NYSERDA: funding via NY-Sun financial incentives.

3.3.2 Prepare the Environmental Assessment Form (EAF)

Step 2 of the SEQR process is likely to be combined with Step 1 in the form of a site plan application. Preparation of Part 1 of the EAF is typically required as part of the site plan review application requirements. If the municipal board has not already, it would be very helpful for future applications to provide guidance on the contents for a site plan application and any special considerations for SEQR. For example, some communities require the preparation of a Full EAF regardless of the classification of the project (Type I or Unlisted).

The Applicant will prepare Part 1 of the EAF. Unless directed otherwise, the Applicant will use the Short EAF for Unlisted Actions and a Full EAF for Type I Actions. Information on how to prepare the EAF is provided in Section 5.

Communication between the Applicant and the municipal board should begin early on so the Applicant is clear on what is required for the application. The municipal board should provide an initial determination on the type of SEQR action (Type I, Type II or Unlisted) so the applicant can submit the correct EAF.

3.3.3 Coordinated Review

Step 3 of the SEQR process is to designate the Lead Agency. If the municipal board is the only Involved Agency, there is no required coordination. Unlisted Actions with multiple agencies can be progressed under Uncoordinated Review, whereby each agency is responsible for completing SEQR on their own (described further in Section 4.4.3), or can proceed under Coordinated Review. A project will likely proceed in a more efficient manner by using Coordinated Review for projects with multiple Involved Agencies. For Type I Actions, Coordinated Review is required.

The municipal board reviewing the project would initiate Coordinated Review by submitting Part 1 of the EAF along with a project location map, project plans, and a letter indicating the municipal board's intent to serve as Lead Agency to all Involved Agencies, requesting concurrence. It is common practice to include the Interested Agencies in this submittal. The Interested Agencies may provide comments but they cannot participate in the establishment of Lead Agency. The process can take up to 30 days to complete. By regulation, a Lead Agency must be agreed upon within 30 days of the Involved Agencies receiving the request. The process can be expedited if desired and agreed to by the Involved Agencies. Some suggestions include:

- Include a statement at the end of the Lead Agency request letter that states the undersigned Involved Agency has no objection to the municipal board serving as Lead Agency and provide a signature line.
- Contact the Involved Agencies and obtain a response by email.

If an Involved Agency does not respond to the request within 30 days, it can be assumed that the Agency has no objections. To keep a clear record of the SEQR process and the decisions being made, it is important for the municipal board to memorialize the Lead Agency designation by resolution.

Challenges to Lead Agency are rare. If a challenge occurs, many times the Involved Agencies can resolve the dispute by direct communication. If after 30 days there is no agreement on Lead Agency, then the disputing parties can request that the NYSDEC Commissioner designate Lead Agency in accordance with 6 NYCRR 617.6(b)(5).

3.3.4 Uncoordinated Review

For an Unlisted Action, the municipal board may proceed with the SEQR process on its own via Uncoordinated Review. Each Involved Agency must complete their own SEQR process. The benefit of this approach includes less effort on the part of the municipal board and the potential to bypass the 30-day period to establish Lead Agency. This approach may be desirable when timing is a critical factor for local approvals and funding deadlines. Conversely, this approach could lead to a longer approval process for the project due to the need for each agency to complete SEQR on their own. For projects with several Involved Agencies, this approach is not recommended.

3.4 Determine Significance

The Lead Agency is responsible for evaluating the impacts of a project and must complete its own analysis by preparing Parts 2 and 3 of the EAF. The Lead Agency may request technical assistance from the Applicant or contract with a third-party consultant, but the Lead Agency is ultimately responsible for its own analysis and decisions. If the Applicant has the expertise, either directly or through a consultant, they may want to consider preparing Parts 2 and 3 immediately following the preparation of Part 1 to provide technical assistance to the Lead Agency concerning the size of impacts.

It is not necessary to wait until Lead Agency has been established. The municipal board will have the responsibility of reviewing the Applicant's documentation and ensuring that a thorough evaluation has been performed. Based on the results of Parts 2 and 3, the municipal board must determine if any of the impacts are significant, which will lead to the issuance of either a Positive Declaration (EIS required) or a Negative Declaration (SEQR process ends).

3.4.1 Prepare Parts 2 and 3 of the EAF

Step 4 of the SEQR process involves the evaluation of the impacts of the project on the environment through the preparation of Parts 2 and 3 of the EAF. Details on how to prepare these forms are provided in Section 5. Impact evaluation can be highly subjective and biased. It is the municipality's duty to protect the health, safety and welfare of the community, and as such it should carefully review the results of this process. NYSDEC's EAF Workbook provides useful information to determine if an impact is small or moderate to large. Part 2 of the EAF provides subcategories of questions and thresholds that are indicative of moderate to large impacts. Additionally, links to the EAF Workbook are provided to help answer specific questions. The municipal board should not ignore common sense and general concerns that are important to the community. Checking moderate to large indicates that there is the potential for a significant impact that needs to be resolved through additional study and discussion in Part 3.

Part 3 of the EAF is the opportunity to strengthen the record by discussing the impact in greater detail, providing additional studies and perhaps making design changes/incorporating best management practices to minimize or eliminate the impact (Step 5 of the SEQR process). Common documentation provided in Part 3 includes the following:

- Wetland Delineation Report
- Threatened and Endangered Species Habitat Assessment
- Cultural Resources Survey
- Visual Impact Assessment
- Farmland Protection Strategy

Depending on the municipal board's experience reviewing technical reports, coordination with Involved and Interested Agencies may be critical to reaching a conclusion on the magnitude of the impact. Many municipalities require the Applicant

to provide documentation from various agencies providing their opinion on impacts or the presence/absence of important resources. This might include:

- Jurisdictional determination from the U.S. Army Corps of Engineers to address the presence/absence of wetlands and other Waters of the United States
- Correspondence from NYSDEC concurring with the results of a habitat assessment.
- Opinion from SHPO on historic and archeological impacts.

Such information and guidance from the Involved and Interested Agencies provides closure on certain issues or may raise new concerns that in either case will inform the Lead Agency's decision.

3.4.2 Review Significance Criteria

Step 6 of the SEQR process involves a review of the SEQR significance criteria to evaluate whether the project warrants additional review through the preparation of an EIS. The SEQR regulations require that the Lead Agency issue a Positive Declaration if it is determined the project may have one or more significant adverse environmental impacts. The SEQR Handbook provides guidance to determine significance. Creating a legally defendable determination of significance requires consideration of the following factors described in the SEQR Handbook:

- the entire action (see Segmentation);
- the environmental assessment form (EAF);
- any other information provided by the Applicant, including the underlying application;
- the criteria for determining significance found in 617.7(c); and
- any input from Involved and Interested Agencies, organizations or the public.

The criteria identified in 617.7(c) should be used by the municipal board to determine whether the project must proceed to an EIS. An indication of the need for an EIS is the need for mitigation. Mitigation is an additional level of protection that typically must be developed through the continued local approval process. Mitigation assumes that an impact is significant and must be reduced through special measures. A Negative Declaration cannot incorporate mitigation because issuance of a Negative Declaration means a project has no significant impacts. As a result, there are no conditions placed on the project to address environmental concerns. These issues should have all been addressed through design and best management practices. However, the SEQR regulations (617.7(d)) do allow the Lead Agency to issue a Conditioned Negative Declaration, which stipulates that no significant adverse environmental impact will occur if the Applicant fulfills certain conditions placed on the solar project. Mitigation should not be confused with the actions taken by a project sponsor to modify project plans as part of the review process, thereby avoiding or eliminating a potential adverse impact.

3.4.3 Notification Requirements

Steps 7 and 8 of the SEQR process involve the filing of the Determination of Significance. The SEQR Handbook provides requirements for a Negative Declaration. The signature portion of EAF Part 3 serves as the Negative or Positive Declaration. The municipal board should adopt its Negative or Positive Declaration by resolution, at which time the documents must be filed as follows (more information on notices and filings is in the SEQR Handbook):

- Negative Declaration for an Unlisted Action - Filed with the Lead Agency
- Conditioned Negative Declaration for an Unlisted Action – Lead Agency must publish a notice in the Environmental Notice Bulletin and provide at least a 30-day public review period starting from the publication date.
- Negative Declaration for a Type I Action or a Positive Declaration - the Lead Agency must retain a copy in its own files and provide notice to, and file a copy of the declaration with:
  - > The chief executive officer of the political subdivision in which the action will be principally located;
  - > The Applicant, when there is one;
  - > All Involved Agencies;
  - > Individuals or groups who have requested a copy; and
  - > The Lead Agency must also file the notice of the declaration for publication in the Environmental Notice Bulletin (ENB).

4. Preparing the Environmental Assessment Form (EAF)

Once the municipal board has determined if an action is Type I or Unlisted under SEQRA, the appropriate form must be completed. These forms are located on the NYSDEC website. From this page, the user can navigate to both the EAF Mapper Application and the EAF Workbook.

The EAF Mapper application generates partially completed EAF forms by utilizing GIS to complete certain geographic questions. The use of the EAF Workbook, although not required, is an excellent guide to completing all three parts of either the Short or Full EAF.

Part 1 of the FEAF provides details that help the municipal board understand the location, size, type, and characteristics of the proposed project. Part 1 can be completed by the Applicant using information prepared as part of a submission for approval along with maps, plats, or other studies. The Workbook provides background information, links to data and maps that will help the Applicant locate information needed to answer the questions.

Part 2 of the FEAF is used by the municipal board to identify potential impacts that may result from the project. The municipal board may ask the Applicant for clarification of information provided in Part 1, or for additional information.

Part 3 is used by the municipal board to determine if the potential adverse impacts identified in Part 2 are significant or not, and whether a draft environmental impact statement (DEIS) will be prepared. If the municipal board determines that a DEIS shall be required, Part 3 is also used to identify the scope (topics to be considered in more detail) for that evaluation. Part 3 is also used to help the municipal board identify whether the Applicant has addressed the potential adverse impacts as part of the project design. The municipal board is responsible to ensure it has the appropriate information to evaluate and determine the significance of the action.

The guidance related to Parts 2 and 3 of the FEAF is not found in regulation, but it provides invaluable information as to whether an impact is considered large or significant (and the difference between the two). It also provides certain thresholds and examples of how to identify if an impact is small, moderate or large. Using the criteria outlined in the guidance assists the municipal board in making its determination of significance utilizing a methodical, defensible approach.

4.1 Using the Online Tools

Links to all SEQRA forms, including the FEAF and SEAF, can be found on the NYSDEC website. These forms are supported by the following browsers: Firefox, Internet Explorer 9 & above, Google Chrome and Safari. In addition, computers must have Acrobat Reader to fill out and save the forms. If necessary, forms can be printed out and completed manually.

4.1.1 How to use EAF Mapper and Create the Project Review Area

The recommended sequence to complete Part 1 of either a FEAF or SEAF is as follows:

A. Go to the NYSDEC webpage.

B. Scroll to NYSDEC EAF Mapper to utilize the EAF Mapper Application. Although not required, it is recommended that you enter the forms through the Mapper Application. This saves time by prefilling several Part 1 questions on both the SEAF and the FEAF.

a. Navigate to the specific project location utilizing any of the following:

- Use the drop-down menus to enter the county and town where the project is located and zoom in to the particular site;
- Use the 'Locate Address' tab to enter a specific address;
- Use the 'Go To' Place tab to enter a place name.

b. Define the specific project site boundary. Zoom in to the general area where the project is located. You may locate your project in two ways:

- If tax parcel information is available for the project location, it will appear when you zoom in far enough on the map. Click on the "Select Tax Parcel" button and click on the desired tax parcel on the map to select it.

- If tax parcels are not available, or if the project location is larger than a single parcel, use the "Draw Polygon" button to draw a boundary around the project site. In both cases (tax parcel or polygon), the project site will be shaded to show the extent and boundaries selected.

c. After locating the project site and its boundaries, a report can be generated by clicking the FEAF or SEAF button in the bottom-right corner of the EAF Mapper.

Clicking the button for the Short EAF or Full EAF prompts EAF Mapper to return a fill-in, savable PDF with many location- based questions in Part 1 already populated.

d. Always save the prefilled form to your network before completing the remaining questions in Part 1.[9]

C. Continue responding to Part 1 questions using the EAF Workbook as a guide.

4.1.2 How to use the NYSDEC Environmental Resource Mapper

Additional responses to questions in the EAF can be found using the NYSDEC Environmental Resource Mapper (NYSDEC Environmental Mapper). This tool identifies freshwater wetlands, federal wetlands, water features, State-listed endangered or threatened plants and animals, and significant natural communities on or near a project site.

For help using this tool, click on the question mark icon found on the upper right-hand corner of the page for step-by-step instructions.

A. Navigate to the project site or area by address, municipality, county or zip code.

B. Using the layers and legend tab on the left choose the resources to be mapped. Note: clicking "All Layers" will provide the most complete data for a site or area.

C. The map of the site or area will be generated.

D. The layers and legend tab also includes links to other wetland layers, information on permits and contacts for more information, if needed.

4.1.3 Other Useful Resources

The EAF Workbook contains many links and sources of additional information that can be helpful to complete each part of the EAF. Each question in the EAF includes a hyperlink to the EAF Workbook that provides more detail on the information that is requested in a specific question. This information is presented in narrative descriptions, examples and additional links.

Useful links found on the NYSDEC SEQR homepage include:

- 6 NYCRR Part 617, State Environmental Quality Review (SEQR): The section of New York Codes, Rules and Regulations on SEQR.
- Introduction to SEQR: This is NYSDEC's introductory page on SEQR.
- Stepping Through the SEQR Process: A step-by-step guide to the SEQR process
- SEQR Publications: Publications pertaining to SEQR
- "EIS on the Web" Requirement: A resource to access Environmental Impact Statements.
- Critical Environmental Areas: Provides a list of such areas in each county.
- DEC Commissioner Decisions on Lead Agency Disputes: Overview with the Commissioner's decisions on Lead Agency disputes.
- State Environmental Quality Review Act - Adopted Amendments 2018: The NYSDEC website for adopted amendments to streamline the SEQR process.

[9] The pre-filled answers cannot be changed. Applicants should add supplemental information if they believe a "yes" response to an EAF mapper result is incorrect. If the EAF mapper provides a "no" answer, both Applicants and municipalities can be confident that the environmental feature in question is not present or adjacent to the site.

4.2 Part 1 of the EAF

Part 1 of the FEAF provides details that help the municipal board understand the location, size, type and characteristics of the proposed project. Part 1 can be completed by the Applicant using information prepared as part of a submission for approval along with maps, plats, or other studies.

Questions in Part 1 of the FEAF are organized into the following major headings:

A. Project and Sponsor Information

B. Government Approvals

C. Planning and Zoning

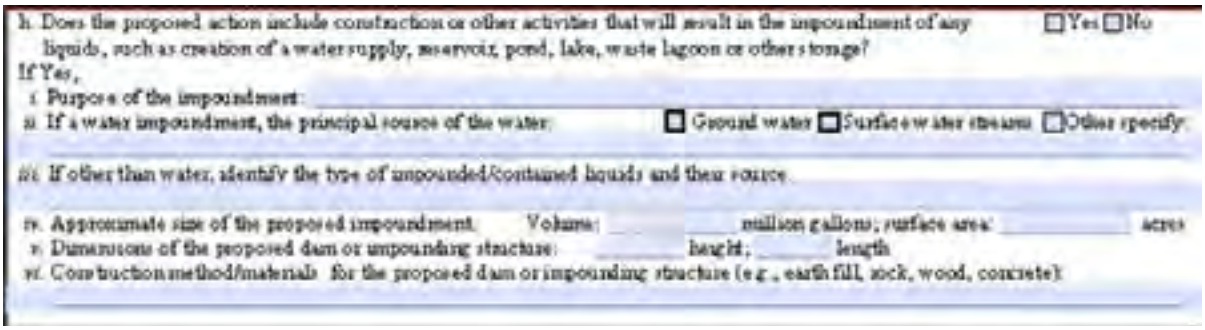
D. Project Details

E. Site and Setting of Proposed Action

F. Additional Information

G. Verification

Each question includes a hyperlink to the EAF Workbook, which provides more detail on the information that is requested by a specific question. For example, a question in Section D, "Project Details" (Question D.1.h) is pasted below. The Workbook provides further explanation of the term "impoundment," how to identify the source of an impoundment, and pertinent links to potential permits.


h. Does the proposed action include construction or other activities that will result in the impoundment of any liquids, such as creation of a water supply, reservoir, pond, lake, waste lagoon or other storage? ☐ Yes ☐ No

If Yes,

i. Purpose of the impoundment: _____

ii. If a water impoundment, the principal source of the water: ☐ Ground water ☐ Surface water streams ☐ Other (specify): _____

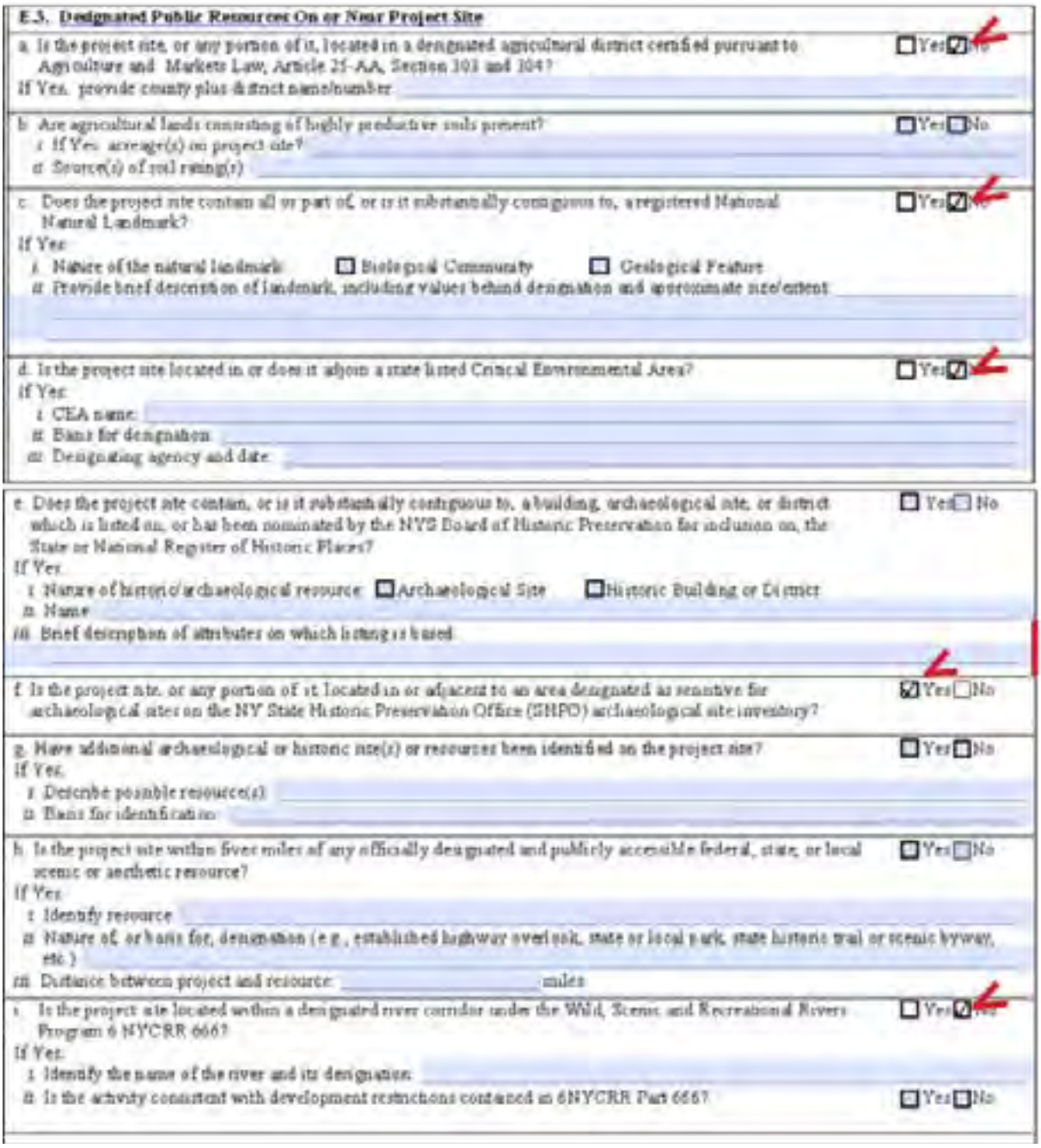
iii. If other than water, identify the type of impounded/contained liquids and their source. _____

iv. Approximate size of the proposed impoundment. Volume: _____ million gallons; surface area: _____ acres

v. Dimensions of the proposed dam or impounding structure: _____ height; _____ length

vi. Construction method/materials for the proposed dam or impounding structure (e.g., earth fill, rock, wood, concrete): _____

Another example is taken from Section E, "Site and Setting of Proposed Action Designated Public Resources on or Near Project Site" (Question E.3). This section of Part 1 was generated though the EAF Mapper link using a random location in Saratoga County, New York, and a series of auto-filled responses. The affirmative response to E.3.f alerts the Applicant as well as the municipal board that additional information is needed to identify the nature and extent of potential archeological resources. Guidance in the EAF workbook provides a link to the NYS Cultural Resources Information System (CRIS), an on-line tool maintained by the New York State Historic Preservation Office (SHPO).



E.3. Designated Public Resources On or Near Project Site

a. Is the project site, or any portion of it, located in a designated agricultural district certified pursuant to Agriculture and Markets Law, Article 25-AA, Section 303 and 304? ☐ Yes ☑ No
If Yes, provide county plus district name/number:

b. Are agricultural lands consisting of highly productive soils present? ☐ Yes ☐ No
i. If Yes: acreage(s) on project site?
ii. Source(s) of soil rating(s):

c. Does the project site contain all or part of, or is it substantially contiguous to, a registered National Natural Landmark? ☐ Yes ☑ No
If Yes:
i. Nature of the natural landmark: ☐ Biological Community ☐ Geological Feature
ii. Provide brief description of landmark, including values behind designation and approximate size/extent:

d. Is the project site located in or does it adjoin a state listed Critical Environmental Area? ☐ Yes ☑ No
If Yes:
i. CEA name:
ii. Basis for designation:
iii. Designating agency and date:

e. Does the project site contain, or is it substantially contiguous to, a building, archaeological site, or district which is listed on, or has been nominated by the NYS Board of Historic Preservation for inclusion on, the State or National Register of Historic Places? ☐ Yes ☐ No
If Yes:
i. Nature of historic/archaeological resource: ☐ Archaeological Site ☐ Historic Building or District
ii. Name:
iii. Brief description of attributes on which listing is based:

f. Is the project site, or any portion of it located in or adjacent to an area designated as sensitive for archaeological sites on the NY State Historic Preservation Office (SHPO) archaeological site inventory? ☑ Yes ☐ No

g. Have additional archaeological or historic site(s) or resources been identified on the project site? ☐ Yes ☐ No
If Yes:
i. Describe possible resource(s):
ii. Basis for identification:

h. Is the project site within five miles of any officially designated and publicly accessible federal, state, or local scenic or aesthetic resource? ☐ Yes ☐ No
If Yes:
i. Identify resource:
ii. Nature of, or basis for, designation (e.g., established highway overlook, state or local park, state historic trail or scenic byway, etc.):
iii. Distance between project and resource: _____ miles

i. Is the project site located within a designated river corridor under the Wild, Scenic and Recreational Rivers Program 6 NYCRR 666? ☐ Yes ☑ No
If Yes:
i. Identify the name of the river and its designation:
ii. Is the activity consistent with development restrictions contained in 6NYCRR Part 666? ☐ Yes ☐ No

The Applicant should work through each question using the EAF Workbook to complete Part 1 of the FEAF. The Applicant should submit this form along with a site map and any other information or studies (Section F. Additional Information) that will help the municipal board understand and evaluate the project.

4.3 Parts 2 and 3 of the EAF

Part 2, "Identification of Potential Impact," and Part 3, "Evaluation of Impacts and Determination of Significance," are the responsibility of the Lead Agency. Part 2 helps the Municipal board inventory the potential resources that could be affected by the proposed action. The DEC website offers guidance to complete Part 2, as well as the Part 2 form. Again, this section refers to Part 2 of the FEAF. Following general instructions, there are a series of topical questions followed by sub-questions. Links on the first page of Part 2 provide helpful information to evaluate scale, context and impact.

When trying to identify an impact and its relative size, it is often easier to evaluate the sub-questions first. Each major question includes a hyperlink to the appropriate section of the EAF Workbook, and back to relevant questions in Part 1, as well as examples and thresholds that can be used in the evaluation. The municipal board will use this information to determine if there will be no impact or a small impact, or a moderate-to-large impact.

If "No or small impact may occur" was checked for all 18 questions in Part 2, the municipal board only needs to check the appropriate box on Part 3 and sign it. The DEC website offers guidance to complete Part 3, as well as the Part 3 form. If any question was checked "Moderate to large impact may occur," the Lead Agency must include a discussion for each question identified as such to determine how significant the moderate to large impact may or may not be.

According to the EAF Workbook, this discussion should evaluate the importance of the impact, take into account any design element or project changes and provide the reason(s) why the impact may, or will not, result in a significant adverse environmental impact. Based on the evaluation, the municipal board must check the appropriate box indicating a positive or negative declaration and sign the form.

Check the appropriate box to indicate a Negative Declaration, Conditioned Negative Declaration, or Positive Declaration.

5. Agency Coordination

This section explores some of the more common environmental issues that may arise during the SEQR process for solar projects and the agencies associated with them. As discussed in Section 4.3.3, agency coordination is a key component of the SEQR process. Coordination helps the municipal board identify important environmental and social-cultural resources that may be affected by the project. These agencies can provide closure on certain environmental issues and will help support the record of decision, resulting in a more legally defensible outcome.

Many of the resources discussed in this section are applicable to ground-mount installations only. However, cultural resources can be impacted by all types of solar installations (e.g. rooftop installations on historic structures).

5.1 Wetlands and Streams

In New York State, wetlands are primarily regulated by three agencies: U.S. Army Corps of Engineers (USACE), NYSDEC, and the Adirondack Park Agency (APA). This section will focus on USACE and NYSDEC, which also regulate streams. A separate section is devoted to APA involvement.

Wetlands are one of the most commonly encountered regulated environmental resources in New York State. Wetland regulations significantly limit what can be done within wetland boundaries or buffers. Wetlands should be avoided to the greatest extent practicable. Streams are regulated by USACE as Waters of the United States. The State regulates streams in accordance with Article 15 of the Environmental Conservation Law, administered by NYSDEC.

For the purposes of complying with SEQR, the potential presence of wetlands and streams can initially be identified through mapping. NYSDEC's Environmental Resources Mapper identifies wetlands regulated under the State Freshwater Wetlands program and all mapped streams and their water quality classification. If a State-regulated wetland or stream occurs on a project site, it is likely that NYSDEC will be an Involved Agency.

The Environmental Resources Mapper also provides mapping from the U.S. Fish and Wildlife Service National Wetland Inventory. This tool helps identify the potential presence of wetlands on a given site. All Waters of the U.S. are regulated by USACE. The definition of waters of the U.S. includes most wetlands and streams. However, the determination of federal jurisdiction has become much more complicated over the years. It is important to note that there is no recognized regulatory federal wetland or stream mapping in the U.S. For a site to be properly identified, consult the 1987 Corps of Engineers Wetland Delineation Manual and Regional Supplement to the Corps of Engineers Wetland Manual: Northcentral and Northeast Region, Version 2.0 (January 2012). The municipal board should expect the Applicant to provide a wetland delineation map for the site with surveyed boundaries. It is the Lead Agency's responsibility to understand the magnitude of impact as part of its determination of significance. If federal wetlands or other Waters of the U.S. are present, it is good practice to include USACE as an Interested Agency.

5.2 Threatened and Endangered Species

Certain rare species of plants and animals are protected as threatened and endangered species under both State and federal regulations. Federally listed species are protected under the federal Endangered Species Act of 1973 (ESA; 16 U.S.C. § 1531 et seq.). The agencies responsible for implementing the ESA are the U.S. Fish and Wildlife Service and the National Marine Fisheries Service. Solar projects in New York are likely to require coordination with only the U.S. Fish and Wildlife Service. An initial screening for threatened and endangered species is available through its Information for Planning and Consultation. The Applicant can use this website to input specific information on site location and receive a listing of species that may occur in the area. The website is not intended to identify whether a species is present. If species are identified, it becomes necessary to perform a habitat assessment to first determine if the site is suitable for the species and, if so, further investigation may be necessary to determine presence/absence.

State-listed species are regulated by NYSDEC under 6 NYCRR Part 182. The potential presence of threatened and endangered species is addressed in Part 1 of the EAF. Preparing the EAF using the interactive form will result in a link to the protected species database and will automatically populate the question on the EAF. In addition, an initial screening for protected species can be conducted by viewing the Environmental Resources Mapper. If the mapper indicates the potential presence for protected species, the next step is to contact the NYS Natural Heritage Program for additional information.

5.3 Cultural Resources

For the purposes of SEQR, the term "cultural resources" refers to historic and archeological resources. This includes specific sites that are listed on the State and National Register of Historic Places. These resources are protected under Section 106 of the National Historic Preservation Act of 1966 (36 CFR Part 800) and the NYS Historic Preservation Act of 1980 (Article 14 of the Parks, Recreation and Historic Preservation Law), implemented through the 14.09 State Regulations. Section 106 requires federal agencies to consult with the State Historic Preservation Office (SHPO) for all federal actions. For solar installations, this would most commonly occur when a wetland or stream impact permit is required from USACE. The 14.09 regulations require the same for State agency actions. Local governments are not directly subject to these consultation requirements at either the federal or State level. Indirectly, projects requiring State or federal approvals cannot move forward without consultation and the SEQR process itself requires a sufficient evaluation of the impact on cultural resources. As a result, coordination with SHPO during the SEQR process is highly encouraged and commonly practiced. Additionally, Unlisted Actions that occur within historic sites are elevated to Type I Actions.

Initial review of potential impacts on cultural resources can be completed by accessing SHPO's Cultural Resource Information System (CRIS), where a mapping program will zoom in to the subject site, and existing Register and Register Eligible sites are identified, along with a site sensitivity map for archeological resources.

5.4 Agricultural Resources

Ground-mount solar installations are commonly sited on agricultural land. In New York State, agricultural land in certain areas of the State are protected under the Agriculture and Markets Law, specifically Article 25AA of the Agricultural Districts Law. Part 1 of the EAF requires a calculation of the impact to productive agricultural soils regardless of whether the project is located in a State-certified Agricultural District. Applicants may wish to consult the Department of Agriculture and Markets document *Guidelines for Agricultural Mitigation for Solar Energy Projects*.

The NYSERDA factsheet *Understanding Solar Installations in Agricultural Districts* provides guidance on frequently asked questions. The NYS Department of Agriculture and Markets may be an Interested Agency in the SEQR process and may become an Involved Agency depending on the nature of the impact. If a project is located in an Agricultural District, the following regulations/review processes may apply:

- Penalty for conversion of land to non-agricultural uses (excludes on-farm equipment where the solar installation does not exceed 110% of the farm's energy use).
- Notice of Intent – This would apply to solar installations that are primarily intended for off-farm use and are specific to governmental actions.
- Farmland Protection Plans – Local farmland protection plans may provide specific recommendations for conserving agricultural lands.

5.5 Coastal Zone

Certain activities within the State's Coastal Zone are regulated under the NYS Coastal Management Program (CZM), administered by the NYS Department of State (NYSDOS). Part 1 of the EAF will determine whether a project is located within the State Coastal Zone and if a Local Waterfront Revitalization Plan exists. State agencies are required to provide certification that their actions do not significantly impact State coastal policies as provided in 19 NYCRR Part 600. Federal agencies are required to comply with State policies and must coordinate with NYSDOS for federal coastal consistency review in accordance with U.S. Department of Commerce regulations (15 CFR 930.57). Relative to solar projects within the coastal zone, NYSDOS is an Interested Agency if their only involvement is consistency review. Those municipalities with approval Local Waterfront Revitalization Plans (LWRP) are directly responsible for reviewing the consistency of the project with State policies.

5.6 New York City Watershed

Certain solar projects within New York City are subject to the City Environmental Quality Review Act (CEQR). This guidance document does not provide details on this process, but additional information can be found at CEQR. Most solar installations in New York City are rooftop installations that typically require only building permits.

Actions within the NYC Watershed are regulated by the NYC Department of Environmental Protection (DEP) and may be subject to NYC DEP permitting. The SEQR process still applies within the NYC watershed, outside the City limits. However, within the watershed, DEP would become an Involved Agency. The DEP funds and implements a Long-Term Watershed Protection Program to preserve the quality of New York City's water supply. A map of the NYC Watershed is provided at Watershed Map.

5.7 Adirondack Park

The Adirondack Park Agency (APA) administers the Adirondack Park Agency Act (Executive Law, Article 27), the Freshwater Wetlands Act (Environmental Conservation Law, article 24) within the Adirondack Park and, for private lands within the Adirondack Park, the Wild Scenic and Recreational Rivers System Act (Environmental Conservation Law, article 15, title 27) (APA Act). In general, municipalities approving solar projects within the Park may not be subject to SEQR but would be subject to the APA regulations that guide land use. See guidance provided in the SEQR Handbook (Type II Actions).

6. Solar Developer Guidance

6.1 Design Considerations

Like any development project, the design and location of a solar project has a direct effect on the size and significance of potential impacts. The Lead Agency is responsible to determine the significance of any impacts in the SEQR process. A pre-application meeting with municipal officials is recommended to identify any concerns of the municipal board early-on in the process. This may also allow the municipal board an opportunity to declare its intent to serve as Lead Agency, and to determine the need for a Short EAF or Full EAF in the case of an Unlisted Action.

Important design considerations for siting a solar array include:

- Slope (avoidance of steep slopes)
- Aspect (the direction the panels face)
- Land area (sufficient area is required for large arrays)
- Proximity to electrical interconnection points
- Lack of other environmental constraints (e.g., avoid siting in wetlands, critical environmental areas, etc.

Simply avoiding the Type I thresholds (See section 3.2) does not guarantee a project will not have significant impacts. During project siting and design, the following questions should be addressed to identify other impacts that must be considered:

- What are the limits of disturbance?
- Is the project located in or near a federal or State wetland?
- Are there threatened and/or endangered species in or near the project site?
- Are there cultural resources on or adjacent to the site such as historic districts and structures and archeologically sensitive areas?
- Is the project located in a coastal zone?
- Is it adjacent or within public parkland or public open space?
- Is the project in a Critical Environmental Area?
- Is the site in an agricultural district certified by NYS Agriculture and Markets?

If the site contains one or more of these resources, an Applicant may want to consider design modifications to avoid any impacts.

A developer should also determine the following as they may result in additional Involved Agencies under SEQR.

- Is the project located in New York City?
- Is the project located in the New York City watershed?
- Is the project located in the Adirondack Park?

If a project is located within New York City, it is subject to the CEQR (City Environmental Quality Review). CEQR is New York City's process for implementing SEQR, and by law can be no less stringent than its State counterpart. CEQR is governed by SEQRA, NYC's Executive Order No. 91 (43 RCNY, Chapter 6), and the CEQR Rules of Procedure. Some of the primary practical differences between CEQR and SEQRA are that CEQR provides guidance on selection of a Lead Agency, adds scoping requirements, and promotes the use of the City's CEQR Technical Manual in conducting environmental reviews (62 RCNY, Chapter 5).

Projects located in the New York City watershed may require a permit from the Department of Environmental Protection. The most likely trigger for a permit related to solar projects on this list is "a land clearing or land grading project, involving two or more acres, located at least in part within the limiting distance of 100 feet of a watercourse or wetland, or within the limiting distance of 300 feet of a reservoir, reservoir stem or controlled lake or on a slope exceeding 15 percent." The complete list of activities governed by these regulations can be found at NYC Watershed Regulations.

A solar project located on private land in the Adirondack Park may require a permit if it is a new land use or development within a critical environmental area or designated river area, or if the project will involve wetlands or will be greater than 40 feet in height. If energy derived from a solar power project will be sold for use off the project site, a permit for a major public utility use or commercial use may also be required (Wind & Solar Power, APA).

6.2 Useful Resources

There are several resources available to developers and municipalities to assist them in collecting data to conduct an environmental review of a site and complete the SEQR process. The Quick Reference Guide (Section 2) and Preparing the EAF (Section 5) of this guidance document includes a series of links to the SEQR forms and regulations and numerous online tools.

Some of the key links are described below:

- EAF Workbook: The DEC has prepared the Workbooks to assist Applicants, project sponsors and reviewing agencies with the completion of the EAF. The Workbook contains background information, links to data and maps, and answers to questions a reviewing agency may have. They should be considered source books to assist and guide Applicants and reviewers involved in a SEQR review.
- DEC SEQR Webpage: A general page providing information about the SEQR regulations, SEQR enforcement, SEQR forms and workbooks.

- SEQR Handbook: The SEQR Handbook is the standard reference book for state, county and local government officials; environmental consultants; attorneys; permit Applicants; and the public at large.
- NYSDEC EAF Mapper: The NYSDEC's mapper tool auto-populates a series of answers in both the SEAF and FEAF, based on the project location.
- NYSDEC Environmental Resource Mapper: An additional mapping resource based on NYSDEC databases. This map provides information on natural features such as wetlands, natural communities, rare plants and animals, and other water resources.
- CRIS: The Cultural Resource Information System website allows users to screen a site for the location of historic structures or districts and archeological sensitivity using the SEARCH tab. CRIS should be used to submit project information for review for projects in archaeologically sensitive areas. Consult the New York State Historic Preservation Office for more information.

6.3 Process Guidance

Although not required, it is recommended that the Applicant schedule a pre-application meeting with the relevant municipal board to identify early on the known concerns related to the site and other guidance the municipal board may offer, such as which EAF form to complete. Upon receiving a solar project application, a municipal board will follow the steps in the SEQR Flow Chart for Solar Projects (Appendix A). This flowchart is a useful guide for Applicants to understand regulatory timeframes under SEQR and the responsibilities of both the municipal board and the Applicant.

7. Frequently Asked Questions (FAQs)

We provide the most frequently asked questions about the SEQR process. Additional guidance and other SEQR topics are found in NYSDEC's SEQR Handbook.

7.1 How does the SEQR process get started?

SEQR is triggered when an Applicant or developer submits a project application or plan to a municipal board. That agency is responsible for determining if a project is a Type I, Type II or Unlisted Action and following the appropriate procedures to complete the SEQR process.

7.2 Who enforces SEQR?

SEQR is self-enforcing; each government agency is responsible to comply with SEQR regulations. The Department of Environmental Conservation is charged with issuing regulations regarding the SEQR process, but DEC has no authority to review the implementation of SEQR by other agencies.

If an agency makes an improper decision or fails to undertake a proper review, citizens or groups who can demonstrate harm from such a failure may take legal action against the agency under Article 78 of the New York State Civil Practice Law and Rules. Project approvals may be rescinded by a court and a new SEQR review process may be required. New York State's court system has consistently ruled in favor of strong compliance with SEQR provisions (SEQR, Enforcement).

7.3 What are Type I, Type II and Unlisted Actions?

A Type I action is an action or class of actions that is more likely to have a significant adverse environmental impact than other actions or classes of actions. Type I actions are listed in the statewide SEQR regulations (617.4) or listed in any Involved Agency's SEQR procedures. The Type I list in 617.4 contains numeric thresholds; therefore, any actions that will equal or exceed one or more of the thresholds in this list would be classified as Type I. A Type I Action always requires the completion of a Full EAF.

Type II actions represent actions or classes of actions which have been found categorically to not have significant adverse impacts on the environment, or actions that have been statutorily exempted from SEQR review. Type II actions require no further action or documentation under SEQR. Type II actions are listed under Part 617.5 and require no further processing under SEQR.

Unlisted Actions are actions that are neither Type I or Type II. They generally do not require the completion of a FEAF nor coordinated review. However, to avoid having each Involved Agency prepare its own SEQR review separately, NYSERDA will require coordinated review procedures for both Type I and Unlisted Actions.

7.4 Is a large-scale ground-mount solar energy system a Type I, Type II Unlisted Action? What about a large-scale rooftop solar energy system?

The existing SEQR regulations do not specifically classify solar installations on the Type I or Type II lists. The appropriate municipal board must apply the criteria found in the Type I list to determine if a solar installation is a Type I or Unlisted Action. Large-scale ground-mount PV systems do not meet the criteria of a Type II action under Part 617.5. Typical thresholds on the Type I list (617.4) that might impact the determination include:

- Physical alteration of more than 10 acres
- Unlisted Actions occurring wholly, partially in or substantially contiguous to any historic building or site
- Unlisted Actions that are non-agricultural uses occurring in a state-certified Agricultural District

Thresholds of interest related to rooftop systems on the Type I list that might impact the determination would generally be limited to an Unlisted Action occurring wholly, partially in or substantially contiguous to any historic building or site.

The NYSDEC has adopted amendments to the SEQR regulations including changes to the Type II list that affect solar projects. Please see FAQ 12 below.

7.5 What are the most common environmental impacts of large-scale ground-mount PV systems?

Environmental impacts will depend on the specific circumstances of each project, including location, size and natural features. Common Type I (617.4) thresholds related to ground-mount installations that Lead Agencies may review include those listed in the previous answer. A Type I Action does not necessarily mean an EIS will be required. While a Type I Action is more likely to have a significant adverse environmental impact, every Type I Action does not require an EIS.

7.6 What is the difference between a "short" Environmental Assessment Form and a "full" one? When is the "full" form required?

A Short Environmental Assessment Form (SEAF) is used when evaluating Unlisted Actions. As the name implies, it is a shorter form with fewer questions than the Full EAF. A Full Environmental Assessment Form is used to evaluate Type I Actions, as it requires more in-depth responses. A reviewing municipal board can request that a FEAF be completed for an Unlisted Action, but a Type I Action always requires a FEAF.

7.7 What is an "Environmental Impact Statement"?

An Environmental Impact Statement (EIS) is a document used by municipalities, project sponsors and the public that systematically considers significant adverse environmental impacts, alternatives, and mitigation measures for a proposed project. The EIS is typically prepared by the Applicant (solar developer), although it can be prepared by the Lead Agency.

The decision to prepare an EIS is the result of the issuance of a positive declaration by the Lead Agency. Both Type I and Unlisted Actions can result in a positive declaration and preparation of an EIS depending on the unique circumstance of a project. Please note that while a Type I Action is more likely to have an adverse impact on the environment, it does not mean that every Type I action requires an EIS.

7.8 I am a municipal official. What are my SEQR responsibilities if a developer wants to build a solar project in my jurisdiction?

As the municipal official where the project will occur, you are responsible to determine if an Action is a Type I, Type II or Unlisted Action, and to initiate Lead Agency coordination procedures as required under Part 617.6. Once the appropriate municipal board is designated as Lead Agency, it is responsible for making a determination of significance and issuing a positive or negative declaration by completing Part 2 and Part 3 of the EAF. A final determination on a project cannot be made on a project until SEQR is complete. For instance, site plan approval on a project cannot be granted before SEQR has been completed. Please refer to Local Official's Guide to SEQR for more information on the role of local boards in the SEQR process.

7.9 I am a solar developer. What am I required to do for the SEQR process?

As an Applicant, you are required to provide a completed Part 1 of the SEAF or FEAF along with any accompanying maps and project information that the reviewing municipal board requests. Once the Lead Agency is established, it must complete Parts 2 and 3 of the SEAF or FEAF. The Lead Agency may request that the Applicant provide relevant information it may need to make a determination of significance and issue a positive or negative declaration under SEQR. If a positive declaration is issued, the Lead Agency will require the preparation of the Environmental Impact Statement.

7.10 I am solar developer. What if the town where my project is located will not serve as Lead Agency?

Although it is preferred that the agency principally responsible for approving, permitting, or funding an action assume the role of Lead Agency, any Involved Agency can serve as Lead Agency. As a funding agency, NYSERDA is an Involved Agency under SEQR and may serve as Lead Agency.

7.11 I am a solar developer in New York City. Do I have to complete both the City Environmental Quality Review (CEQR) and the State Environmental Quality Review (SEQR)?

Like SEQR, CEQR reviews are triggered when an agency has a discretionary approval of an action or project. CEQR is New York City's process for implementing SEQR, and by law can be no less stringent than its State counterpart. CEQR adapts and refines the State rules to take into account the special circumstances of New York City. CEQR is governed by SEQRA, NYC's Executive Order No. 91 (43 RCNY, Chapter 6), and the CEQR Rules of Procedure. Some of the primary practical differences between CEQR and SEQRA are that CEQR provides guidance on the selection of a Lead Agency, adds scoping requirements, and promotes the use of the City's CEQR Technical Manual in conducting environmental reviews (62 RCNY, Chapter 5).

Therefore, for projects physically located in New York City, an Applicant must follow the CEQR process. For more information, please consult the CEQR FAQs.

7.12 Is NYSDEC changing the SEQR regulations for solar projects? What are the changes?

Information on the adopted SEQR amendments are located on the NYSDEC website at State Environmental Quality Review Act- Adopted Amendments 2018. These new amendments will take effect January 1, 2019.

627.5(14)

Installation of solar energy arrays where such installation involves 25 acres or less of physical alteration on the follow sites;

- closed landfills,
- brownfield sites that have received a Brownfield Cleanup Program certificate of completion (COC) pursuant to ECL 27-1419 and 6 NYCRR 375-3.9 or Environmental Restoration Project sites that have received a COC pursuant to 6 NYCRR 375-4.9, where the COC under either program for a particular site has an allowable use of commercial or industrial, provided that the change of use requirements in 6 NYCRR 375-1.11 are compiled with.
- sites that have received an inactive hazardous waste disposal site full liability release or a COC pursuant to 6 NYCRR 375-2.9, where the Department has determined an allowable use for a particular site is commercial or industrial, provided that the change of use requirements in 6 NYCRR 375-1.11 are compiled with,
- currently disturbed areas at publicly-owned wastewater treatment facilities
- currently disturbed areas at sites zoned for industrial use
- parking lots or parking garages

617.5(15)

Installation of solar energy arrays on an existing structure provided the structure is not:

- listed on the National or State Register of Historic Places;
- located within a district listed in the National or State Register of Historic Places;
- been determined by the Commissioner of the Office of Parks, Recreation and Historic Preservation to be eligible for listing on the State Register of Historic Places pursuant to sections 14.07 or 14.09 of the Parks, Recreation and Historic Preservation Law; or
- within a district that has been determined by the Commissioner of the Office of Parks, Recreation and Historic Preservation to be eligible for listing on the State Register of Historic Places pursuant to sections 14.07 or 14.09 of the Parks, Recreation and Historic Preservation Law.

7.13 I read this guidance document but still have questions. How can I get help?

Additional information regarding the SEQR process can be found on the NYSDEC website. This webpage includes links to forms, handbooks and the regulations. Some of the most pertinent include:

- Introduction to SEQR
- The SEQR Handbook
- The EAF Workbooks
- SEQR Publications

Questions?

If you have any questions regarding the SEQR process for large-scale solar energy systems, please email questions to cleanenergyhelp@nyserda.ny.gov or request free technical assistance at nyserda.ny.gov/SolarGuidebook. The NYSERDA team looks forward to partnering with communities across the state to help them meet their solar energy goals.

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New York State's Real Property Tax Law § 487

The following outlines important points for local governments that are considering opting out of the Real Property Tax Law § 487.

NEW YORK STATE OF OPPORTUNITY. | NYSERDA

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Overview

It is increasingly important for local governments to be aware of the New York State Real Property Tax Law § 487 as it relates to developing solar electric systems in your community. We provide answers to questions that may arise when local officials are deciding whether to opt-in or opt-out of the Real Property Tax Law.

1. Real Property Tax Law § 487

This law provides a 15-year real property tax exemption for properties located in New York State with renewable energy systems, including solar electric systems. This law only applies to the value that a solar electric system adds to the overall value of the property; it does not mean that landowners with an installed renewable energy system are exempt from all property tax. A local government that does not opt out can still benefit financially through payment-in- lieu-of-taxes (PILOT) agreements.

In local governments that have taken no action one way or the other, the exemption is in effect. If a local law, ordinance, or resolution opting out of the exemption is adopted, a copy must be filed with the New York State Department of Taxation and Finance, and the New York State Energy Research and Development Authority (NYSERDA).

1.1 Local Economic Impact of Solar

New York State's solar market is one of the fastest growing solar markets in the country. Installations grew by almost 1,000 percent from 2011 to December 2017. During 2011 to 2017, the U.S. as a whole saw a 452 percent increase. New York State ranked 12th nationwide for cumulative solar installed capacity in 2017.[10]

The solar industry is creating jobs across the State with more than 770 solar companies employing more than 9,000 people. In 2017, the solar industry added approximately 900 new jobs throughout the State, a 11 percent increase over 2016 job growth. New York is currently ranked number 3 in solar jobs. [11]

With average wages of $21 per hour, the solar industry is responsible for creating thousands of living-wage jobs that allow workers to contribute to their local economies.[12] Most jobs are local or regional and cannot be outsourced.

1.2 Why would jurisdictions opt out of the RPTL § 487?

All local governments must offer the RPTL § 487 exemption unless they have opted out not to. Local governments can decide to opt out. As the solar market in New York continues to grow, many large-scale solar projects are being proposed throughout New York. Some local governments are opting out of RPTL § 487 so they can tax these multimillion-dollar projects and generate additional property tax revenue. However, these jurisdictions may find that they will not actually collect substantially more tax revenue from solar or other renewable energy systems because the systems may not be built if they are fully taxable. Property taxes can have a significant impact on the financial viability of solar electric projects, sometimes impacting project economics in a way that unintentionally prohibits solar electric development. Jurisdictions that opt out of RPTL § 487 may unintentionally prevent solar electric development at the local level. Activity in other states suggest there is less solar development in jurisdictions that opt out of the property tax exemption, with little to no additional tax revenue collected.[13]

10 Greentech Media. "US Solar Market Insight 2017 Year in Review." https://www.greentechmedia.com/research/report/us-solar-market-insight-2017-year-in-review#gs.SscwdeE

11 The Solar Foundation. "New York Solar Jobs Census 2017." https://www.thesolarfoundation.org/solar-jobs-census-factsheet-2017-NY/

12 The Solar Foundation. "National Job Census." https://www.thesolarfoundation.org/national/

13 Barnes et al. 2013. "Property Taxes and Solar PV Systems: Policies, Practices, and Issues." https://ncsolarcen-prod.s3.amazonaws.com/wp-content/uploads/2015/06/Property-Taxes-and-Solar-PV-Systems-Policies-Practices-and-Issues.pdf

1.3 Can jurisdictions opt out of RPTL§ 487 for large-scale solar only?

No. Under RPTL § 487, jurisdictions are not permitted to conditionally opt out of the property tax exemption. In other words, jurisdictions cannot choose to tax large systems but not small ones. A jurisdiction that opts out of RPTL § 487 to generate tax revenue from larger projects makes solar installations more expensive for homeowners and local businesses.

1.4 Capturing revenue from installations without opting out of RPTL§ 487

The law allows jurisdictions that offer the RPTL § 487 exemption to negotiate payments in lieu of taxes (PILOTs). The purpose of a PILOT is to reduce the tax burden and tax rate uncertainty on the property and/or system owner, while preserving some of the forgone revenue that would have been paid in property taxes. PILOTs are often used for large-scale[14] renewable energy projects, including solar electric systems. They are annual payments commonly related to the system's size (often in dollars per megawatt [MW]) and cannot exceed the amount of taxes that would be owed without the exemption.

Each taxing jurisdiction (except the school districts of New York, Buffalo, Rochester, Syracuse, and Yonkers) that has not opted out of RPTL § 487 may require the owner of a solar installation to enter a PILOT. The PILOT may not exceed a 15-year term, but it cannot require payments that exceed the value of taxes that would be paid without the exemption provided by RPTL § 487.[15] PILOT agreements can be an effective tool for jurisdictions to generate comparable revenue without making solar costs prohibitive for most homeowners and businesses.

1.5 Opting back in

The New York State Department of Taxation and Finance has stated that local governments can reinstate the RPTL § 487 exemption simply by repealing the local law, ordinance, or resolution that implemented the opt out. The final step to reinstate the exemption is to provide a copy of the new law, ordinance, or resolution to the New York State Department of Taxation and Finance and NYSERDA.[16]

1.6 Property tax exemptions in other states

Thirty-three states offer some form of tax exemptions for renewable energy. Twenty-two of those states mandate property tax exemptions for 100 percent of the value of solar energy installations over 10 or more years.[17] These states include ones with significant solar development such as California, Massachusetts, and New Jersey, as well as states with minimal solar capacity such as South Dakota, Kansas, and Montana. The majority of states recognize the positive financial impact property tax exemptions can have on solar electric development and the local economic benefits of a robust solar industry.

Questions?

If you have any questions regarding New York State's Real Property Tax Law § 487, please email questions to cleanenergyhelp@nyserda.ny.gov or request free technical assistance at nyserda.ny.gov/SolarGuidebook. The NYSERDA team looks forward to partnering with communities across the state to help them meet their solar energy goals.

[14] In this guide, large scale is considered solar electric projects that are in the megawatt range.
[15] New York State Department of Taxation and Finance. January 2016. "Recently Asked Questions About the Real Property Tax Law on the Topic of Solar Energy." Available at: https://www.tax.ny.gov/research/property/legal/raq_index.htm
[16] New York State Department of Taxation and Finance, supra note 13.
[17] Solar Power Rocks. https://solarpowerrocks.com/new-york/

Solar Payment-In-Lieu-Of-Taxes (PILOT)

Assisting New York State municipalities considering PILOT agreements for community solar projects larger than one megawatt.

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Overview

The following toolkit is for local governments in New York State who are considering a payment-in-lieu-of-taxes (PILOT) agreement for solar projects larger than one megawatt (MW). We provide resources for local governments to gain more information on PILOT agreements. A few notable resources within the toolkit are the New York Model Solar Energy PILOT Law, Model Solar PILOT Agreement for a single jurisdiction, and the PILOT calculator for taxing jurisdictions, which can be accessed here and under the PILOT toolkit section below.[18]

1. Community Solar

In addition to residential, commercial, and municipal projects, a relatively new kind of solar project, "community solar," has emerged as an efficient and affordable way for all New Yorkers to gain access to clean energy. Community solar projects are much larger, typically in the 2-5MW range and allow individuals (including renters and others who cannot install a system on their own roof) to purchase individual panels or some fraction of the electricity the entire system generates. These customers receive credits for this electricity on their monthly utility bills.

A community solar project brings revenues and benefits to a community and its residents in several ways. The owner of a project site will typically lease land to the solar company in return for lease payments. Community solar customers, which may include municipalities, businesses, and residents, save money on their utility bills. Taxing jurisdictions can benefit from PILOT payments. At the same time, given the passive nature of a solar array, a solar project does not create increased demands on municipal services and infrastructure.

2. Real Property Tax Law (RPTL) § 487

As a measure to promote the installation of clean energy sources, the New York State legislature adopted a section of the RPTL § 487 that exempts the value of a solar panel system from local property taxes.[19] Under the law, any increase in the property value attributable to the addition of the solar panel system is exempt from property tax. The RPTL § 487 exemption has been a cornerstone of the State's efforts to meet its clean energy goals, providing essential economic incentives for solar. The law does, however, allow any taxing jurisdiction (town, school, etc.) to "opt-out" of the tax exemption by adopting a local law or resolution, making the added value of a solar panel system fully taxable. Alternatively, a taxing jurisdiction that does not opt-out can require a solar developer to pay an annual fee or "payment- in-lieu of taxes" as a replacement for the taxes it would have otherwise collected. Under the law, PILOT amounts cannot exceed what the tax amount would have been without the exemption. Additionally, the law does not allow jurisdictions to partially opt out of the law to generate tax revenue from large solar projects while exempting the small systems of homeowners. Opting out of RPTL § 487 makes community solar projects financially unviable and makes homeowners' rooftop systems more expensive.

[18] The terms "taxing jurisdictions" and "jurisdictions" include counties, cities, towns, villages and school districts.

[19] New York State Real Property Tax Law § 487 provides a 15-year real property tax exemption for properties located in New York State with renewable energy systems, including solar electric systems. The law applies only to the value that a solar electric system adds to the overall value of the property; it does not mean that landowners with an installed renewable energy system are exempt from all property tax. Local governments have the option to opt out of RPTL § 487 and tax solar projects at the full property tax rate, but doing so can impact project economics in a way that unintentionally prohibits developers from building projects. For more information on RPTL § 487, see Understanding New York State's Real Property Tax Law § 487 fact sheet. A local government that does not opt out of RPTL § 487 can still generate revenue through PILOT agreements.

NYSERDA understands that many communities have little or no experience with solar PILOT agreements or with assessing the value of large-scale solar projects. Information is difficult to obtain by consulting other communities because few communities have completed large-scale solar projects.

Two common questions have arisen from New York State municipal officials and other interested parties:

(1) If we do not opt-out and seek a PILOT, what is a fair PILOT amount based on what projects can afford?

(2) What are the steps to negotiate a successful PILOT agreement?

The answer to the first question is complicated, as PILOTs are often negotiated for individual projects, and the PILOT amount a project can afford depends on many factors, including construction and maintenance costs, and the amount of revenue from electricity sales. From the point of view of solar developers, if the PILOT amount is too high, they will not be able to make the project economically feasible and will not proceed. So, the amount of revenue available for a PILOT is dependent on the overall project economics. The first question then becomes, "What PILOT amount will allow the jurisdiction and its residents to enjoy the benefits of the project, but will not make the project financially unviable and unattractive to a developer?"

NYSERDA's research indicates that PILOT rates should be negotiable between 1% and 3% of the compensation solar developers receive for the electricity their projects generate.[20] This research includes an independent analysis of current solar market data and an analysis of solar project compensation rates established under the preliminary value stack in the New York Public Service Commission's March 2017 Value of Distributed Energy Resources (VDER) order. The new solar energy compensation methodology will likely reduce project revenue. NYSERDA will review and update its PILOT guidance regularly; taxing jurisdictions are encouraged to adjust their PILOT rates accordingly.

NYSERDA offers the Solar PILOT Toolkit as a resource to help municipalities and solar developers negotiate successful PILOT agreements. The following describes the Toolkit's contents.

3. Solar PILOT Toolkit

3.1 The Model Solar PILOT Law

The Model Solar PILOT Law, or resolution, provides a sample template for jurisdictions that wish to establish the legal authority to implement a formulaic, jurisdiction-wide PILOT agreement process with solar developers. The model law cites the appropriate laws to do so and includes blank fields for jurisdictions to fill in. The model law exempts projects smaller than 1 MW AC as the amount of PILOT revenue may not justify the cost of negotiating the PILOT.

3.2 The Model Solar PILOT Agreement

Only jurisdictions that do not opt out of RPTL § 487 may enter PILOT agreements. The Model Solar PILOT Agreement provides a draft contract that jurisdictions can sign with solar developers. The agreement can be tailored to meet a jurisdiction's specific needs and includes blank fields for the jurisdiction to fill in. Jurisdictions may negotiate PILOT rates with solar developers on a project-by-project basis or may adopt a jurisdiction-wide rate for certain types of solar panel systems, typically in the form of annual payments based on a dollar-per-MW rate.

[20] NYSERDA continuously assesses market data and Public Service Commission proceedings and may revise this Toolkit when appropriate.

3.3 The Solar PILOT Calculator

The Solar PILOT Calculator can be accessed here.

This tool provides PILOT rate guidance for solar projects and includes two separate calculators.[21] Calculator One should be used to set a uniform PILOT rate across an entire jurisdiction.

The following table displays sample PILOT rates generated by Calculator One for a 2-MW AC community solar project in each utility service territory. The "Low" and "High" rates represent 1% and 3% of the compensation solar developers receive for the electricity their projects generate. NYSERDA's research of solar project economics across the State indicates that such projects should be able to afford rates within this range.

	Low ($/MW AC)	High ($/MW AC)
Central Hudson	$2,600	$7,600
Orange & Rockland	$3,200	$9,500
National Grid	$1,700	$5,100
NYSEG	$1,700	$5,000
Con Edison	$3,700	$11,100
Rochester Gas & Electric	$1,700	$5,000

Calculator Two should be used to set PILOT rates on a project-by-project basis. It is highly customizable, taking into account extensive project-specific data and all factors affecting solar project economics. Users may accept the default values but are encouraged to enter project-specific data. Calculator Two estimates PILOT rates based on the net present value of a project's unlevered cash flow that achieves a specified pre-tax internal rate of return.

[21] Each calculator's outputs reflect the sum total of all PILOT payments, property taxes from taxing jurisdictions which have opted-out of the exemption, and special district taxes (which are not exempt under RPTL § 487).

4. New York Model Solar Energy System PILOT Law

The workable version of this document can be found at nyserda.ny.gov/SolarGuidebook, under the PILOT tab.

§1. Title

This Local Law [if for a school district, change "Law" to "Resolution" throughout this document] may be cited as the "Solar Energy System PILOT Law of the [Village/Town/City/County/School District] of _____, New York."

§2. Purpose

This Local Law [Resolution] is adopted to ensure that the benefits of the community's solar energy resource are available to the entire community, by promoting the installation of solar energy generating equipment through a payment-in-lieu-taxes (PILOT), granting reduced costs to system developers and energy consumers, and providing a revenue stream to the entire community.

§3. Authority [IF MUNICIPALITY]

This Local Law is adopted under the authority granted by
1. Article IX of the New York State Constitution, §2(c)(8),
2. New York Statute of Local Governments, § 10 (5),
3. New York Municipal Home Rule Law, § 10 (1)(i) and (ii) and §10 (1)(a)(8), and
4. New York Real Property Tax Law § 487(9).

§3. Authority [IF SCHOOL DISTRICT]

This Resolution is adopted under the authority granted by New York Real Property Tax Law § 487(9).

§4. Definitions

1. "Annual Payment" means the payment due under a PILOT Agreement entered into pursuant to Real Property Tax Law § 487(9).
2. "Annual Payment Date" means January 1st of each year [September 1st for school districts].
3. "Capacity" means the manufacturer's nameplate capacity of the Solar Energy System as measured in kilowatts (kW) or megawatts (MW) AC.
4. "Owner" means the owner of the property on which a Solar Energy System is located or installed, or their lessee, licensee or other person authorized to install and operate a Solar Energy System on the property.
5. "Residential Solar Energy Systems" means a Solar Energy System with a nameplate generating capacity less than 50 kW AC in size, installed on the roof or the property of a residential dwelling (including multi-family dwellings), and designed to serve that dwelling.
6. "Solar Energy Equipment" means collectors, controls, energy storage devices, heat pumps and pumps, heat exchangers, windmills, and other materials, hardware or equipment necessary to the process by which solar radiation is (i) collected, (ii) converted into another form of energy such as thermal, electrical, mechanical or chemical, (iii) stored, (iv) protected from unnecessary dissipation and (v) distributed. It does not include pipes, controls, insulation or other equipment which are part of the normal heating, cooling, or insulation system of a building. It does include insulated glazing or insulation to the extent that such materials exceed the energy efficiency standards required by New York law.
7. "Solar Energy System" means an arrangement or combination of Solar Energy Equipment designed to provide heating, cooling, hot water, or mechanical, chemical, or electrical energy by the collection of solar energy and its conversion, storage, protection and distribution.

§5. PILOT Required

1. The owner of a property on which a Solar Energy System is located or installed (including any improvement, reconstruction, or replacement thereof), shall enter into a PILOT Agreement with the [Village/Town/City/County/School District] consistent with the terms of this Local Law [Resolution], except for
   a) Residential Solar Energy Systems
   b) Solar Energy Systems that do not seek or qualify for an exemption from real property taxes pursuant to Real Property Tax Law § 487(4).

2. The Lessee or licensee of any owner of a property required to enter into a PILOT Agreement by this section, which owns or controls the Solar Energy System, may enter into the PILOT Agreement on behalf of the owner of the property.

3. Upon receipt of any notification from an owner or other person of intent to install a Solar Energy System, the [title of appropriate official, e.g., Town Supervisor, Superintendent, Building Inspector] shall immediately, but in no case more than sixty days after receipt of the notification, notify the owner or other person of the mandatory requirement for a PILOT Agreement pursuant to the terms of this Local Law [Resolution].

4. Nothing in this Local Law [Resolution] shall exempt any requirement for compliance with state and local codes for the installation of any solar energy equipment or a solar energy system, or authorize the installation of any solar energy equipment or a solar energy system. All solar energy systems must file a Real Property Tax Exemption application pursuant to Real Property Tax Law § 487 to receive a tax exemption.

§6. Contents of PILOT Agreements

1. Each PILOT Agreement entered into shall include

   a) Name and contact information of the Owner or other party authorized to act upon behalf of the Owner of the Solar Energy System.
   b) The SBL number for each parcel or portion of a parcel on which the Solar Energy System will be located.
   c) A requirement for fifteen successive annual payments, to be paid commencing on the first Annual Payment Date after the effective date of the Real Property Tax Exemption granted pursuant to Real Property Tax Law § 487.
   d) The Capacity of the Solar Energy System, and that if the Capacity is increased or increased as a result of a system upgrade, replacement, partial removal or retirement of Solar Energy Equipment, the annual payments shall be increased or decreased on a pro rata basis for the remaining years of the Agreement.
   e) That the parties agree that under the authority of Real Property Tax Law § 487 the Solar Energy System shall be considered exempt from real property taxes for the fifteen- year life of the PILOT Agreement.
   f) That the PILOT Agreement may not be assigned without the prior written consent of the [Village/Town/City/County/School District], which consent may not be unreasonably withheld if the Assignee has agreed in writing to accept all obligations of the Owner, except that the Owner may, with advance written notice to the [Village/Town/City/County/School District] but without prior consent, assign its payment obligations under the PILOT Agreement to an affiliate of the Owner or to any party who has provided or is providing financing to the Owner for or related to the Solar Energy System, and has agreed in writing to accept all payment obligations of the Owner.
   g) That a Notice of this Agreement may be recorded by the Owner at its expense, and that the [Village/Town/City/County/School District] shall cooperate in the execution of any Notices or Assignments with the Owner and its successors.
   h) That the Annual Payment shall be
      i) For Solar Energy Systems with a Capacity greater than 1 MW and less than 5MW, $____per MW of Capacity.
      ii) For Solar Energy Systems with a Capacity greater than 5MW will be determined on a case by case basis.
   i) That the Annual Payment shall escalate ___ percent (___%) per year, starting with the second Annual Payment.
   j. That if the Annual Payment is not paid when due, that upon failure to cure within thirty days, the [Village/Town/City/County/School District] may cancel the PILOT Agreement without notice to the Owner, and the Solar Energy System shall thereafter be subject to taxation at its full assessed value.

§7. Severability

Should any provision of this Local Law [Resolution] be declared by the courts to be unconstitutional or invalid, such decision shall not affect the validity of this Local Law [Resolution] as a whole or any part thereof other than the part so decided to be unconstitutional or invalid.

§8. Effective Date

This Local Law [Resolution] shall be effective upon its filing with the Secretary of State in accordance with the Municipal Home Rule Law, and shall apply to all solar energy systems constructed.

5. Model Solar PILOT Agreement for a Single Jurisdiction

The workable version of this document can be found at nyserda.ny.gov/SolarGuidebook, under the PILOT tab.

PAYMENT IN LIEU OF TAXES AGREEMENT
FOR SOLAR ENERGY SYSTEMS

between

[NAME OF TAXING JURISDICTION]

and

[NAME OF OWNER]

Dated as of _____, 2017

RELATING TO THE PREMISES LOCATED AT_____
(TAX MAP _____) IN THE (TOWN/COUNTY/VILLAGE,
_____COUNTY, NEW YORK.

PAYMENT IN LIEU OF TAXES AGREEMENT
FOR SOLAR ENERGY SYSTEMS PURSUANT TO REAL PROPERTY TAX LAW § 487

THIS AGREEMENT FOR PAYMENT IN LIEU OF TAXES FOR REAL PROPERTY, effective as of the date on the cover page, above, by and between [ENTER OWNER NAME] (the "Owner"), a Owner, with a principal place of business located at____ [ENTER ADDRESS]; and [choose ONE as appropriate]

the [ENTER SCHOOL DISTRICT NAME], (the "School District"), a school district duly established with a principal place of business located at _____ [ENTER ADDRESS];

the [Village/Town/City] of _____, New York, (the "Town"), a municipal corporation duly established in County with a principal place of business located at_____[ENTER ADDRESS];

the County of ___, New York, a municipal corporation duly established with a principal place of business located at_____ [ENTER ADDRESS] (the "County");

the School District/Town/County is herein referred to as the "Taxing Jurisdiction." Owner and the Taxing Jurisdiction are collectively referred to in this Agreement as the "Parties" and are individually referred to as a "Party."

RECITALS

WHEREAS, Owner has submitted a Notice of Intent to the Taxing Jurisdiction that it plans to build and operate a "Solar Energy System" as defined in New York Real Property Tax Law ("RPTL") Section 487 (1)(b) (herein the "Project") with an expected nameplate capacity ("Capacity'') of approximately___Megawatts AC on a parcel of land located within the Village/Town/City at _____ and identified as SBL # ___, as described in Exhibit A (herein the "Property"); and;

WHEREAS, the Taxing Jurisdiction has not opted out of RPTL Section 487; and WHEREAS, pursuant to RPTL Section 487 (9) (a), the Taxing Jurisdiction has indicated its intent to require a Payment in Lieu of Taxes ("PILOT") Agreement with the Owner, under which the Owner (or any successor owner of the Project) will be required to make annual payments to the Taxing Jurisdiction for each year during the term of this Agreement; and

WHEREAS, the Owner has submitted or will submit to the assessor of the (Village/Town/City) a RP-487 Application for Tax Exemption of Solar or Wind Energy Systems or Farm Waste Energy Systems, demonstrating its eligibility for a real property tax exemption pursuant to RPTL Section 487; and

WHEREAS, the Parties intend that, during the term of this Agreement, the Project will be placed on exempt portion of the assessment roll and the Owner will not be assessed for any statutory real property taxes for which it might otherwise be subjected under New York law with respect to the Project.

NOW THEREFORE, for and in consideration of the mutual covenants hereinafter contained, the receipt and sufficiency of which are hereby acknowledged, the Parties hereby agree as follows:

1. Representations of the Parties.

(a) The Owner hereby represents, warrants, and covenants that, as of the date of this Agreement:

1. The Owner is duly organized, and a validly existing_____ (corporation, limited liability company, etc.) duly authorized to do business in the State of New York, has requisite authority to conduct its business as presently conducted or proposed to be conducted under this Agreement, and has full legal right, power, and authority to execute, deliver, and perform all applicable terms and provisions of this Agreement.

2. All necessary action has been taken to authorize the Owner's execution, delivery, and performance of this Agreement and this Agreement constitutes the Owner's legal, valid, and binding obligation enforceable against it in accordance with its terms.

3. None of the execution or delivery of this Agreement, the performance of the obligations in connection with the transactions contemplated hereby, or the fulfillment of the terms and conditions hereof will (i) conflict with or violate any provision of the Owner's Certificate of Incorporation, Certificate of Formation, bylaws or other organizational documents or of any restriction or any agreement or instrument to which the Owner is a party and by which it is bound; (ii) conflict with, violate, or result in a breach of any applicable law, rule, regulation, or order of any court or other taxing jurisdiction or authority of government or ordinance of the State or any political subdivision thereof; or (iii) conflict with, violate, or result in a breach of or constitute a default under or result

in the imposition or creation of any mortgage, pledge, lien, security interest, or other encumbrance under this Agreement or under any term or condition of any mortgage, indenture, or any other agreement or instrument to which it is a party or by which it or any of the Owner's properties or assets are bound. There is no action, suit, or proceeding, at law or in equity, or official investigation before or by any government authority pending or, to its knowledge, threatened against the Owner, wherein an anticipated decision, ruling, or finding would result in a material adverse effect on the Owner's ability to perform its obligations under this Agreement or on the validity or enforceability of this Agreement.

(b) The Taxing Jurisdiction hereby represents, warrants, and covenants that, as of the date of this Agreement:

1. The Taxing Jurisdiction is duly organized, validly existing, and in good standing under the laws of the State of New York and has full legal right, power, and authority to execute, deliver, and perform all applicable terms and provisions of this Agreement.

2. All necessary action has been taken to authorize the Taxing Jurisdiction's execution, delivery, and performance of this Agreement, and this Agreement constitutes the Taxing Jurisdiction's legal, valid, and binding obligation enforceable against it in accordance with its terms.

3. No governmental approval by or with any government authority is required for the valid execution, delivery, and performance under this Agreement by the Taxing Jurisdiction except such as have been duly or will be obtained or made.

4. There is no action, suit, or proceeding, at law or in equity, or official investigation before or by any government authority pending or, to its knowledge, threatened against the Taxing Jurisdiction, wherein an anticipated decision, ruling, or finding would result in a material adverse effect on the Taxing Jurisdiction's ability to perform its obligations under this Agreement or on the validity or enforceability of this Agreement.

2. Tax Exemption; Payment in Lieu of Real Property Taxes.

(a) Tax-Exempt Status of the Project Facility. Pursuant to RPTL 487 the Parties hereto agree that the Project shall be placed by the Taxing Jurisdiction as exempt upon the assessment rolls of the Taxing Jurisdiction. A Real Property Tax Exemption Form (RP 487) has or will be filed with the Assessor responsible for the Taxing Jurisdiction and the Project is eligible for exemption pursuant to RPTL 487 (4).

(b) Owner agrees to make annual payments to the Taxing Jurisdiction in lieu of real property taxes for the Project for a period of fifteen (15) consecutive fiscal tax years; annual payments may not exceed the amounts that would otherwise be payable but for the RPTL 487 exemption. Such 15-year term shall commence on the first taxable status date selected by Owner following commencement of the construction of the Project (the "Commencement Date"), and shall end the fifteenth fiscal year following the Commercial Operations Date. The first annual payment shall be in the amount of $__per Megawatt AC of Capacity (the "Annual Payment"). Thereafter Annual Payments will escalate by ___ percent (___%) per year. Based on the Capacity of_____Megawatts AC, Annual Payments to be made by Owner during the term of this Agreement shall be as listed in Exhibit B. Each Annual Payment will be paid to the Taxing Jurisdiction in accordance with Section 5 of this Agreement; and the annual payment amount and payment date will be noted on an annual bill issued by the Taxing Jurisdiction to the Owner, provided that any failure of the Taxing Jurisdiction to issue such a bill shall not relieve Owner of its obligation to make timely payments under this section.

(c) Owner agrees that the payments in lieu of taxes under this Agreement will not be reduced on account of a depreciation factor or reduction in the Taxing Jurisdiction tax rate, and the Taxing Jurisdiction agrees that the payments in lieu of taxes will not be increased on account of an inflation factor or increase in the Taxing Jurisdiction tax rate, all of which factors have been considered in arriving at the payment amounts reflected in this Agreement.

3. Change in Capacity at Mechanical Completion: Adjustments to Payments. To the extent that the Capacity of the Project is more or less than the_____Megawatts AC on the date when the Project is mechanically complete, and Owner has commenced production of electricity, the payments set forth in Exhibit B will be increased or decreased on a pro rata basis.

4. Change in Capacity After Mechanical Completion: Adjustments to Payments. If after the Completion Date the Capacity is increased or decreased as a result of the replacement or upgrade or partial removal or retirement of existing Project equipment or property or the addition of new Project equipment or property, the Annual Payments set forth in Exhibit B shall be increased or decreased on a pro rata basis for the remaining years of the Agreement.

5. Payment Collection. (depending on the type of jurisdiction – choose ONE)

Payments for the School District shall be made payable to the_____ School District and mailed to the School District, c/o the Superintendent's Office, located at [ENTER SCHOOL DISTRICT ADDRESS] and are due no later than September 15th of each year.

Payments for the Town shall be made payable to the Town of_____and mailed to the Town of _____ , c/o the Town of _____ Supervisor's Office, located at [ENTER TOWN ADDRESS] and are due no later than February 15th of each year.

Payments for the County shall be made payable to the County Treasurer and mailed to the County of _____, c/o [ENTER COUNTY ADDRESS], and are due no later than February 15th of each year.

All late payments shall accrue interest at the statutory rate for late tax payments under New York Law. Owner shall pay the reasonable attorney fees, court and other costs incurred by the Taxing Jurisdiction in the collection of the unpaid amounts. All payments by the Owner hereunder shall be paid in lawful money of the United States of America.

6. Tax Status. Separate Tax Lot. The Taxing Jurisdiction agrees that during the term of this Agreement, the Taxing Jurisdiction will not assess Owner for any real property taxes with respect to the Project to which Owner might otherwise be subject under New York law, and the Taxing Jurisdiction agrees that this Agreement will exclusively govern the payments of all such taxes, provided, however, that this Agreement is not intended to affect, and will not preclude the Taxing Jurisdiction from assessing, any other taxes, fees, charges, rates or assessments which the Owner is obligated to pay, including, but not limited to, special assessments or special district assessments, fees, or charges for services provided by the Taxing Jurisdiction to the Project. Nothing in this Agreement shall limit the right of the Owner to challenge the assessment of the Project pursuant to the RPTL.

7. No Assignments Without Prior Notice; Binding Effect.

(a) This Agreement may not be assigned by Owner without the prior written consent of the Taxing Jurisdiction; such consent may not be unreasonably withheld if the Assignee has agreed in writing to accept all obligations of the Owner. The restrictions on assignment contained herein do not prohibit or otherwise limit changes in control of Owner. If Owner assigns this Agreement with the advance written consent of the Taxing Jurisdiction, the Owner shall be released from all obligations under this Agreement upon assumption hereof in writing by the assignee, provided that Owner shall, as a condition of such assignment and to the reasonable satisfaction of the Taxing Jurisdiction, cure any defaults and satisfy all liabilities arising under this Agreement prior to the date of such assignment. A Notice of this Agreement may be recorded by Owner and the Taxing Jurisdiction shall cooperate in the execution of required Assignments with the Owner and its successors. Owner may, with advance written notice to the Taxing Jurisdiction and without prior consent, assign this Agreement to an affiliate of Owner or to any party who has provided or is providing financing to Owner for the construction, operation and/or maintenance of the Project.

(b) Binding Effect. This PILOT Agreement shall inure to the benefit of, and shall be binding upon, the Taxing Jurisdiction, the Owner and their respective successors and assigns.

8. Statement of Good Faith. The Parties agree that the payment obligations established by this Agreement have been negotiated in good faith in recognition of and with due consideration of the full and fair taxable value of the Project.

9. Additional Documentation and Actions. Subject to applicable laws and regulations, each Party will, from time to time hereafter, execute and deliver or cause to be executed and delivered, such reasonable additional instruments and documents as the other Party reasonably requests for the purpose of implementing or effectuating the provisions of this Agreement. Owner shall pay all reasonable attorneys' and consulting fees incurred by the Taxing Jurisdiction to review and negotiate any such instruments or documents.

10. Notices. All notices, consents, requests, or other communications provided for or permitted to be given hereunder by a Party must be in writing and will be deemed to have been properly given or served upon the personal delivery thereof, via courier delivery service, by hand, or by certified mail, return receipt requested. Such notices shall be addressed or delivered to the Parties at their respective addresses shown below.

If to Owner:

With a copy to:

If to the Taxing Jurisdiction: Attn: Superintendent
Mayor
Town Supervisor County

With a copy to:

Any such addresses for the giving of notices may be changed by either Party by giving written notice as provided above to the other Party. Notice given by counsel to a Party shall be effective as notice from such Party.

11. Applicable Law. This Agreement will be made and interpreted in accordance with the laws of the State of New York. Owner and the Taxing Jurisdiction each consent to the jurisdiction of the New York courts in and for the County in which the Project is located regarding any and all matters, including interpretation or enforcement of this Agreement or any of its provisions. Accordingly, any litigation arising hereunder shall be brought solely in such courts.

12. Termination Rights of the Owner. Owner may terminate this Agreement at any time by Notice to the Taxing Jurisdiction. Upon receipt of the Notice of Termination, the Project shall be placed on the taxable portion of the tax roll effective on the next taxable status date of the Taxing Jurisdiction. Owner shall be liable for all PILOT payments due in the year of termination, except that if Owner is required to pay any part-year real property taxes, the PILOT payment for that year shall be reduced pro rata so that the Owner is not required to pay both PILOT payments and real property taxes for any period of time.

13. Termination Rights of Taxing Jurisdiction. Notwithstanding anything to the contrary in this Agreement, the Taxing Jurisdiction may terminate this Agreement on thirty (30) days written notice to Owner if:

a. Owner fails to make timely payments required under this Agreement, unless such payment is received by the Taxing Jurisdiction within the 30-day notice period with interest as stated in this Agreement

b. Owner has filed, or has had filed against it, a petition in Bankruptcy, or is otherwise insolvent;

14. Remedies; Waiver and Notice.

(A) No Remedy Exclusive. No remedy herein conferred upon or reserved to Party is intended to be exclusive of any other available remedy or remedies, but each and every such remedy shall be cumulative and shall be in addition to every other remedy given under this Agreement or now or hereafter existing at law or in equity or by statute.

(B) Delay. No delay or omission in exercising any right or power accruing upon the occurrence of any breach of an obligation hereunder shall impair any such right or power or shall be construed to be a waiver thereof, but any such right or power may be exercised from time to time and as often as may be deemed expedient.

(C) No Waiver. In the event any provision contained in this Agreement should be breached by any party and thereafter duly waived by the other party so empowered to act, such waiver shall be limited to the particular breach so waived and shall not be deemed to be a waiver of any other breach hereunder. No waiver, amendment, release or modification of this Agreement shall be established by conduct, custom or course of dealing.

15. Entire Agreement. The Parties agree that this is the entire, fully integrated Agreement between them with respect to payments in lieu of taxes for the Project.

16. Amendments. This Agreement may not be effectively amended, changed, modified, altered or terminated except by an instrument in writing executed by the parties hereto.

17. No Third-Party Beneficiaries. The Parties state that there are no third-party beneficiaries to this Agreement.

18. Severability. If any article, section, subdivision, paragraph, sentence, clause, phrase, provision or portion of this Agreement shall for any reason be held or adjudged to be invalid or illegal or unenforceable by any court of competent jurisdiction, such article, section, subdivision, paragraph, sentence, clause, phrase, provision or portion so adjudged invalid, illegal or unenforceable shall be deemed separate, distinct and independent and the remainder of this Agreement shall be and remain in full force and effect and shall not be invalidated or rendered illegal or unenforceable or otherwise affected by such holding or adjudication.

19. Counterparts. This Agreement may be simultaneously executed in several counterparts, each of which shall be an original and all of which shall constitute but one and the same instrument.

Executed by the undersigned as of the day and year first written above, each of whom represents that it is fully and duly authorized to act on behalf of and bind its principals.

_____

By:

_____

Name

_____

Title

_____

Date

_____

Superintendent/Supervisor/County Official

_____

Date

EXHIBIT A

Description of Land

EXHIBIT B

Year	Payment Amount

Questions?

If you have any questions regarding solar PILOT agreements, please email questions to cleanenergyhelp@nyserda.ny.gov or request free technical assistance at nyserda.ny.gov/SolarGuidebook. The NYSERDA team looks forward to partnering with communities across the state to help them meet their solar energy goals.

Using Special Use Permits and Site Plan Regulations

To Allow Large-Scale Solar Installations While Protecting Farmland

Step-by-step instructions for municipalities to use special use permits and site plan regulations to support solar energy development while ensuring that their most valuable and productive farmland remains in operation.

NEW YORK STATE OF OPPORTUNITY. | NYSERDA

Solar Guidebook for Local Governments
NYSERDA 17 Columbia Circle Albany, NY 12203

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Overview

For many municipalities in agricultural districts, it is necessary to consider the short- and long-term needs of farmers, while also supporting the development of solar in their local communities. While sometimes this can be a challenge, there are two land-use tools that are commonly used in New York State to address this issue; special use permits and site plan regulations. These two land-use tools are used for siting large-scale solar energy systems in agricultural districts, while also allowing local officials to ensure that farmers valuable and productive farmland remains in operation.

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1. Community Solar

New York State has committed to generating 100% of its electricity from carbon-free energy sources by 2040, increasing the demand for land used for solar energy generation.

A relatively new kind of solar project, community solar, has emerged as an efficient and affordable way for all New Yorkers to gain access to clean energy. Community solar allows individuals (including renters and others who cannot install a system on their own roof) to purchase individual panels or some fraction of the electricity a large-scale solar energy system generates. These customers receive credits for this electricity on their monthly utility bills. A community solar project benefits a community and its residents in several ways. Community solar customers—which may include municipalities, businesses, and residents—save money on their utility bills. Taxing jurisdictions can benefit from additional revenue through payment-in-lieu-of-tax (PILOT) agreements. Farmers generate revenue by leasing parts of their land. At the same time, given the passive nature of a solar energy system, a solar project does not create increased demands on municipal services and infrastructure.

Community solar projects are much larger than residential rooftop projects and are typically ground-mounted in rural areas, sometimes on agricultural land. A typical 2 MW AC community solar project will require about 10 acres of land. However, solar development is significantly constrained by several factors, including utility infrastructure, the locational cost of electricity, zoning policies and state policies.

There may be some potential for agricultural uses on the same site as solar energy systems, including grazing livestock. Planting wildflowers for pollinator purposes on marginal or abandoned agricultural land can also provide some added benefit. In addition, the underlying land could be returned to agricultural use if properly restored at the end of the solar energy system lifecycle. A balanced approach that allows solar development and adequately preserves agricultural land is necessary.

2. Selecting a Land-Use Tool

In municipalities where large-scale solar energy systems are being considered, there are several land-use tools available to accommodate them in agricultural areas, including overlay zones, floating zones, special-use permits, site plan regulations, and environmental review requirements. The two land-use tools addressed here, special-use permits and site plan regulations, are the most commonly used for solar in New York State.

For information on navigating the development of solar projects in State-certified agricultural districts, see the Solar Installations in Agricultural Districts chapter.

2.1 Special-Use Permits

Special-use permits may be used to impose conditions that mitigate adverse impacts on the most valuable or productive agricultural land. Zoning traditionally singles out land uses that are allowed in designated zoning districts on the condition that they are compatible with the surrounding neighborhood. These are called conditional uses and are allowed by the issuance of a special-use permit. The zoning code sets forth the specific standards under which the use will be permitted.

Special-Use Permit: Summary of Steps

1. Determine the conditions under which large- scale solar energy systems will be granted special-use permit approval. (Consult the Current Land Use and Soil Types section for minimum conditions and the remaining guidance for additional requirements.)
2. Create a menu of potential mitigation conditions to reduce impact in the event that projects are approved upon conditions.
3. Amend the zoning code to allow large-scale solar energy systems by special-use permit in zoning districts where agricultural uses dominate.

Steps: Municipalities can designate large-scale solar energy systems as a conditionally permitted use in agricultural zones and create a special permit process to carefully examine the impact before granting approval if the project meets certain conditions. These conditions (or standards) can be calibrated to minimize the impact of a solar energy system on agricultural land and operations. Using the standards discussed in the Determining Approval Standards section, municipalities should determine the specific conditions for special permit approval. To create conditions that distinguish between the most valuable or productive farmland and land suitable for solar installations, municipalities may give special consideration to the Current Land Use and Soil Types section. Beyond the land selection standards, municipalities may wish to include conditions for special permit approval that mitigate a solar project's impact.

Once the conditions have been determined, amend the zoning code to incorporate this new special permit option in the selected zoning districts. The municipality might consider designating whichever board approves site plan applications as the same board to approve these new special-use permits. This will allow applicants with fully developed site plan applications to combine approvals and streamline the process. Within the regulation, the community may also include the zone's objectives—such as the preservation of farming on the most valuable or productive agricultural land—which could then be considered when evaluating the potential effect on neighborhood character when variances from the conditional use standards are requested.

It should be noted that in drafting the conditions for a special-use permit, it is often unavoidable that language will leave discretion or need interpretation in a given situation. While conditions should be detailed, detail often defies the diversity of situations that arise. Municipalities should anticipate that special-use permits will either be approved, denied, or approved upon conditions, where further conditions are needed to ensure that the delineated special-use permit conditions are met. Municipalities may consult the Determining Approval Standards section, where the conditions needed for special permit approval on a case-by-case basis are explained. For a sample special-use permit approach for large-scale systems, see the New York State Model Solar Energy Law chapter.

2.2 Site Plan Regulations

Municipalities can amend site plan regulations to limit the adverse impact of permitted solar energy systems on farming operations, including conditions that avoid using the most valuable or productive agricultural land. A site plan is a drawing that shows the layout, arrangement, and design of a land-use proposal of a single site. Most municipalities have adopted site plan regulations that contain specifications for submissions and standards that applicants must meet before applying for a building permit. Municipalities can amend these regulations to require applicants for solar energy systems to identify information and meet standards regarding the suitability of the land for such use. This gives municipalities the opportunity to evaluate the solar energy system's impact on the most valuable or productive agricultural lands and deny a site plan application if such requirements are not met.

Steps: Municipalities can amend site plan regulations to require applicants to provide all information the municipality determines necessary for a solar energy system. Municipalities should first determine the specific standards they'll wish to impose for site plan approval. At a minimum, municipalities should develop standards from the Current Land Use and Soil Types section in order to distinguish between the most valuable or productive farmland and land suitable for solar installations. In making selections from the list of approval standards, municipalities should consider what additional information to require on site plan submissions for determining compliance and identifying mitigation opportunities. For example, in order to determine compliance with a requirement to locate structures for overhead collection lines in nonagricultural areas and along field edges where possible, applicants should be required to show field edges on the site plan.

Once the standards have been determined, municipalities may then amend site plan regulations to include new approval standards with submittal specifications. Municipalities with zoning codes may then amend the uses in agricultural zones to allow solar installations as-of-right or by special-use permit but specifying that any such project triggers site plan review.

Site Plan Review: Summary of Steps

1. Determine new site plan approval standards to minimize the impact of large-scale solar on appropriate land. (Consult the Current Land Use and Soil Types section for minimum standards and the remaining guidance for additional requirements.)
2. Based on the selected additional site plan requirements, determine what additional submission information will be required to determine compliance and identify mitigation opportunities.
3. Amend the site plan regulations to include new approval standards with submittal specifications.
4. Amend the zoning code (if applicable) to specify that the development of any large- scale solar project triggers a site plan review.

3. Determining Approval Standards

When using the land-use tools previously described, municipalities may include conditions that protect their most valuable and productive agricultural land. For an inventory of potential mitigating conditions, municipalities should refer to the Department of Agriculture and Markets' Guidelines for Agricultural Mitigation for Solar Energy Projects. These guidelines include details on the following standards.

- **Current Land Use and Soil Types**, such as avoiding installation of solar arrays on the most valuable or productive farmland (provided in the order of importance of current use: active rotational farmland, permanent hayland, improved pasture, unimproved pasture, other support lands, fallow/inactive farmland), especially when containing prime farmland soils or soils of statewide importance.
- **Siting Goals,** such as minimizing adverse impacts to fencing and watering systems; minimizing impacts to normal farming operations by locating structures for overhead collection lines in nonagricultural areas and along field edges; avoiding dividing larger fields into smaller fields, which are more difficult to farm; eliminating the need for cut and fill and reducing the risk of creating drainage problems by locating access roads, which cross agricultural fields, along ridge tops and by following field contours; limiting the permanent width of access roads in agricultural fields to no more than 16 feet to minimize the loss of agricultural land; and avoiding existing drainage and erosion control structures.
- **Construction Requirements**, such as ensuring the surface of access roads is level with the adjacent agricultural field surface; installing culverts and water bars to maintain natural drainage patterns; stripping all topsoil from agricultural areas used for vehicle and equipment traffic, parking, and equipment laydown and storage areas; stockpiling topsoil stripped from work areas; burying interconnected cables at a specified depth; removing excess subsoil and rock from the site; constructing temporary or permanent fences around work areas to prevent livestock access; and picking up and properly disposing of pieces of wire, bolts, and other unused metal objects.

- **Restoration Requirements**, such as decompacting disturbed agricultural areas; regrading access roads to allow for farm equipment crossing and to restore original surface drainage patterns; seeding restored agricultural areas with the seed mix specified by the landowner; repairing all surface or subsurface drainage structures damaged during construction; and, following restoration, remove all construction debris from the site.
- **Two-Year Monitoring and Remediation** Immediately Following Restoration, including mitigation of topsoil deficiency and trench settling with imported topsoil consistent with the quality of topsoil on the affected site; and determination of the appropriate rehabilitation measures if the subsequent crop productivity within affected areas is less than that of the adjacent unaffected agricultural land.
- **Decommissioning**, including removal of all above-ground structures and restoration of areas previously used for agricultural production, according to recommendations by the landowner, the Soil and Water Conservation District, and the Department of Agriculture and Markets; removal of concrete piers, footers, or other supports to a depth of 48 inches below the soil surface; and removal of access roads, unless otherwise specified by the landowner.

Questions?

If you have any questions regarding special use permits and site plan regulations on farmland, please email questions to cleanenergyhelp@nyserda.ny.gov or request free technical assistance at nyserda.ny.gov/SolarGuidebook. The NYSERDA team looks forward to partnering with communities across the state to help them meet their solar energy goals.

Acknowledgments

NYSERDA created this document in consultation with the Pace University Land Use Law Center and the New York State Department of Agriculture and Markets.

Solar Installations in Agricultural Districts

Navigating the development of solar projects in accordance with local and New York State agricultural policies.

NEW YORK STATE OF OPPORTUNITY. | NYSERDA

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Overview

When navigating solar energy projects in accordance with New York State policies, local officials may have unanswered questions regarding solar installations taking place in their respective agricultural districts. In this section, we discuss agricultural assessments, farm-related solar projects, laws and penalties as they relate to solar development in agricultural districts.

Many local governments are implementing strategies to review solar installations within their community by updating their comprehensive plan and adopting zoning requirements for the siting, installation, and decommissioning of large-scale solar arrays. To protect productive farmland, municipalities should consider siting the non-farm solar energy projects on less productive land. There is a distinction between farm- related solar systems, and solar systems built on agricultural land that primarily serve off-site uses.

1. Agricultural Districts

New York State's Agriculture and Markets Law provides a bottoms-up approach for the protection of viable farmland by including land within an Agricultural District. Landowners petition the County Legislature to include their land into an Agricultural District, affected municipalities are notified, a public hearing is held, and the County Legislature creates or modifies an Agricultural District by adding or removing land from the District. Farm operations located within an Agricultural District are provided certain protections, such as limited protection from eminent domain and condemnation; unreasonably restrictive local rules, regulations, laws, and ordinances; agricultural assessment; protection from private nuisance lawsuits; and other benefits.

1.1 Agricultural Assessments

An agricultural assessment is an assessed value placed on eligible land that is used for agricultural production, based on the land's ability to produce a crop. The taxes paid on the property by the owner are based on the agricultural assessment.

Land inside and outside of an agricultural district is eligible for an agricultural assessment. To qualify, farmers must produce crops, livestock, or livestock products on seven plus acres of land and have an average gross sales of $10,000 in the prior two years. Land that is used in agricultural production that has less than seven acres in production must have an average gross sales of $50,000 in the prior two years.

Additionally, a land owner receiving an agricultural assessment inside an agricultural district annually commits the land to an agricultural use for the next five years, or eight years if located outside of an agricultural district. Farmland outside agricultural districts are generally not eligible for other agricultural district benefits and protections.

1.2 Protections for farm-related solar

The Department of Agriculture and Markets considers solar panel systems to be "on-farm" equipment when they are designed, installed, and operated so that the anticipated annual total amounts of electrical energy generated do not exceed the anticipated annual total electrical needs of the farm by more than 110 percent. If a local government classifies solar equipment as structures or buildings, they are deemed on-farm buildings. As on-farm equipment or buildings, the installation of solar panel systems are protected under the Agricultural Districts Law.

To ensure that the electrical output of solar equipment does not exceed the 110-percent threshold, an initial energy assessment may be required to separate farm-related energy consumption from other uses.

Further, if the solar equipment is connected by remote net metering, multiple meters must be combined to determine the electrical needs of on-farm equipment.

1.3 Regulations for on-farm solar

Reasonable regulations for solar development include:

- A streamlined site plan review process that involves a shorter review period and fewer submission requirements.
- A building/zoning permit and compliance with the State's Fire Prevention and Building Code requirements.

"Overly restrictive" regulations for solar development include:

- Extensive site plan regulations.
- Special use permit regulations.
- Nonconforming use requirements.
- Height restrictions and excessive setbacks from buildings and property lines.
- A Full Environmental Assessment Form (on-farm solar development is considered a Type II action in the State Environmental Quality Review (SEQR) process, which does not require EAF preparation).
- Visual impact assessments.
- Prohibiting the construction of on-farm, solar generated electricity to offset the energy demands of the farm.

1.4 Penalties for converting farmland to solar

A conversion penalty is imposed if farmland that is subject to an agricultural assessment is located in an agricultural district and is converted to a nonagricultural use within five years of the last agricultural assessment (or eight years if the farmland is located outside an agricultural district). No conversion penalty is imposed if agricultural land is converted for oil, gas, or wind energy development that does not support agricultural production. Because solar energy is not included in this exemption, the conversion penalty could apply if electrical output of solar equipment substantially exceeds (e.g., is more than 110 percent of) a farm's anticipated electrical needs.

The assessor determines whether a conversion has occurred on the basis of the facts of each case:

- Conversion is defined as "an outward or affirmative act changing the use of agricultural land" to a nonagricultural use, in New York State's Agriculture and Markets Law.
- A conversion penalty involves a payment to capture the tax savings a property owner received while the land was under an agricultural assessment. This is limited to a five-year roll-back as specified in New York State's Agriculture and Markets Law.
- Conversion payments are equal to five times the taxes saved in the most recent year that the land received an agricultural assessment, plus interest.

When only a portion of a parcel is converted, the assessor apportions the real property tax assessment and the agricultural assessment, determines the tax savings attributable to the converted portion, and computes the conversion payment based on that portion. If the remaining land within a parcel is used for agricultural purposes and the eligibility criteria are met, that land may still receive an agricultural assessment.

Payments for the conversion of agricultural land to nonagricultural use are added to the taxes of the converted land. Properties may be subject to a tax sale if conversion penalty payments are not made. These payments generally become the landowner's responsibility at the time of conversion. Failure to notify may result in a penalty of two times the payments owed, to a maximum of $1,000.

Questions?

If you have any questions regarding solar installations in agricultural districts, please email questions to cleanenergyhelp@nyserda.ny.gov or request free technical assistance at nyserda.ny.gov/SolarGuidebook. The NYSERDA team looks forward to partnering with communities across the state to help them meet their solar energy goals.

Landowner Considerations for Solar Land Leases

Identifying key questions and potential impacts of leasing land for solar projects.

NEW YORK STATE OF OPPORTUNITY. | NYSERDA

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Overview

When deciding to lease land for solar, landowners have many factors to consider before committing. Throughout this section, we provide landowners with the necessary information to take their solar development project to the next step by discussing the topics of: community solar, per-acre lease rates, agricultural assessments, conversion penalties, taxing on solar, and other potential impacts and considerations when in the decision making process.

New York's solar market is growing fast and demand for sites to install large-scale solar electric systems is high. Across New York State, solar developers are contacting farmers and landowners to secure long-term land leases for siting solar arrays. The amount of land desirable for a lease generally ranges from 10 to 30 acres, depending upon the size of the solar array.

Before considering such a lease or contract, you should know installing solar panels on farmland may trigger a "conversion penalty" and may increase the taxable value of the overall property. To fully understand the impact of these factors, landowners are urged to consult with an attorney and their municipal assessor before signing any documents.

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1. Community Solar

NY-Sun, Governor Andrew M. Cuomo's initiative to add more than 6 GW of installed solar capacity in New York State by 2025, encourages and supports the installation of solar arrays to generate clean and renewable energy statewide.

Tens of thousands of New Yorkers have already put solar panels on their homes. Many buildings, however, are not suited for solar panels due to shading, roof condition, or other factors. New Yorkers now can subscribe to larger community solar systems. Community solar provides opportunities for renters, homeowners, businesses, and municipalities to subscribe to a portion of community solar energy projects. The siting of these systems is creating an even greater interest in the leasing of farmland.

2. Solar For Your Land

The size of a solar installation is measured by its capacity to produce energy. A 1-megawatt (MW) installation will generate approximately 1,174,000 kilowatt hours (kWh is how electricity usage is measured on your utility bill) each year. A 1-MW system will generally require about six acres of land for 3,000 to 4,000 individual solar panels and will cost $2 million to $3 million to build. Systems built on open land will connect directly to the electric grid and will have their own utility meter. Solar panels are typically warrantied for 25 years, but a system can last longer than that if panels are replaced over time.

2.1 Per Acre Lease Rates

Rates can vary. If you are approached by a developer or have interest in leasing your land, research the going rate for land leases in your area. Contact multiple solar developers to gauge interest in your land. Certain site characteristics are especially attractive for solar development, such as cleared land that is south-facing with road access and in close proximity to the substation. Do research online about solar lease rates in other areas and consider working with a real estate professional. Prior to signing a lease with a solar developer, landowners should examine possible tax consequences and issues associated with the construction of roads, fencing, and electrical poles. Landowners should consider asking an attorney to carefully examine the land lease terms.

3. Agricultural Assessments For Your Property

Under the Agriculture and Markets Law, if a landowner receives an agricultural assessment and converts the land to a nonagricultural use, the landowner may be subject to a monetary payment for converting the land. A conversion of land is “an outward or affirmative act changing the use of agricultural lands” (AML §301(8)).

Municipal assessors are responsible for tracking conversions when they occur. Landowners are also required to notify the assessor within 90 days whenever a parcel receiving an agricultural assessment is converted to a nonagricultural use. A fine of up to $1,000 can be levied against a landowner who fails to report the conversion.

3.1 Conversion penalty

The landowner on record is responsible for paying the conversion penalty. Your assessor can work with you to determine what the conversion penalty may cost. Make sure you know where the solar array will be placed on your property so that a comparative analysis of benefited acres versus total converted acres, by mineral, organic, and farm woodland soil groups can be determined.

3.2 Solar Panels and Taxes

A solar energy system is “real property” once it has been permanently affixed to land or a structure [Real Property Tax Law (RPTL) § 102(12)(b); 8 Op. Counsel SBEA No. 3]. The definition of “real property” also includes a “power generating apparatus” [RPTL §102(12)(f)]. As such, it is taxable unless it qualifies for an exemption (RPTL § 300). The assessor must determine the contributory value of the solar array to the value of your property. If the value of the converted acreage devoted to the solar array increases, it may affect your taxes. An increase in taxable value may affect your county, town, village, and school taxes as well as other taxes that may be levied, such as highway, fire, ambulance, library, lighting district, drainage district, and other taxes and levies. It may also affect special district taxes for municipal water and sewer districts if the land is no longer predominantly used for agricultural purposes.

3.3 Exemptions from School, County, Town, and Village Taxes

There is an exemption statute in State Law that applies specifically to solar energy systems: Section 487 of the RPTL. Section 487, which also covers wind power systems and farm waste energy systems, provides a 15-year exemption from real property taxation for the increase in value resulting from the installation of a qualifying system. However, the statute allows municipalities and school districts to opt-out of this exemption. To find out if your county, town, village, and/or school district has opted out, talk to your local tax assessor. Leases beyond 15 years will likely have an effect on your tax liabilities going forward. Absent the exemption, the local government may seek to value the solar array at full value. This assessment would again depend upon the contributory value of the solar array on your property at year 16. This question should be discussed with your local tax assessor.

4. Other Potential Impacts

Solar arrays must be connected to the electrical grid, which may require the installation of power poles. Landowners should make sure that pole placement and the height of the wire will not interfere with their ability to farm the land. The same can be said concerning the siting of access roads. Make sure the access road is constructed so that it does not shed water onto your fields and that the finished grade does not interfere with normal drainage patterns. Also, ask about the material used to finish the surface of the access road. Will the size of the stone interfere with the operation of your equipment if some of it ends up in your field? See if the access road can be used by you and your farm equipment to access your property. Design the road so that it also serves both your needs and that of the solar company. Be sure to discuss these aspects of the construction of the solar project with the developer before you sign the lease.

4.1 Responsibility of Dismantling Solar Arrays

In the contract, make sure that there are provisions that determine who is responsible for dismantling the facility if the company is no longer in business or if the solar array ages out and is no longer viable, ensuring the property is returned to its pre-leased condition.

4.2 Selecting your Solar Array Location

If you are interested in the possibility of a lease to a solar company, talk to them about the siting of the solar arrays on your property. Does it have to be placed on your best farmland (such as on Soil Groups 1-4)? Can the solar arrays be placed on land that is not suited for agricultural production, such as support land, sloping pasture, or underutilized areas of the farm? Can the land beneath the solar arrays be planted with crops or grazed by non-climbing animals? There are a number of possibilities that should be explored. Think about how the siting of a solar array on your property can benefit your farm operation and ask questions.

4.3 Local Solar Laws in your Community

Some municipalities have provisions in their zoning code to address the siting of solar arrays within the community. Other municipalities have placed a temporary freeze on the siting and installation of such facilities until they have decided on the best method to review and/or regulate the use within the town or village. Some municipalities are also in the process of drafting amendments to their zoning code to address this issue.

Influence the Local Process

If you do not participate in the local process, your point of view cannot be heard. Also, speak with your assessor to determine what impact the siting of a solar array may have on your farm or property and the bottom line (taxes versus lease payments).

Questions?

If you have any questions regarding solar land leases, please email questions to cleanenergyhelp@nyserda.ny.gov or request free technical assistance at nyserda.ny.gov/SolarGuidebook. The NYSERDA team looks forward to partnering with communities across the state to help them meet their solar energy goals.

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Decommissioning Solar Panel Systems

Information for local governments and landowners on the decommissioning of large-scale solar panel systems.

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Solar Guidebook for Local Governments
NYSERDA 17 Columbia Circle Albany, NY 12203

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Overview

We provide information for local governments and landowners on the decommissioning of large-scale solar panel systems through the topics of decommissioning plans and costs and financial and non-financial mechanisms in land-lease agreements.

As local governments develop solar regulations and landowners negotiate land leases, it is important to understand the options for decommissioning solar panel systems and restoring project sites to their original status.

From a land use perspective, solar panel systems are generally considered large-scale when they constitute the primary use of the land and can range from less than one acre in urban areas to 10 or more acres in rural areas. Depending on where they are sited, large-scale solar projects can have habitat, farmland, and aesthetic impacts. As a result, large-scale systems must often adhere to specific development standards.

1. Abandonment and Decommissioning

Abandonment occurs when a solar array is inactive for a certain period of time.

- Abandonment requires that solar panel systems be removed after a specified period of time if they are no longer in use. Local governments establish timeframes for the removal of abandoned systems based on aesthetics, system size and complexity, and location. For example, the Town of Geneva, NY, defines a solar panel system as abandoned if construction has not started within 18 months of site plan approval, or if the completed system has been nonoperational for more than one year.[22]
- Once a local government determines a solar panel system is abandoned and has provided thirty (30) days prior written notice to the owner it can take enforcement actions, including imposing civil penalties/fines, and removing the system and imposing a lien on the property to recover associated costs.

Decommissioning is the process for removing an abandoned solar panel system and remediating the land.

- When describing requirements for decommissioning sites, it is possible to specifically require the removal of infrastructure, disposal of any components, and the stabilization and re-vegetation of the site.

1.1 Decommissioning Plans

Local governments may require having a plan in place to remove solar panel systems at the end of their lifecycle, which is typically 20-40 years. A decommissioning plan outlines required steps to remove the system, dispose of or recycle its components, and restore the land to its original state. Plans may also include an estimated cost schedule and a form of decommissioning security (see Table 1).

[22] Town of Geneva, N.Y. CODE § 130-4(D)(5) (2016):

1.2 Estimated Cost of Decommissioning

Given the potential costs of decommissioning and land reclamation, it is reasonable for landowners and local governments to proactively consider system removal guarantees. A licensed professional engineer, preferably with solar development experience, can estimate decommissioning costs, which vary across the United States. Decommissioning costs will vary depending upon project size, location, and complexity. Table 1 provides an estimate of potential decommissioning costs for a ground-mounted 2-MW solar panel system. Figures are based on estimates from the Massachusetts solar market. Decommissioning costs for a New York solar installation may differ. Some materials from solar installations may be recycled, reused, or even sold resulting in no costs or compensation. Consider allowing a periodic reevaluation of decommissioning costs during the project's lifetime by a licensed professional engineer, as costs could decrease, and the required payment should be reduced accordingly.

Table 1: Sample list of decommissioning tasks and estimated costs

Tasks	Estimated Cost ($)
Remove Rack Wiring	$2,459
Remove Panels	$2,450
Dismantle Racks	$12,350
Remove Electrical Equipment	$1,850
Breakup and Remove Concrete Pads or Ballasts	$1,500
Remove Racks	$7,800
Remove Cable	$6,500
Remove Ground Screws and Power Poles	$13,850
Remove Fence	$4,950
Grading	$4,000
Seed Disturbed Areas	$250
Truck to Recycling Center	$2,250
Current Total	**$60,200**
Total After 20 Years (2.5% inflation rate)	**$98,900**

2. Ensuring Decommissioning

Landowners and local governments can ensure appropriate decommissioning and reclamation by using financial and regulatory mechanisms. However, these mechanisms come with tradeoffs. Including decommissioning costs in the upfront price of solar projects increases overall project costs, which could discourage solar development. As a result, solar developers are sometimes hesitant to provide or require financial surety for decommissioning costs.

It is also important to note that many local governments choose to require a financial mechanism for decommissioning. Although similar to telecommunications installations, there is no specific authority to do so as part of a land use approval for solar projects (see Table 2). Therefore, a local government should consult their municipal attorney when evaluating financial mechanisms.

The various financial and regulatory mechanisms to decommission projects are detailed below.

Table 2: Relevant Provisions of General City, Town, and Village Laws Relating to Municipal Authority to Require Conditions, Waivers, and Financial Mechanisms

Site Plan Review	General City Law	Town Law	Village
Conditions	27-a (4)	274-a (4)	7-725-a (4)
Waivers	27-a (5)	274-a (5)	7-725-a (5)
Performance bond or other security	27-a (7)	274-a (7)	7-725-a (7)
Subdivision	**General City Law**	**Town Law**	**Village Law**
Waivers	33 (7)	277 (7)	7-730 (7)
Performance bond or other security	33 (8)	277 (9)	7-730 (9)
Special	**General City Law**	**Town Law**	**Village Law**
Conditions	27-b (4)	274-b (4)	7-725-b (4)
Waivers	27-b (5)	274-b (5)	7-725-b (5

Source: Referenced citations may be viewed using the NYS Laws of New York Online

Excerpts from these statutes are also contained within the "Guide to Planning and Zoning Laws of New York State," New York State Division of Local Governments Services, June 2011: https://www.dos.ny.gov/lg/publications/Guide_to_planning_and_zoning_laws.pdf

2.1 Financial mechanisms

Decommissioning Provisions in Land-Lease Agreements. If a decommission plan is required, public or private landowners should make sure a decommissioning clause is included in the land-lease agreement. This clause may depend on the decommissioning preferences of the landowner and the developer. The clause could require the solar project developer to remove all equipment and restore the land to its original condition after the end of the contract, or after generation drops below a certain level, or it could offer an option for the landowner to buy-out and continue to use the equipment to generate electricity. The decommissioning clause should also address abandonment and the possible failure of the developer to comply with the decommissioning plan. This clause could allow for the landowner to pay for removal of the system or pass the costs to the developer.

Decommissioning Trusts or Escrow Accounts. Solar developers can establish a cash account or trust fund for decommissioning purposes. The developer makes a series of payments during the project's lifecycle until the fund reaches the estimated cost of decommissioning. Landowners or third-party financial institutions can manage these accounts. Terms on individual payment amounts and frequency can be included in the land lease.

Removal or Surety Bonds. Solar developers can provide decommissioning security in the form of bonds to guarantee the availability of funds for system removal. The bond amount equals the decommissioning and reclamation costs for the entire system. The bond must remain valid until the decommissioning obligations have been met. Therefore, the bond must be renewed or replaced if necessary to account for any changes in the total decommissioning cost.

Letters of credit. A letter of credit is a document issued by a bank that assures landowners a payment up to a specified amount, given that certain conditions have been met. In the case that the project developer fails to remove the system, the landowner can claim the specified amount to cover decommissioning costs. A letter of credit should clearly state the conditions for payment, supporting documentation landowners must provide, and an expiration date. The document must be continuously renewed or replaced to remain effective until obligations under the decommissioning plan are met.

2.2 Nonfinancial mechanisms

Local governments can establish nonfinancial decommissioning requirements as part of the law. Provisions for decommissioning large-scale solar panel systems are similar to those regulating telecommunications installations, such as cellular towers and antennas. The following options may be used separately or together.

- **Abandonment and Removal Clause.** Local governments can include in their zoning code an abandonment and removal clause for solar panel systems. These cases effectively become zoning enforcement matters where project owners can be mandated to remove the equipment via the imposition of civil penalties and fines, and/or by imposing a lien on the property to recover the associated costs. To be most effective, these regulations should be very specific about the length of time that constitutes abandonment. Establishing a timeframe for the removal of a solar panel system can be based on system aesthetics, size, location, and complexity. Local governments should include a high degree of specificity when defining "removal" to avoid ambiguity and potential conflicts
- **Special Permit Application.** A local government may also mandate through its zoning code that a decommissioning plan be submitted by the solar developer as part of a site plan or special permit application. Having such a plan in place allows the local government, in cases of noncompliance, to place a lien on the property to pay for the costs of removal and remediation.
- **Temporary Variance/Special Permit Process.** As an alternative to requiring a financial mechanism as part of a land use approval, local governments could employ a temporary variance/special permit process (effectively a re- licensing system). Under this system, the locality would issue a special permit or variance for the facility for a term of 20 or more years; once expired (and if not renewed), the site would no longer be in compliance with local zoning, and the locality could then use their regular zoning enforcement authority to require the removal of the facility.

2.3 Examples of abandonment and decommissioning provisions

The New York State Model Solar Energy Law provides model language for abandonment and decommissioning provisions in the Model Law section of this Guidebook.

The following provide further examples that are intended to be illustrative and do not confer an endorsement of content:

- Town of Geneva, N.Y., § 130-4(D): ecode360 .com/28823382
- Town of Olean, N.Y., § 10.25.5: https://www.cityofolean.org/council/minutes/ccmin2015-04-14.pdf

2.4 Checklist for Decommissioning Plans

The following items are often addressed in decommissioning plans requirements:

- Defined conditions upon which decommissioning will be initiated (i.e., end of land lease, no operation for 12 months, prior written notice to facility owner, etc.).
- Removal of all nonutility owned equipment, conduit, structures, fencing, roads, and foundations.
- Restoration of property to condition prior to solar development.
- The timeframe for completion of decommissioning activities.
- Description of any agreement (e.g., lease) with landowner regarding decommissioning.
- The party responsible for decommissioning.
- Plans for updating the decommissioning plan.
- Before final electrical inspection, provide evidence that the decommissioning plan was recorded with the Register of Deeds.

Questions?

If you have any questions regarding the decommissioning of solar panels, please email questions to cleanenergyhelp@nyserda.ny.gov or request free technical assistance at nyserda.ny.gov/SolarGuidebook. The NYSERDA team looks forward to partnering with communities across the state to help them meet their solar energy goals.

Model Solar Energy Local Law

For local governments to utilize when drafting local laws and regulations for solar development.

NYSERDA

Solar Guidebook for Local Governments
NYSERDA 17 Columbia Circle Albany, NY 12203

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1. **Model Solar Energy Local Law** 167

Overview

The Model Solar Energy Local Law serves as a resource to inform local officials on the processes of installing, operating, maintaining and decommissioning solar energy systems in their respective jurisdictions. Providing this as a resource for local governments, officials can then use this Model Law to assist them in examining their own local laws, regulations, and policies to adopt their own rules and regulations that make sense for their respective community with regards to solar development.

The Model Solar Energy Local Law can be found on the following page and at nyserda.ny.gov/SolarGuidebook, under the Model Solar Energy Local Law tab. A workable version of this document can also be found online at the above website. It is not recommended for municipalities to use the Model Law 'as is', it was created as a resource for advising local governments when adopting solar energy local laws.

1. Model Solar Energy Local Law

Model Solar Energy Local Law Instructions

1. The sole siting authority for most solar projects under 25 MW resides at the local level rather than the state level. One purpose of this Model Solar Energy Local Law (Model Law) is to inform and facilitate local efforts to expand solar energy generation in a sustainable way. This Model Solar Energy Local Law regulates the installation, operation, maintenance, and decommissioning of solar energy systems. The Model Law is intended to be an "all-inclusive" ordinance to allow for a thorough review of all aspects of solar energy systems under typical zoning and land use regulations, including the State Environmental Quality Review Act. Municipalities are encouraged to review this Model Law, examine their local laws and regulations and the types, size range and number of solar energy projects proposed, and adopt a local law addressing the aspects of solar energy development that make the most sense for each municipality, deleting, modifying, or adding other provisions as appropriate.
2. In some cases, there may be multiple approaches to regulate a certain aspect of solar energy systems. The word "OR" has been placed in the text of the model law to indicate these options. Municipalities should choose the option that works best for their communities. The content provided in brackets and highlighted is optional. Depending on local circumstances, a municipality may want to include this content or choose to adopt a different standard.
3. This Model Law is not intended for adoption exactly as it is written. It is intended to be advisory only, and users should not rely upon it as legal advice. A municipality is not required to adopt this Model Law. Municipal officials are urged to seek legal advice from their attorneys before enacting a solar energy law. Municipalities must carefully consider how this language may be modified to suit local conditions, their comprehensive plan, and existing land use and zoning provisions.

4. Prior to drafting a local solar energy law, municipalities can assess the potential of the local electric distribution system to interconnect significant amounts of solar generating capacity. New York utilities have made several tools available, such as Hosting Capacity maps, to help customers and developers conduct initial assessments.

    A. The "Hosting Capacity" is the utility's estimate of the amount of new distributed generation (DG) resources that may be interconnected at a particular part of the distribution system without adversely impacting power quality or reliability under current configurations and without requiring expensive infrastructure upgrades.

    B. Users should understand that the Hosting Capacity maps are not intended as a guarantee that a specific project can interconnect. A number of factors that Hosting Capacity maps cannot fully account for drive up the cost of interconnecting DG to the electric system, and actual interconnection requirements and costs will be determined following the respective utility's study of individual interconnection applications. However, the maps provide an assessment of the relative feasibility of pursuing projects on different parts of the utility's system and thus help define areas of higher and lower potential for development. Questions regarding Hosting Capacity maps can be directed to cleanenergyhelp@nyserda.ny.gov.

    C. If the electrical system within a municipality appears to have development potential, municipalities should review and, if necessary, amend their comprehensive plans to address solar energy development within the community and adopt policies to carry this goal forward.

5. Municipalities may consider taking action on the comprehensive plan update at the same time it considers adoption of local laws and/or regulations for solar energy projects. Suggestions on how municipalities can develop and adopt solar friendly policies and plans that provide protection for the municipality are listed below:

    A. Adopt a resolution or policy statement, or the mayor can issue an executive order or proclamation to outline a strategy for municipal-wide solar development.

    B. Appoint a Solar Energy Task Force ("Task Force") that represents all interested stakeholders, including residents, businesses, interested non- profit organizations, the solar industry, utilities, and relevant municipal officials and staff to prepare an action plan, amend the comprehensive plan to include solar energy planning goals and actions, and develop local laws and/or regulations to ensure the orderly development of solar energy projects.

    C. Charge the Task Force with conducting meetings on a communitywide basis to involve all key stakeholders, gather all available ideas, identify divergent groups and views, and secure support from the entire community. The Task Force also should conduct studies and should determine whether existing policies, plans, and land use regulations require amendments to remove barriers to and facilitate solar energy development goals.

    D. Establish a training program for local staff and land use boards. Municipalities are encouraged to utilize State and Federal technical assistance and grants for training programs when available.

    E. Partner with adjacent communities and/or county agencies to adopt compatible policies, plan components, and zoning provisions.

Model Solar Energy Local Law

1. Authority

This Solar Energy Local Law is adopted pursuant to [Select one: sections 261-263 of the Town Law / sections 7-700 through 7-704 of the Village Law / sections 19 and 20 of the City Law and section 20 of the Municipal Home Rule Law] of the State of New York, which authorize the [Village/Town/City] to adopt zoning provisions that advance and protect the health, safety and welfare of the community, and, in accordance with the [Village/Town/City] law of New York State, "to make provision for, so far as conditions may permit, the accommodation of solar energy systems and equipment and access to sunlight necessary therefor."

Commentary: Municipalities are specifically authorized to adopt legislation to accommodate Solar Energy Systems and equipment. The Model Law Authority Section references this delegated authority. The municipal attorney should be consulted regarding this Section as well as the Model Solar Energy Law in its totality.

2. Statement of Purpose

A. This Solar Energy Local Law is adopted to advance and protect the public health, safety, and welfare of [Village/Town/City] by creating regulations for the installation and use of solar energy generating systems and equipment, with the following objectives:

1) To take advantage of a safe, abundant, renewable and non-polluting energy resource;

2) To decrease the cost of electricity to the owners of residential and commercial properties, including single-family houses;

3) To increase employment and business development in the [Village/Town/City], to the extent reasonably practical, by furthering the installation of Solar Energy Systems;

4) To mitigate the impacts of Solar Energy Systems on environmental resources such as important agricultural lands, forests, wildlife and other protected resources, and;

5) To create synergy between solar and [other stated goals of the community pursuant to its Comprehensive Plan], [such as urban/downtown revitalization, vacant land management, creating a walkable, healthy community, etc.].

Commentary: As the benefits of Solar Energy Systems may vary from community to community, the Purpose Section should be reviewed and adjusted accordingly. Any benefits of solar energy referred to specifically in the local comprehensive plan should be added to this list. An expansive list of the benefits of solar energy may help secure support from local stakeholder groups for the adoption of the Model Law. A municipality should include benefits in this list that resonate with the stakeholders involved in its community. The following list includes additional benefits of solar energy that communities may choose to incorporate into the Purpose Section, as appropriate:

- To decrease the use of fossil fuels, thereby reducing the carbon footprint of [Village/Town/City];
- To invest in a locally generated source of energy and to increase local economic value, rather than importing non-local fossil fuels;
- To align the laws and regulations of the community with several policies of the State of New York, particularly those that encourage distributed energy systems;
- To become more competitive for state and federal grants and tax benefits;
- To make the community more resilient during storm events;
- To aid in the energy independence of the community as well as the country;
- To diversify energy resources to decrease dependence on the grid;
- To improve public health;
- To encourage a sense of pride in the community;
- To encourage investment in public infrastructure supportive of solar, such as generation facilities, grid-scale transmission infrastructure, and energy storage sites.

3. Definitions

BUILDING-INTEGRATED SOLAR ENERGY SYSTEM: A combination of Solar Panels and Solar Energy Equipment integrated into any building envelope system such as vertical facades, semitransparent skylight systems, roofing materials, or shading over windows, which produce electricity for onsite consumption.

FARMLAND OF STATEWIDE IMPORTANCE: Land, designated as “Farmland of Statewide Importance” in the U.S. Department of Agriculture Natural Resources Conservation Service (NRCS)’s Soil Survey Geographic (SSURGO) Database on Web Soil Survey, that is of state wide importance for the production of food, feed, fiber, forage, and oilseed crops as determined by the appropriate state agency or agencies. Farmland of Statewide Importance may include tracts of land that have been designated for agriculture by state law.

GLARE: The effect by reflections of light with intensity sufficient as determined in a commercially reasonable manner to cause annoyance, discomfort, or loss in visual performance and visibility in any material respects.

GROUND-MOUNTED SOLAR ENERGY SYSTEM: A Solar Energy System that is anchored to the ground via a pole or other mounting system, detached from any other structure, that generates electricity for onsite or offsite consumption.

NATIVE PERENNIAL VEGETATION: native wildflowers, forbs, and grasses that serve as habitat, forage, and migratory way stations for pollinators and shall not include any prohibited or regulated invasive species as determined by the New York State Department of Environmental Conservation.

POLLINATOR: bees, birds, bats, and other insects or wildlife that pollinate flowering plants, and includes both wild and managed insects.

PRIME FARMLAND: Land, designated as "Prime Farmland" in the U.S. Department of Agriculture Natural Resources Conservation Service (NRCS)'s Soil Survey Geographic (SSURGO) Database on Web Soil Survey, that has the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops and is also available for these land uses.

ROOF-MOUNTED SOLAR ENERGY SYSTEM: A Solar Energy System located on the roof of any legally permitted building or structure that produces electricity for onsite or offsite consumption.

SOLAR ACCESS: Space open to the sun and clear of overhangs or shade so as to permit the use of active and/or passive Solar Energy Systems on individual properties.

SOLAR ENERGY EQUIPMENT: Electrical material, hardware, inverters, conduit, storage devices, or other electrical and photovoltaic equipment associated with the production of electricity.

SOLAR ENERGY SYSTEM: The components and subsystems required to convert solar energy into electric energy suitable for use. The term includes, but is not limited to, Solar Panels and Solar Energy Equipment. The area of a Solar Energy System includes all the land inside the perimeter of the Solar Energy System, which extends to any interconnection equipment. A Solar Energy System is classified as a Tier 1, Tier 2, or Tier 3 Solar Energy System as follows.

A. Tier 1 Solar Energy Systems include the following:

   a. Roof-Mounted Solar Energy Systems

   b. Building-Integrated Solar Energy Systems

B. Tier 2 Solar Energy Systems include Ground-Mounted Solar Energy Systems with system capacity up to [25] kW AC and that generate no more than [110] % of the electricity consumed on the site over the previous [12] months.

OR

Tier 2 Solar Energy Systems include Ground-Mounted Solar Energy Systems with a total surface area of all solar panels on the lot of up to [4,000] square feet and that generate up to [110] % of the electricity consumed on the site over the previous [12] months.

C. Tier 3 Solar Energy Systems are systems that are not included in the list for Tier 1 and Tier 2 Solar Energy Systems.

Commentary: These definitions are critical to the workability of the remaining sections of the Model Law. There are three types of Solar Energy Systems defined here.

Tier 1 Solar Energy Systems are defined as all Roof-Mounted and Building-Integrated Solar Energy Systems and are permitted in all zoning districts.

Tier 2 Solar Energy Systems are Ground-Mounted systems that use the electricity generated from solar panels primarily onsite. A municipality may define Tier 2 Solar Energy Systems according to their physical size using measurements similar to those found in the zoning ordinance's bulk and area requirements (measured in acres, square feet etc.), or based on energy capacity due to the fact that the physical size of a Solar Energy System tends to increase as kilowatts produced increases.

Tier 3 Solar Energy Systems are systems that are not included in either Tier 1 or Tier 2 Solar Energy Systems. Note that Solar Energy Systems producing 25 MW or more are required to seek a permit through a State-level siting process administered by the Office of Renewable Energy Siting (ORES). ORES will ensure that siting decisions are predictable, responsible, and timely, while providing opportunities for local engagement throughout the process. Additionally, new solar projects between 20-25 MW and existing projects in the initial phases of the Article 10 review process may opt-in to the ORES review process.

This Model Law does not include a specific definition for Solar Energy Systems raised on canopy mounting, such as a solar parking canopy. These configurations are included within the definition of Ground-Mounted Solar Energy Systems or Roof-Mounted Solar Energy Systems, depending on the location of the canopy. If a municipality anticipates requiring special consideration for solar canopy systems, it could consider adding to the Model Law specific provisions addressing these concerns or using a waiver to remove certain standards when they are deemed unnecessary by the community.

SOLAR PANEL: A photovoltaic device capable of collecting and converting solar energy into electricity.

STORAGE BATTERY: A device that stores energy and makes it available in an electrical form.

4. Applicability

A. The requirements of this Local Law shall apply to all Solar Energy Systems permitted, installed, or modified in [Village/Town/City] after the effective date of this Local Law, excluding general maintenance and repair.

B. Solar Energy Systems constructed or installed prior to the effective date of this Local Law shall not be required to meet the requirements of this Local Law.

C. Modifications to an existing Solar Energy System that increase the Solar Energy System area by more than [5] % of the original area of the Solar Energy System (exclusive of moving any fencing) shall be subject to this Local Law.

D. All Solar Energy Systems shall be designed, erected, and installed in accordance with all applicable codes, regulations, and industry standards as referenced in the NYS Uniform Fire Prevention and Building Code ("Building Code"), the NYS Energy Conservation Code ("Energy Code"), and the [Village/Town/City] Code.

Commentary: The Applicability Section establishes the effective date for implementation of the law. In addition, it carves out an exemption for maintenance, repair of systems, and modifications to existing Solar Energy Systems with an increase in area less than 5% of the original area of the system (exclusive of moving any fencing).

Note that other zoning code definitions, regulations, and uses should be reviewed for conflict with the provisions of this law. For example, municipalities should amend any zoning provision that prevents an accessory use from existing on an accessory structure, which the Model Law allows. If a municipality's zoning code defines or limits the use of the term "subordinate," in a way that conflicts with the Model Law's definitions, the municipality should amend the Model Law to state that it preempts the more restrictive definition. Some local zoning laws prohibit accessory structures on other accessory uses, which this law allows. One solution to this and the other conflicts noted here is to amend the zoning definition for solar accessory uses to clarify that they are allowed despite restrictive definitions of "subordinate" or the prohibition of accessory uses to accessory buildings.

5. General Requirements

A. A Building permit shall be required for installation of all Solar Energy Systems.

B. Local land use boards are encouraged to condition their approval of proposed developments on sites adjacent to Solar Energy Systems so as to protect their access to sufficient sunlight to remain economically feasible over time.

C. Issuance of permits and approvals by the [Reviewing Board] shall include review pursuant to the State Environmental Quality Review Act [ECL Article 8 and its implementing regulations at 6 NYCRR Part 617 ("SEQRA")].

6. Permitting Requirements for Tier 1 Solar Energy Systems

All Tier 1 Solar Energy Systems shall be permitted in all zoning districts and shall be exempt from site plan review under the local zoning code or other land use regulation, subject to the following conditions for each type of Solar Energy Systems:

A. Roof-Mounted Solar Energy Systems

1) Roof-Mounted Solar Energy Systems shall incorporate, when feasible, the following design requirements:

a. Solar Panels on pitched roofs shall be mounted with a maximum distance of [8] inches between the roof surface the highest edge of the system.

b. Solar Panels on pitched roofs shall be installed parallel to the roof surface on which they are mounted or attached.

c. Solar Panels on pitched roofs shall not extend higher than the highest point of the roof surface on which they are mounted or attached.

d. Solar Panels on flat roofs shall not extend above the top of the surrounding parapet, or more than [24] inches above the flat surface of the roof, whichever is higher.

2) Glare: All Solar Panels shall have anti-reflective coating(s).

3) Height: All Roof-Mounted Solar Energy Systems shall comply with the height limitations in Appendix 3.

OR

All Roof-Mounted Solar Energy Systems shall be subject to the maximum height regulations specified for principal and accessory buildings within the underlying zoning district.

Commentary: Roof-Mounted Solar Energy Systems regulated under this Section produce electricity for onsite or offsite consumption, are permitted in all zoning districts, and do not require site plan review. Because Roof-Mounted Solar Energy Systems are installed on existing structures, their placement has no effect on the impermeability of a property's surface area or the parcel's lot coverage, making it unnecessary to include Roof-Mounted Solar Energy Systems in lot coverage and impervious surface calculations.

Most concerns related to these systems are attributed to aesthetics, which in some communities can be a major barrier to the approval of Solar Energy Systems. To help regulate aesthetics, specific requirements regarding height, coloration, and equipment placement can be incorporated into zoning regulations. Municipalities should evaluate their existing height limitations within each zoning district to determine if they are overly restrictive. The height limitations included in Appendix 3 provide a guide if municipalities aim to design specific height limitations for Roof-Mounted Solar Energy Systems. This Model Law also includes other aesthetic standards that address placement and tilt, while limiting the enforcement to "when feasible" to avoid overly burdensome standards.

Solar panels are constructed of dark-colored (usually blue or black) materials and should be covered with anti-reflective coatings. Modern solar panels reflect as little as two percent of incoming sunlight, which is about the same as water and less than soil or wood shingles. For more information, please refer to the US Department of Energy Office of Energy Efficiency and Renewable Energy's Solar PV and Glare Factsheet, available at https://www.energy.gov/eere/solar/downloads/solar-pv-and-glare-factsheet.

B. Building-Integrated Solar Energy Systems shall be shown on the plans submitted for the building permit application for the building containing the system.

Commentary: Building-Integrated Photovoltaic Systems are exempt from any bulk and area requirements and design standards of the law because they are integrated into building envelope systems themselves, including vertical façades (made of glass and/or other façade materials), semitransparent skylight systems, roofing materials, and window shading elements. These systems are regulated in the same manner as the building envelope systems of which they are a part. Therefore, this Model Law only requires that Building-Integrated Solar Energy Systems be shown on the plans submitted for the building permit application.

7. Permitting Requirements for Tier 2 Solar Energy Systems

All Tier 2 Solar Energy Systems shall be permitted in all zoning districts as accessory structures and shall be exempt from site plan review under the local zoning code or other land use regulations, subject to the following conditions:

A. Glare: All Solar Panels shall have anti-reflective coating(s).

B. Setbacks: Tier 2 Solar Energy Systems shall be subject to the setback regulations specified for the accessory structures within the underlying zoning district. All Ground- Mounted Solar Energy Systems shall only be installed in the side or rear yards in residential districts.

Commentary: To avoid being overly restrictive, municipalities in rural or less dense areas may elect to remove the Model Law's requirement that Tier 2 Solar Energy Systems in residential districts must be installed in the side or rear yards. These systems might not be visible from the street in less dense areas.

C. Height: Tier 2 Solar Energy Systems shall be subject to the height limitations specified for accessory structures within the underlying zoning district.

OR

Tier 2 Solar Energy Systems shall comply with the height limitations in Appendix 3.

D. Screening and Visibility.

1) All Tier 2 Solar Energy Systems shall have views minimized from adjacent properties to the extent reasonably practicable.

2) Solar Energy Equipment shall be located in a manner to reasonably avoid and/or minimize blockage of views from surrounding properties and shading of property to the north, while still providing adequate solar access.

E. Lot Size: Tier 2 Solar Energy Systems shall comply with the existing lot size requirement specified for accessory structures within the underlying zoning district.

Commentary: Tier 2 Solar Energy Systems regulated under this Section are Ground- Mounted Systems that produce electricity primarily for onsite consumption and are relatively smaller in physical size compared to Tier 3 Solar Energy Systems. They are permitted as accessory structures in all zoning districts deemed appropriate by the local jurisdiction and do not require site plan review. Tier 2 Solar Energy Systems are standalone structures and generate different concerns than Roof-Mounted installations. Because Tier 2 system sizes are not limited to a structure's available roof space, it is important to think about the size of the lot in relation to the allowable system size, after accounting for setbacks. The Model Law requires all Tier 2 systems to be subject to the setback requirements of the underlying zoning district.

The Model Law provides two options to regulate the height of Tier 2 Solar Energy Systems. One way is to limit the height of Ground-Mounted Solar Energy Systems to the requirements in the underlying zoning district. Each municipality must adopt appropriate height restrictions based on local need. Alternatively, municipalities can specify a set of new height standards, as shown in Appendix 3. All height measurements should be calculated when the Solar Energy System is oriented at maximum tilt.

This Model Law includes specific screening and visibility standards for Tier 2 Solar Energy Systems while limiting the enforcement to "the extent reasonably practicable" to avoid overly burdensome standards.

8. Permitting requirements for Tier 3 Solar Energy Systems

All Tier 3 Solar Energy Systems are permitted through the issuance of a [special use permit] within the [XXXXXXXXXXXX, XXXXXXXXXX, XXXXXXXXXX] zoning districts, and subject to site plan application requirements set forth in this Section.

Commentary: Tier 3 Solar Energy Systems are systems that are not included in either Tier 1 or Tier 2 Solar Energy Systems. Note that Solar Energy Systems producing 25 MW or more are required to seek a permit through a State-level siting process administered by the Office of Renewable Energy Siting (ORES). ORES will ensure that siting decisions are predictable, responsible, and timely, while providing opportunities for local engagement throughout the process. Additionally, new solar projects between 20-25 MW and existing projects in the initial phases of the Article 10 review process may opt-in to the ORES review process.

A. Applications for the installation of Tier 3 Solar Energy System shall be:

1) reviewed by the [Code Enforcement/Zoning Enforcement Officer or Reviewing Board] for completeness. Applicants shall be advised within [10] business days of the completeness of their application or any deficiencies that must be addressed prior to substantive review.

2) subject to a public hearing to hear all comments for and against the application. The [Reviewing Board] of the [Village/Town/City] shall have a notice printed in a newspaper of general circulation in the [Village/Town/City] at least [5] days in advance of such hearing. Applicants shall have delivered the notice by first class mail to adjoining landowners or landowners within [200] feet of the property at least [10] days prior to such a hearing. Proof of mailing shall be provided to the [Reviewing Board] at the public hearing.

3) referred to the [County Planning Department] pursuant to General Municipal Law § 239-m if required.

4) upon closing of the public hearing, the [Reviewing Board] shall take action on the application within 62 days of the public hearing, which can include approval, approval with conditions, or denial. The 62-day period may be extended upon consent by both the [Reviewing Board] and applicant.

B. Underground Requirements. All on-site utility lines shall be placed underground to the extent feasible and as permitted by the serving utility, with the exception of the main service connection at the utility company right-of-way and any new interconnection equipment, including without limitation any poles, with new easements and right-of-way.

C. Vehicular Paths. Vehicular paths within the site shall be designed to minimize the extent of impervious materials and soil compaction.

D. Signage.

1) No signage or graphic content shall be displayed on the Solar Energy Systems except the manufacturer's name, equipment specification information, safety information, and 24-hour emergency contact information. Said information

shall be depicted within an area no more than [8] square feet.

2) As required by National Electric Code (NEC), disconnect and other emergency shutoff information shall be clearly displayed on a light reflective surface. A clearly visible warning sign concerning voltage shall be placed at the base of all pad-mounted transformers and substations.

E. Glare. All Solar Panels shall have anti-reflective coating(s).

F. Lighting. Lighting of the Solar Energy Systems shall be limited to that minimally required for safety and operational purposes and shall be reasonably shielded and downcast from abutting properties.

G. Tree-cutting. Removal of existing trees larger than [6] inches in diameter should be minimized to the extent possible.

H. Decommissioning.

1) Solar Energy Systems that have been abandoned and/or not producing electricity for a period of [1] year shall be removed at the Owner and/or Operators expense, which at the Owner's option may come from any security made with the [Village/Town/City] as set forth in Section 10(b) herein.

2) A decommissioning plan (see Appendix 4) signed by the owner and/or operator of the Solar Energy System shall be submitted by the applicant, addressing the following:

a. The cost of removing the Solar Energy System.

b. The time required to decommission and remove the Solar Energy System any ancillary structures.

c. The time required to repair any damage caused to the property by the installation and removal of the Solar Energy System.

3) Security.

a. The deposit, executions, or filing with the [Village/Town/City] Clerk of cash, bond, or other form of security reasonably acceptable to the [Village/Town/City] attorney and/or engineer, shall be in an amount sufficient to ensure the good faith performance of the terms and conditions of the permit issued pursuant hereto and to provide for the removal and restorations of the site subsequent to removal. The amount of the bond or security shall be [125] % of the cost of removal of the Tier 3 Solar Energy System and restoration of the property with an escalator of [2] % annually for the life of the Solar Energy System. The decommissioning amount shall be reduced by the amount of the estimated salvage value of the Solar Energy System.

b. In the event of default upon performance of such conditions, after proper notice and expiration of any cure periods, the cash deposit, bond, or security shall be forfeited to the [Village/Town/City], which shall be entitled to maintain an action thereon. The cash deposit, bond, or security shall remain in full force and effect until restoration of the property as set forth in the decommissioning plan is completed.

Commentary: Decommissioning is the process of removing an abandoned Solar Energy System and remediating the land. When describing requirements for decommissioning Solar Energy Systems, it is possible to specifically require the removal of infrastructure, disposal of any components, and the stabilization and re-vegetation of the site. A decommissioning plan is required for Tier 3 Solar Energy Systems.

It is important to note that despite many municipalities' choice to require a financial mechanism for decommissioning, there is no specific authority to do so as part of a land use approval for solar PV projects. Therefore, a municipality should consult the municipal attorney when evaluating financial mechanisms.

For additional resources, please refer to NYSERDA's Fact Sheet on Decommissioning Solar Panel Systems, available at nyserda.ny.gov/SolarGuidebook.

I. Site plan application. For any Solar Energy system requiring a Special Use Permit, site plan approval shall be required. Any site plan application shall include the following information:

1) Property lines and physical features, including roads, for the project site

2) Proposed changes to the landscape of the site, grading, vegetation clearing and planting, exterior lighting, and screening vegetation or structures

3) A one- or three-line electrical diagram detailing the Solar Energy System layout, solar collector installation, associated components, and electrical interconnection methods, with all National Electrical Code compliant disconnects and over current devices.

4) A preliminary equipment specification sheet that documents all proposed solar panels, significant components, mounting systems, and inverters that are to be installed. A final equipment specification sheet shall be submitted prior to the issuance of building permit.

5) Name, address, and contact information of proposed or potential system installer and the owner and/or operator of the Solar Energy System. Such information of the final system installer shall be submitted prior to the issuance of building permit.

6) Name, address, phone number, and signature of the project applicant, as well as all the property owners, demonstrating their consent to the application and the use of the property for the Solar Energy System.

7) Zoning district designation for the parcel(s) of land comprising the project site.

8) Property Operation and Maintenance Plan. Such plan shall describe continuing photovoltaic maintenance and property upkeep, such as mowing and trimming.

9) Erosion and sediment control and storm water management plans prepared to New York State Department of Environmental Conservation standards, if applicable, and to such standards as may be established by the Planning Board.

10) Prior to the issuance of the building permit or final approval by the [Reviewing Board], but not required as part of the application, engineering documents must be signed and sealed by a New York State (NYS) Licensed Professional Engineer or NYS Registered Architect.

Commentary: It is important to consolidate the application review for Solar Energy System approval in one board. In some communities, the local zoning law may allocate responsibilities for special use permits and site plan approvals to different boards. Moving the application back and forth between two boards can add months and unnecessary costs to the Solar Energy System. To avoid this, the community should determine which board should be primarily responsible for Solar Energy System approvals and consolidate special use permit and site plan approval thereby adding the following language to the Model Law: "All site plan and special use permit approvals for Solar Energy Systems shall be the responsibility of the [Reviewing Board] in order to avoid delays in the review of Solar Energy System applications."

Including specific requirements for site plan approval ensures that potential problems are addressed in the initial stages of the project. Municipalities can modify the list of required information to meet local needs as appropriate.

J. Special Use Permit Standards.

1) Lot size

a. The property on which the Tier 3 Solar Energy System is placed shall meet the lot size requirements of the underlying zoning district.

OR

The property on which the Tier 3 Solar Energy System is placed shall meet the lot size requirements in Appendix 1.

2) Setbacks

a. The Tier 3 Solar Energy Systems shall comply with the setback requirements of the underlying zoning district for principal structures.

OR

The Tier 3 Solar Energy Systems shall meet the setback requirements in Appendix 2.

3) Height

a. The Tier 3 Solar Energy Systems shall comply with the building height limitations for principal structures of the underlying zoning district.

OR

b. The Tier 3 Solar Energy Systems shall comply with the height limitations in Appendix 3 depending on the underlying zoning district.

4) Lot coverage

a. The following components of a Tier 3 Solar Energy System shall be considered included in the calculations for lot coverage requirements:

I. Foundation systems, typically consisting of driven piles or monopoles or helical screws with or without small concrete collars.

II. All mechanical equipment of the Solar Energy System, including any pad mounted structure for batteries, switchboard, transformers, or storage cells.

III. Paved access roads servicing the Solar Energy System.

b. Lot coverage of the Solar Energy System, as defined above, shall not exceed the maximum lot coverage requirement of the underlying zoning district.

Commentary: Since Ground-Mounted Solar Energy Systems generally do not include much impervious surface, and since lot coverage requirements are designed, in large part, to reduce impervious surfaces and the run-off they create, this Model Law measures lot coverage for a Ground-Mounted Solar Energy System by its actual impervious footprint, which results in a smaller measurement than the square footage of the solar panels.

It is also important to note that Tier 3 Solar Energy Systems must comply with New York State stormwater regulations, as the panels could alter the volume, velocity, and discharge pattern of stormwater runoff.

5) Fencing Requirements. All mechanical equipment, including any structure for storage batteries, shall be enclosed by a [7-foot-high] fence, as required by NEC, with a self-locking gate to prevent unauthorized access.

6) Screening and Visibility.

a. Solar Energy Systems smaller than [10] acres shall have views minimized from adjacent properties to the extent reasonably practicable using architectural features, earth berms, landscaping, or other screening methods that will harmonize with the character of the property and surrounding area.

b. Solar Energy Systems larger than [10] acres shall be required to:

I. Conduct a visual assessment of the visual impacts of the Solar Energy System on public roadways and adjacent properties. At a minimum, a line-of-sight profile analysis shall be provided. Depending upon the scope and potential significance of the visual impacts, additional impact analyses, including for example a digital viewshed report, [shall/may] be required to submitted by the applicant.

II. Submit a screening & landscaping plan to show adequate measures to screen through landscaping, grading, or other means so that views of Solar Panels and Solar Energy Equipment shall be minimized as reasonably practical from public roadways and adjacent properties to the extent feasible.

i. The screening & landscaping plan shall specify the locations, elevations, height, plant species, and/or materials that will comprise the structures, landscaping, and/or grading used to screen and/or mitigate any adverse aesthetic effects of the system. The landscaped screening shall be comprised of a minimum of [1] evergreen tree, at least [6] feet high at time of planning, plus [2] supplemental shrubs at the reasonable discretion of the [Village/Town/city] [Reviewing Board], all planted within each [10] linear feet of the Solar Energy System. Existing vegetation may be used to satisfy all or a portion of the required landscaped screening. A list of suitable evergreen tree and shrub species should be provided by the [Village/Town/city].

OR

The screening & landscaping plan shall specify the locations, elevations, height, plant species, and/or materials that will comprise the structures, landscaping, and/or grading used to screen and/or mitigate any adverse aesthetic effects of the system, following the applicable rules and standards established by the [Village/Town/County].

Commentary: In general, municipalities should think through how helpful SEQRA can be in mitigating adverse impacts of any proposed system approved through a special use permit under this Section.

For Tier 3 Solar Energy Systems that are smaller than 10 acres (considered Unlisted Actions in SEQR, except for systems in agricultural districts with a solar-panel surface area larger than 2.5 acres), this Model Law limits the enforcement of screening and visibility standards to "the extent reasonably practicable" to avoid overly burdensome standards.

For Tier 3 Solar Energy Systems that are larger than 10 acres, a visual impact assessment is already required for SEQR (considered Type I Actions in SEQR), and solar projects could use the same assessment to analyze visual impacts on public roadways and adjacent properties to comply with Model Law screening and visibility requirements.

For additional resources, please refer to NY-Sun's "State Environmental Quality Review (SEQR) for Solar," available at nyserda.ny.gov/SolarGuidebook.

7) Agricultural Resources. For projects located on agricultural lands:

1) Any Tier 3 Solar Energy System located on the areas that consist of Prime Farmland or Farmland of Statewide Importance shall not exceed [50] % of the area of Prime Farmland or Farmland of Statewide Importance on the parcel.

OR

Any Tier 3 Solar Energy System located on the areas that consist of Prime Farmland or Farmland of Statewide Importance shall not exceed [50] % of the entire lot.

AND/OR

Tier 3 Solar Energy Systems on Prime Farmland or Farmland of Statewide Importance shall be required to seed [20] % of the total surface area of all solar panels on the lot with native perennial vegetation designed to attract pollinators.

2) To the maximum extent practicable, Tier 3 Solar Energy Systems located on Prime Farmland shall be constructed in accordance with the construction requirements of the New York State Department of Agriculture and Markets.

Commentary: For more details, please refer to NYS Department of Agriculture and Market's Guidelines for Agricultural Mitigation for Solar Energy Projects, available at www.agriculture.ny.gov/ap/agservices/SolarEnergyGuidelines.pdf.

3) Tier 3 Solar Energy System owners shall develop, implement, and maintain native vegetation to the extent practicable pursuant to a vegetation management plan by providing native perennial vegetation and foraging habitat beneficial to game birds, songbirds, and pollinators. To the extent practicable, when establishing perennial vegetation and beneficial foraging habitat, the owners shall use native plant species and seed mixes.

Commentary: Pollinators (birds, bats, bees, butterflies, moths, beetles, and multiple other species of insects) are critical to agricultural yield in the U.S. Some solar facilities are starting to use seed mixes of native grasses and pollinator friendly flowering plants as ground cover in solar farms. By establishing native pollinator habitats on solar farms, it is possible to reconcile the conflict between solar farms and agricultural land use. Below are multiple recommended approaches that can be used for creating pollinator habitat on solar farms:

- Plant short-growing, low-maintenance, native seed mix underneath and around the panels;
- Plant a diverse pollinator seed mix in between the rows of panels;
- Plant buffers with vegetation that benefit pollinators and early successional species; Plant native shrubs along the property boundary;
- Specify a minimum number of species of native flowers (encouraged to include species for each bloom period) and native grass species.

K. Ownership Changes. If the owner or operator of the Solar Energy System changes or the owner of the property changes, the special use permit shall remain in effect, provided that the successor owner or operator assumes in writing all of the obligations of the special use permit, site plan approval, and decommissioning plan. A new owner or operator of the Solar Energy System shall notify the zoning enforcement officer of such change in ownership or operator within [30] days of the ownership change.

9. Safety

A. Solar Energy Systems and Solar Energy Equipment shall be certified under the applicable electrical and/or building codes as required.

B. Solar Energy Systems shall be maintained in good working order and in accordance with industry standards. Site access shall be maintained, including snow removal at a level acceptable to the local fire department and, if the Tier 3 Solar Energy System is located in an ambulance district, the local ambulance corps.

C. If Storage Batteries are included as part of the Solar Energy System, they shall meet the requirements of any applicable fire prevention and building code when in use and, when no longer used, shall be disposed of in accordance with the laws and regulations of the [Village/Town/City] and any applicable federal, state, or county laws or regulations.

10. Permit Time Frame and Abandonment

A. The Special Use Permit and site plan approval for a Solar Energy System shall be valid for a period of [18] months, provided that a building permit is issued for construction [or] construction is commenced. In the event construction is not completed in accordance with the final site plan, as may have been amended and approved, as required by the [Reviewing Board], within [18] months after approval, the applicant or the [Village/Town/City] may extend the time to complete construction for [180] days. If the owner and/or operator fails to perform substantial construction after [24] months, the approvals shall expire.

B. Upon cessation of electricity generation of a Solar Energy System on a continuous basis for [12] months, the [Village/Town/City] may notify and instruct the owner and/or operator of the Solar Energy System to implement the decommissioning plan. The decommissioning plan must be completed within [360] days of notification.

C. If the owner and/or operator fails to comply with decommissioning upon any abandonment, the [Village/Town/City] may, at its discretion, utilize the bond and/or security for the removal of the Solar Energy System and restoration of the site in accordance with the decommissioning plan.

Commentary: Abandonment, as it applies to Solar Energy Systems, requires that the Solar Energy System be removed after a specified amount of time of inactivity. A municipality can establish a timeframe for the removal of a Solar Energy System based on aesthetics, system size, location, and system complexity. Municipalities, in their codes, can designate the amount of time after which a Solar Energy System is considered abandoned.

If provisions of financial surety to cover the cost of removal are not required, municipalities could use other remedies, such as placing a tax lien on the property if the owner and/or operator fail(s) to comply with decommissioning requirements.

11. Enforcement

Any violation of this Solar Energy Law shall be subject to the same enforcement requirements, including the civil and criminal penalties, provided for in the zoning or land use regulations of [Village/Town/City].

Commentary: This Section provides that any violation of the Solar Energy Law will result in the same assessment of civil and criminal penalties already laid out in the existing enforcement provision(s) of the municipality's zoning code.

12. Severability

The invalidity or unenforceability of any section, subsection, paragraph, sentence, clause, provision, or phrase of the aforementioned sections, as declared by the valid judgment of any court of competent jurisdiction to be unconstitutional, shall not affect the validity or enforceability of any other section, subsection, paragraph, sentence, clause, provision, or phrase, which shall remain in full force and effect.

Commentary: Local laws typically have a provision that saves the entire law from invalidation by the courts if one or a few provisions are found invalid. The language in this Section can be adjusted to match that of the language already found in the severability clauses in a municipality's other laws.

Appendix 1: Lot Size Requirements

The following table displays the size requirements of the lot for Ground-Mounted Solar Energy Systems to be permitted.

Table 1: Lot Size Requirements

Zoning District	Tier 3 Solar Energy Systems
Residential Low Density	≥ 2 acres
Residential High Density	—
Commercial / Business	≥ 5 acres
Light Industrial	N/A
Heavy Industrial	N/A
Agricultural / Residential	≥ 5 acres

Key:

—: Not Allowed
N/A: Not Applicable

Appendix 2: Parcel Line Setbacks

The following table provides parcel line setback requirements for Ground-Mounted Solar Energy Systems. Fencing, access roads and landscaping may occur within the setback.

Table 2: Parcel Line Setback Requirements

	Tier 3 Ground-Mounted		
Zoning District	Front	Side	Rear
Residential Low Density	100’	100’	100’
Residential High Density	—	—	—
Commercial / Business	30’	15’	25’
Light Industrial	30’	15’	25’
Heavy Industrial	30’	15’	25’
Agricultural / Residential	30’	15’	25’

Key:

—: Not Allowed

Appendix 3: Height Requirements

The following table displays height requirements for each type of Solar Energy Systems. The height of systems will be measured from the highest natural grade below each solar panel.

Table 3: Height Requirements

Zoning District	Tier 1 Roof-Mounted	Tier 2	Tier 3
Residential Low Density	2’ above roof	10’	15’
Residential High Density	2’ above roof	10’	—
Commercial / Business	4’ above roof	15’	20’
Light Industrial	4’ above roof	15’	20’
Heavy Industrial	4’ above roof	15’	20’
Agricultural / Residential	2’ above roof	15’	20’

Key:

—: Not Allowed

Appendix 4: Example Decommissioning Plan

Date: [Date]

Decommissioning Plan for [Solar Project Name], located at: [Solar Project Address]

Prepared and Submitted by [Solar Developer Name], the owner of [Solar Farm Name]

As required by [Town/Village/City], [Solar Developer Name] presents this decommissioning plan for [Solar Project Name] (the “Facility”).

Decommissioning will occur as a result of any of the following conditions:

1. The land lease, if any, ends
2. The system does not produce power for [12] months
3. The system is damaged and will not be repaired or replaced

The owner of the Facility, as provided for in its lease with the landowner, shall restore the property to its condition as it existed before the Facility was installed, pursuant to which may include the following:

1. Removal of all operator-owned equipment, concrete, conduits, structures, fencing, and foundations to a depth of 36 inches below the soil surface.
2. Removal of any solid and hazardous waste caused by the Facility in accordance with local, state and federal waste disposal regulations.
3. Removal of all graveled areas and access roads unless the landowner requests in writing for it to remain.

All said removal and decommissioning shall occur within [12] months of the Facility ceasing to produce power for sale.

The owner of the Facility, currently [Solar Developer Name], is responsible for this decommissioning.

Facility Owner Signature: _____Date: _____

Questions?

If you have any questions about model solar energy local laws, please email questions to cleanenergyhelp@nyserda.ny.gov or request free technical assistance at nyserda.ny.gov/SolarGuidebook. The NYSERDA team looks forward to partnering with communities across the state to help them meet their solar energy goals.

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Municipal Solar Procurement Toolkit

Information for local governments looking to lease existing underutilized land for solar development.

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Overview

Included in this toolkit are step-by-step instructions on how municipalities can lease underutilized land, such as landfills and brownfields, for solar development. In addition, we provide a Request for Proposals (RFP) template, Lease Agreement template, and a Model Law for Counties subject to New York County Law § 215. These resources previously mentioned are materials often used by local governments when in the solar development process and are included for an advisory purpose.

Intended Use

Municipalities are encouraged to review and consider modifying this toolkit, specifically the template RFP and Lease Agreement, to ensure it addresses all the needs of the municipality by deleting, modifying, or adding any other sections or provisions that would be necessary in the leasing jurisdiction.

Depending on the type of land the municipality plans on leasing, there are specific requirements within the template RFP and Lease Agreement that will need to be updated. The template RFP and Lease Agreement provide specific requirements for landfills and brownfields that will need to be adjusted for the project. All language that may need to be modified by the municipality is highlighted grey.

The Templates in this Toolkit are not intended for use exactly as written. This Toolkit is intended to be advisory only, and users should not rely upon it as legal advice. A municipality is not required to utilize these templates exactly as written. Municipal officials are urged to seek legal advice from their attorneys before issuing an RFP or signing a Lease Agreement.

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1. Planning and Early Stage Goal-Setting

Leasing land for solar development requires the active participation of multiple government departments. All relevant local government stakeholders should be included at the beginning of the process, to ensure that all potential project barriers are identified early and that critical municipal departments are fully informed about the project in advance. Relevant local government stakeholders may include elected leaders, legal counsel, planning and zoning staff, sustainability coordinator, or local State Environmental Quality Review (SEQR) authority. Frequently, the municipal authority or executive authorizes the creation of an advisory committee to investigate the feasibility of a solar project. This committee should be responsible for coordinating the process details and serving as a review committee for selecting the solar developer. In addition to managing the solar land lease process, committee members may wish to arrange project updates with local government leaders and the public. Local government project proponents should also consider developing strategies for communicating information about proposed solar projects to external stakeholders, particularly if the project involves developing large tracts of open space, as large projects have raised concerns among adjacent landowners and other stakeholders in some jurisdictions. External stakeholders may include the community members, utility representatives, or NYS Department of Environmental Conservation (if a landfill or brownfield, or near a wetland).

It is a necessary step to get support from your community members. Pursuant to state law, for example New York Town Law § 64, municipal land leases or solar procurements may be subject to permissive referendums. A permissive referendum is a legal mechanism available for a community to vote on a decision directly, rather than having the issued decided solely by governing board. In addition, certain actions of the governing board that raise or expend money can be subject to a permissive referendum. If an action is determined to be subject to permissive referendum, such act shall be subject to a referendum on petition, unless the proposition has been adopted at an election.

As an example, Town Law Article § 7 lays out the process for town referendums:

- Within ten days after the adoption by the town board, the town clerk shall post and publish a notice which shall set forth the date of the adoption of the act and contain an abstract of such act concisely stating the purpose and effect thereof.
  - The notice shall specify that the resolution that was adopted is subject to a permissive referendum.
- The resolution cannot take effect until thirty (30) days after its adoption.
  - If within 30 days of the adoption, there is a petition filed and signed by the electors of the town protesting against such act and requesting that it be submitted to the electors of the town for approval or disapproval, then this resolution needs to go to a public vote.
- If the petition is filed between 60-75 days prior to a biennial town election, a proposition for the approval of the resolution can be submitted at the election.
- If the petition is filed at any other time, the proposition for the approval of the resolution shall be submitted at a special town election to be held between 60-75 days after filling the petition.

County Consideration: If a project is located on county-owned land, New York County Law § 215 may limit the term of the land lease to five (5) years. As part of this Toolkit, there is a model law that can allow for Counties to lease land longer than 5 years for specific projects. The model law cites the appropriate laws to extend the land lease and includes fields for jurisdictions to fill in. Jurisdictions should work closely with their local legal counsel to determine local land lease requirements.

1.1 Establish Project Goals

The advisory committee, once assembled, should consider the goals and the desired outcomes of a solar project, and develop a preliminary list of project goals and key outcomes, which could include:

- Providing **revenue to the town by leasing public land, such as landfills or brownfields**, to a private developer to construct a community solar project, which the town may or may not participate in, but will provide greater access to clean power to community members.[27]
- Providing a **positive use of a capped landfill, brownfield, or other sites** where environmental or other attributes make alternate land uses difficult.
- Providing **greater access to solar power** for residents, businesses, institutions, and organizations through a community solar project.

2. Site Identification & Considerations

For many municipalities, closed landfills or brownfields are attractive areas to site solar projects because of the limited number of alternative uses for these sites. Developing solar on these sites requires special consideration.[26] If a solar project is being considered for county owned land, County Law § 215 may limit the term of county-owned land leases to a five-years. If municipalities are considering county land, they should contact their legal counsel and County government.

[27] If a solar project is being considered for county owned land, County Law § 215 may limit the term of county-owned land leases to a five-years. If municipalities are considering county land, they should contact their legal counsel and County government.

2.1 Considerations for solar on landfills

- Under 6 N.Y.C.R.R. Part 360, landfill owners must submit landfill closure plans and adhere to a Post-Closure Monitoring and Maintenance Operations Manual when ceasing landfill operations.
- To develop solar on a landfill, a contractor must submit a modification to the post-closure plan to the New York State Department of Environmental Conservation (NYSDEC). These plans will have to take into consideration existing infrastructure, such as gas collection systems and leachate control systems.
- NYSDEC's regional offices offer pre-application consultations to municipalities, who are encouraged to contact NYSDEC early in the project planning process to understand the special requirements of developing solar on landfill sites.

2.2 Considerations for solar on brownfields

- For a proposed brownfield solar site with an Institutional Control (IC) on the property, the Developer will be required to notify the NYSDEC's Division of Environmental Remediation of the site's change of use and to submit details to assess whether the remedy will remain effective or what new Engineering Control and Institutional Control (EC/IC), monitoring activities, and periodic reviews may be necessary. A site-specific inquiry needs to be undertaken in this regard, and the DEC regional office should be engaged early on to discuss next steps.
- Any submissions relative to new and/or revised EC/ICs will likely require modification of the Site Management Plan (SMP) that directs the process for certain site activities and may require additional work to be undertaken pursuant to DEC approval, depending on the scope of proposed site activities.
- SMPs are filed against the deed of the brownfield property via an Environmental Easement, and a copy of the SMP would either be accessible via the DEC or by retrieving the copy included in the County real property records. Of note, the DEC utilizes a form SMP as the starting point for plan development, which is revised based on site-specific information. A copy of the form is available on DEC's website.
- Note that brownfield sites without existing IC equipment should notify the change of use but may not have to submit any additional plan documentation.

3. RFP Process & Contractual Documents

Competitive processes create a fair and open procedure under which solar developers can offer their services. They also ensure that local governments receive the best available pricing, thereby maximizing financial benefits to the municipality. The Toolkit provides a template Request for Proposals (RFP) for municipalities to utilize. The template provides suggested language that can be adjusted to reflect the goals and context of a municipality's procurement. Example evaluation criteria are provided in the template RFP. Municipalities may use these evaluation criteria as a guide but are encouraged to tailor their evaluation processes to meet their own needs and goals. To facilitate comparison of proposals, it is recommended that municipalities ask all respondents to provide price proposals in the same format (the attached sample RFP includes such a request).

One step that municipalities can take to protect their interests is to use a model lease agreement, as provided in the Toolkit. By using a document that the municipality is comfortable with, the municipality may ensure that all its contractual "must haves" are brought up early in the contract negotiations and included in the final contract. It contains many of the terms and conditions that typically arise during contract negotiation. It is the responsibility of the contracting jurisdiction to negotiate its own final contract and local governments should hire legal counsel with solar lease negotiation experience to protect their interests in contract negotiations.

4. Request for Proposal (RFP)

The workable version of this document can be found at nyserda.ny.gov/SolarGuidebook, under the Municipal Solar Procurement Toolkit tab.

REQUEST FOR PROPOSALS

Leasing Municipal Land for Solar Development

Municipality Name

Municipality Address

Issue Date

Proposals Due By:

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1. Executive Summary

The Municipality seeks proposals from solar energy developers ("Respondents") to lease land at site address ("the Site"), pursuant to a Lease Agreement, a form of which is included in this RFP, and install, own, operate, and maintain thereon a solar photovoltaic energy system ("Solar Energy System" or "System").

It is the desire of the Municipality to site a solar energy system for the benefit of the Municipality and the environment. This Request for Proposals is being issued to allow the Municipality to evaluate options and determine the project and financial arrangements that best meet the Municipality's interest. The Municipality notes that it is not seeking proposals to be an off-taker of a solar energy system. The goal of this RFP is to lease the Site for purposes of siting a Solar Energy System in order to provide a revenue stream to the Municipality in the form of lease payments.

The Municipality will evaluate all proposals and reserves the right to select the proposal that provides the best economic solution. The Municipality has the right to accept any bid even if it does not provide the highest revenue to the Municipality. Proposals will be evaluated against other proposals received. In addition to other rights reserved herein, the Municipality reserves the right to cancel this RFP in its discretion and to the fullest extent permitted by law.

All Proposals prepared in response to this RFP are at the sole expense of the Respondent, and with the express understanding that there will be no claim, whatsoever, for reimbursement from Municipality for the expenses of preparation. Municipality shall not be liable for any expenses incurred by the Respondent in development of this proposal.

2. Background

Provide a background on your Municipality and include any demographic information that would be helpful for a developer to understand the character of your community. Provide a brief description of the background of the project site, for example if it is located on a landfill or brownfield. Also provide description of the goals of your Municipality. Below are examples of potential goals and should be updated to match the specific goals of your Municipality.

The Municipality is located in County and is home to # residents and has # households.

Provide any additional background about your Municipality that will be helpful for Respondents to know.

The Municipality wishes to bring this project to our community with the goal of expanding Municipality's and its residents' participation in the energy of the future, and benefit from the lower electric prices and local job creation associated with it.

Municipality is interested in leasing municipal land for solar development. Municipality has the following prioritized goals for the project:

1. Increase revenue for the Municipality through a land lease.
2. Reduce energy bill costs for residents through a community solar project.
3. Purposefully utilize otherwise unusable municipal property such as landfills or brownfields.
4. Advance the community's environmental sustainability and leadership goals.

3. Project Scope

Project Description

Describe the desired project and the amount of land the Municipality is looking to lease to a Developer. Include the responsibilities of the successful Respondent.

The Municipality is interested in leasing all or a portion of the site(s) described in Appendix 1. The lease will be structured initially for a 2-year option to assess the feasibility of the site, following with a 25-year lease when it is determined the site is viable, with up to four additional 5-year optional renewal periods, exercisable at Municipality's sole discretion. The Municipality is willing to consider alternative lease durations and conditions as part of the proposal evaluation process set forth herein. The Municipality will not be an off-taker of the electricity generated at the Site.

The selected Respondent will own the System and will be responsible for the design, engineering, permitting, installation, testing, operation, maintenance, repair, vegetation management, and decommissioning of the System, including, without limitation, procurement of the solar photovoltaic equipment and related services. The successful Respondent will be solely responsible for owning, insuring, commissioning, interconnection, metering, and for providing security for the system at all times. The successful Respondent shall be responsible for all project costs including, but not limited to: the furnishing of all materials, services, labor, performance and payment bonds, insurance, and other costs incurred in the preparation of this response and the performance of the contract, signed by an individual authorized to bind the Respondents contractually.

On termination of the lease, the successful Respondent will be responsible for performing, and paying for the removal of all panels, racks, concrete blocks, and conduits, and returning the portion of the property on which the System was installed to its original conditions as mutually agreed upon.

Site Description

In this section provide any additional unique information about the site.

The potential host site(s) are described in Appendix 1 attached to this RFP.

Before submitting a proposal, each Respondent shall familiarize themselves with the potential host sites as necessary to develop a proposal to undertake the Project in accordance with the terms and conditions of this RFP. The selected Respondent will be responsible for conducting any additional studies it may require, at its own cost and risk, prior to entering the lease agreement and/or in conjunction with the development of the Project. The Municipality intends to lease the municipal land on an "as is" basis.

Site Work and Maintenance Requirements

The successful Respondent shall be responsible for the design, permitting, construction, and maintenance of all site work, drainage, erosion controls, and landscaping associated with the system and lease area.

The successful Respondent shall be responsible for performing vegetation management within the lease area. Respondents shall develop, implement, and maintain native vegetation to the extent practicable pursuant to a vegetation management plan by providing native perennial vegetation and foraging habitat beneficial to game birds, songbirds, and pollinators. To the extent practicable, when establishing perennial vegetation and beneficial foraging habitat, the owners shall use native plant species and seed mixes.

If the project is on a ***landfill***, include the below paragraph in your RFP to provide additional information to Respondents of requirements for solar energy projects on landfills.

Landfills are overseen by DEC's Division of Materials Management. As the proposed solar project will alter and impact the landfill cap, the Respondent is required to submit modifications to the Post-Closure Care Manual that is part of the Closure Plan. The requirements are intended to address concerns regarding the protection and maintenance of the Final Cover ("cap") and the protection of the landfill gas systems. The modification submission shall cover aspects including soil, slope, sediment, erosion, vegetation, drainage, etc. The submitted work plan shall contain descriptions of the planned uses and project plans to demonstrate the disturbance will not increase the potential threat to human health or the environment via construction method, equipment placement, and monitoring systems and plans[28].

If the project is on a ***brownfield***, include the below paragraph in your RFP to provide additional information to Respondents of requirements for solar energy projects on brownfields.

Additional DEC requirements apply to solar on brownfield sites and DEC's Division of Environmental Remediation provides the oversight. For a proposed brownfield solar site with an Institutional Control (IC) on the property, the Respondent will be required to notify the Division of the site's change of use and submit a work plan to ensure whether the remedy will remain effective or what new Engineering Control and Institutional Control (EC/IC), monitoring activities, and period reviews may be necessary. The workplan submission modifies the Site Management Plan (SMP) containing pertinent Environmental Easement information. SMPs are filed in the Deed of the brownfield property and accessible via DEC's Brownfield Cleanup Program site or filed as part of the Deed restriction. Note that brownfield sites without existing IC equipment should notify the change of use, but do not have to submit an additional work plan.

The successful Respondent shall be responsible for the installation and maintenance of site specific safety and security requirements or other measures as are required to comply with all necessary permits and approvals.

Community Engagement

The successful Respondents will play an integral role in public outreach and educational events coordinated for community members. An outreach plan will raise community awareness and provide a platform for education. Creative approaches are encouraged.

If the project is intended to serve as a community solar project, through which local electric customers can purchase electricity from the developer, the Municipality will respect the strategic business decisions of Respondents on how to recruit subscribers of a community solar project. The Municipality requires that a priority process of enrollment be used whereby Municipality residents would have first call on participating as customers in a community solar program. The Municipality also requires that residents of County have a second stage enrollment priority.

Potential support offered by the Municipality as examples of ways the Municipality and other associated organizations would be interested in participating may include:

- Notification of the opportunity on the Municipality and various organizations' websites;
- Use of Municipality and other organizations' staff in conducting community oriented "Solar PV 101" Q&A sessions;
- Support in engaging local media;
- Banners or signage promoting the initiative at town-owned facilities

These are meant as examples of the sorts of informational and recruitment activities in which the Municipality, and perhaps associated organizations, would be interested in participating.

Local Business Utilization

It is in the best interest of the Respondent to give a preference to subcontracting with local businesses, recruiting from the local labor force, and providing education or other benefits to local students particularly inside Municipality limits. The Municipality also encourages all Respondents to include minority and small business participation, including those owned by women, veterans, and disadvantaged individuals. Respondents should include goals for local employment, including for both the construction and operation periods of the project, providing a brief description of the number and types of jobs expected to be created in the Municipality.

[28] https://www.dec.ny.gov/regulations/81768.html

Award

Based upon the results of the evaluation of the proposals and interview process (if applicable), a recommendation will be developed and submitted for approval by the respective stakeholders within the Municipality.

All Respondents shall review the Lease Agreement in Appendix 4. Should a Respondent question any of the terms and conditions contained in this Lease Agreement, it must submit a written attachment to their proposal specifically identifying its objection, setting forth its reasoning for the objection, and proposing an alternative solution addressing the objection. Respondents must include a brief discussion of the purpose and impact, if any, of each proposed revision. Acceptance of any proposed revision is within the Municipality's sole discretion. In no event will general references to the Respondent's terms and conditions or attempts at complete substitutions be considered. All objections will be reviewed as part of the evaluation process.

If the Municipality and the most qualified Respondent are unable, within 60 days following the Municipality's notice of commencement of negotiations with a Respondent (or such longer period of time as the Municipality may deem appropriate), to negotiate satisfactory Agreements with that Respondent at a price the Municipality determines to be fair, competitive, and reasonable, the Municipality shall negotiate with the next highest-rated Respondent. The Municipality reserves the right to waive any and all informalities and to award the proposal on the basis of the above procedures to the Respondent it deems most qualified or terminate the process at any time without making an award.

4. Timeline

EVENT	TARGET DATE
Issuance of Request for Proposal	Day 0
Informational Respondent Meeting and Site Visit	Day 14
Deadline for Submission of Questions	Day 28
Municipality Issues Responses to Respondent Questions	Day 35
RFP Submission Deadline & Opening of Bids	Day 49

5. Submission of Questions

The Designated Contact Person during the RFP period is contact name. All communication of any kind regarding this RFP during this period must be made via contact name. All questions and inquiries regarding this RFP must be submitted via email to contact email no later than question deadline. Questions submitted in writing must include the firm name and the name, title, address, telephone number, and email address of the individual submitting the question. Any questions regarding proposal requirements or specifications received after this date and time will not be considered for response.

Questions will not be answered directly. The Awarding Authority will issue an addendum to address the written questions submitted by the deadline. Any addenda will be posted by email/online at website.

6. Pre-Bid Meeting

The Municipality will hold a pre-bid meeting for all interested Respondents on date & time at site address. It is recommended that all interested Respondents attend in order to familiarize themselves with existing conditions and project requirements. Respondents interested in attending must confirm attendance by contacting point of contact and contact information.

7. Submittal

Responses must be submitted in a sealed package to Municipality's address by date & time and labeled as noted below. Within the package, the Respondent shall enclose a cover letter with the signature, name, and title of the person authorized to submit the proposal on behalf of the Respondent. The Respondent shall enclose three (3) hard copies and one (1) electronic version in a searchable text format (in Adobe Acrobat (pdf) format and on a flash drive or CD-ROM) of the proposal. The sealed outer package shall be marked with the Respondent's company name, and clearly marked in the lower left- hand corner:

"Response to Leasing Municipal Land for Solar Development"

It is the Respondent's responsibility to see that its proposal is delivered within the time and at the place prescribed. The right is reserved, as the interest of the Municipality may require, to reject any or all proposals, to waive any technical defect or informality in proposals received, and to accept or reject any proposal or portion thereof. If there are any differences between the original hard copy and the electronic copy of the proposal, the material in the electronic copy will prevail.

8. Proposal Requirements

These instructions outline the format and content of the proposal and the approach to be used in its development and presentation. Only that information which is essential to an understanding and evaluation of the proposal should be submitted.

Table of Contents

Proposals shall include a Table of Contents listing the individual sections of the proposal and their corresponding page numbers.

Section 1 – General Respondent Information

- **Transmittal Letter** - Each Respondent's response should include a transmittal letter signed by a party authorized to make a formal bid on behalf of the Respondent. The letter shall clearly indicate that the Respondent has carefully read all the provisions in the RFP. Transmittal letters should also acknowledge receipt and understanding of any Addenda associated with the project. Include the name, title, address, telephone number, e-mail address and fax number of the individual the Municipality should contact concerning the Respondent's proposal.
- **Executive Summary** - Provide an overview of the proposal (not more than two pages) describing the highlights of the response and summarizing how your firm will meet the needs and goals of the Municipality.
- Executed **Certificate of Non-Collusion** in Appendix 3.

Section 2 – Experience & Qualification

This section shall discuss the highlights, key features, and distinguishing points of the proposal.

- **Company Overview**
    - Provide a document with the following company information.
        - Year founded and number of continuous years in business
        - Ownership status (public or private company, LLC, LLP, S-Corp, Sole Proprietor)
        - Federal Tax Identification Number
        - Corporate & Local Office location
        - Number of employees in corporate & local office at time of submittal

- Your firm's Experience Modification Rate (EMR) for each of the past three years and your firm's OSHA ratings (Recordable Incidence Rates and Lost Workday Incident Rates) for the past three years
- A description of any ongoing or previous litigation your firm has been involved in and a statement that the Respondent is not debarred, suspended or otherwise prohibited from practice by any federal, state, or local agency

• Project Team

- o Provide information about the key personnel to be assigned to this project.
  - Project Team organizational chart including all key personnel and their proposed roles
  - Provide resumes, in an appendix, for all key personnel that will be assigned to this project
  - Provide evidence of all relevant licenses held by your firm to do work in New York State, attach list and copies of documents as an appendix

• References

- o Provide references for at least three completed and currently operating non-residential grid-connected PV systems, with preference towards New York municipalities and landfill or brownfield projects. Include the following information:
  - Location and Utility Company name
  - System size (kW DC)
  - Metering Type (Remote Net Metering, Community Distributed Solar, Onsite)
  - Date completed
  - Host Customer and/or Owner contract information (name, email, address, phone)

• Project Development Experience

- o Provide the total number of megawatts of solar PV your firm has constructed over the last five (5) years.
- o Provide the total number of megawatts of solar PV your firm has constructed over the last five (5) years in New York.
- o Provide total number of megawatts and projects of solar PV your firm has constructed on landfills and brownfields.
- o Detail the types of customers your firm has worked with in the past (for example, residential, commercial nonprofit, or government).
- o Describe your firm's implementation of PV construction standards and other safety measures.
- o Provide the number of operational PV systems under your firm's management.

• Project Financing Capability

- o Provide number of PV systems that have been financed by you and/or your financing partner.
- o Provide most recent audited financial statements, annual reports, consolidated financials, and Form 10-K (if any). If available, provide similar materials for parent entities, significant affiliates and collaborators.

Section 3 – Proposal Narrative

Provide a detailed plan of the proposed project. Project plans must include the following:

- **Project Management Plan**
  - Provide a detailed narrative description of the approach for installing the proposed project, including how the Respondent will work with subcontractors, municipal agencies, and other relevant stakeholders. Detail how the Respondent will approach special site considerations such as capped landfills.
  - Provide a detailed description of each task and delivery. Include a project schedule indicating key milestones and durations of various activities.
  - Respondents must demonstrate a firm understanding of permits required to successfully execute the project. The selected Respondent will be responsible for all necessary environmental testing, permitting, and compliance. To the extent possible, Respondents should identify the regulatory and permit conditions relevant to their proposals, potential conflicts between the project and existing permit conditions, and variances that might be required.
- **Financing Plan**
  - Provide a description of how the proposed project will be financed. Identify any potential financial partners that will be involved in the project. Describe in this plan possible sources of funds and revenue streams other than the sale of energy including all available tax credits, incentives, and subsidies that will be used to finance the project.
- **Operations and Maintenance Plan**
  - The Respondent will be responsible for Operation & Maintenance (O&M) services for the full term of the Agreement. Describe the proposed O&M procedures for the system, detailing duties performed and if the contract will be maintained with the Respondent or a third-party provider.
- **Decommissioning Plan**
  - Provide information regarding the proposed approach to system decommissioning and restoration of the property. This decommissioning plan should include a description of Respondent's approach to providing financial assurance that funding will be available to decommission the system at the end of the contract term.
  - The owner of the Facility, as provided for in its lease with the landowner, shall restore the property to its condition as it existed before the Facility was installed, pursuant to measures which may include the following:
    - Removal of all operator-owned equipment, concrete, conduits, structures, fencing, and foundations to a depth of 36 inches below the soil surface.
    - Removal of any solid and hazardous waste caused by the Facility in accordance with local, state and federal waste disposal regulations.
    - Removal of all graveled areas and access roads unless the landowner requests in writing for it to remain.
- **Local Business Utilization Plan**
  - Respondent shall submit a proposed local business utilization plan and must make a good faith effort to hire local business enterprises on the project. The utilization plan must demonstrate how this requirement will be met to the extent possible at this stage in the program.
- **Outreach Plan**
  - Respondent will provide a clear plan to best meet the goals and strategies specified in the **Project Scope** section for **Community Engagement.**
  - Provide clear marketing and recruitment strategies from the developer to attract members. Strategies for particular customer segments (e.g. LMI, anchor, commercial, etc.) should be specified, if desired by the Municipality.

Section 4 –Technical Proposal

All solar energy systems proposed under this RFP must conform to industry best practices. System Design and Components are not binding at the proposal stage, but this information will be used to evaluate Respondent proposals.

- Components: Include an overview of the proposed photovoltaic system, including brief descriptions of the main components (at minimum modules, inverters, racking system, and monitoring system) including manufacturer and warranty information. Respondents are encouraged to provide specification sheets for any proposed technologies as an appendix.
- Design: Include Preliminary Drawings for the proposed PV system that include (at a minimum):
    - o System size (in kW DC and kW AC)
    - o Location of modules (including tilt)
    - o Location of inverters
    - o Any other site-specific information that will aid in overall evaluation
- Expected System Generation
    - o Provide estimated annual production of the proposed solar project for years 1-25 inclusive of the degradation rate.

Section 5 – Price Proposal

Price proposals should be provided using the form in Appendix 3 of this RFP. Price proposals shall be valid for a minimum of 180 days.

All price proposals will include a lease payment from the Respondent to the Municipality in the format of a price per acre. The lease will be structured initially for a two-year option to assess the feasibility of the site, followed by a 25-year lease when it is determined the site is viable, with up to four additional 5-year optional renewal periods, exercisable at Municipality's sole discretion, or on the basis of any other alternative lease duration proposal submitted by the respondent.

9. Evaluation Criteria

Overview of Evaluation Process

The Municipality will utilize an evaluation system to rank the qualified Respondents. It is the responsibility of each Respondent to provide information, evidence or exhibits that clearly demonstrate the Respondent's ability to satisfactorily respond to project requirements and the factors listed in this RFP. The evaluation process may include verification of references, confirmation of financial information, and examination of other information as the Municipality deems appropriate. The Municipality will/may as it deems necessary conduct interviews to evaluate the Respondents. The Municipality may require public presentations by Respondents. The Municipality reserves the right to request or obtain additional information about any and all responses. Each response from a qualified Respondent will be evaluated and ranked solely according to the criteria set forth in this RFP.

The Municipality may cancel this RFP at any stage of the process if it determines that cancellation serves the best interests of the public. The Municipality may reject, in whole or in part, any and all planned or proposed project measures, when it determines that rejection serves the best interests of the public.

At a minimum, Respondents shall meet the following requirements:

1. Timely submission of response and attendance at optional/mandatory pre-bid meeting
2. Submission of all required elements found in Section 8 of this RFP
3. Certification of Non-Collusion (Appendix 3)
4. Evidence of appropriate insurance

The qualified Respondents providing completed responses will be evaluated based on the following factors:

Price Proposal – The Respondent should clearly identify the financial benefit to the Municipality of the proposed arrangement in the form of either annual lease payments, savings in current electric costs of Municipality operations, or some other monetary benefit to the Municipality.

Proposal Narrative – The response shall include an explanation of how the Respondent will approach the various tasks, including scheduling methods, project schedule, construction, financing, measurement and verification, operations and maintenance, and decommissioning plans. The demonstrated ability to obtain financing for the construction of the solar energy system is critical to the Respondent's ability to complete the project. Respondents should provide in their responses a clear discussion of how they intend to finance the system and what financing partners will be involved in the project.

Developer Experience & Project Team – The extent of the Respondent's experience in designing, financing, constructing and operating solar energy facilities. Additional consideration will be given to firms with experience constructing and operating such facilities on municipal and commercial properties most similar to the proposed sites, particularly capped landfills. The relevant experience and quality of project personnel and their commitment to the proposed project in Municipality. The clarity and organization of the proposed scope of work and approach will be included in the assessment of the project team.

Technical Proposal – The response will be evaluated on the preliminary system design that is provided and the selected equipment and corresponding warranties. The demonstrated ability of designing a system that will generate the highest production will provide greater benefit to the Municipality and the community members

Appendix 1: Site Description

Provide the below information for the selected site(s) if known.

1. Facility name and address
2. Planned future use of the property and zoning requirements
3. Any shading, trees, or other potential obstructions
4. Electric utility
5. Distance to utility interconnection
6. Phases available at utility pole (single or three-phase)
7. Description of roof and/or available land
8. Aerial photos, site map, and/or roof plan
9. Any feasibility assessment done to date, including information on roof, shading, environmental analysis, etc.

If the site is a landfill, provide additional information, such as NYSDEC Requirements for Closure and Post-Closure Care, site's Final Closure Plan, and the Post-Closure Monitoring and Maintenance Operations Manual.

If the site is a brownfield, provide additional information such as the Site Management Plan.

Appendix 2: Land Lease Price Proposal Template

PV System Size	_____kW dc	Annual System Degradation Factor	_____%/year
Year 1 Estimated kWh Generation	_____kWh		

The Respondent hereby agrees to pay the Municipality the following amounts to lease up to acreage for the construction and operation of a solar energy system for 25 years.

The following is a summary of assumptions for developing the costs for a base solar system. Respondents are to assume no sales tax on equipment purchased, and no property tax. Interconnection costs can vary widely depending on system size, interconnection voltage, and other interconnection requirements. For the purposes of establishing a base bid, Respondents should assume interconnection cost of $0.10 per Watt.

Year 1 Lease Payment	$_____/acre	Annual Lease Escalator	%/year
Year 1 Total Lease Payment	$_____	Total Payments to Municipality over Contract Length (25 Years)	$_____

Respondents shall understand that the submitted price proposals must include the scope of work and all deliverables as defined in the Lease Agreement and as specified in this RFP. Respondents shall complete the below table to account for change orders due to unforeseen additional costs such as interconnection upgrades, taxes, etc. Municipality will use a regression model to predict incremental values if needed.

Change Order ($/acre)	0-$4,999	$5,000-$9,999	$10,000-$14,999	$15,000-$19,999	$20,000-$24,999	>$25,000
Adjustment to ProposedLease Payment ($/acre)						

A Respondent may attach, in substantially the form above, any alternative lease arrangement(s) that the Respondent wishes to include with its proposal.

Appendix 3: Certificate of Non-Collusion

The undersigned certifies, under penalties of perjury, that this bid or proposal has been made and submitted in good faith and without collusion or fraud with any other person. As used in this certification, the word “person” shall mean any natural person, business, partnership, corporation, union, committee, club or other organization, entity, or group of individuals.

_____

(Signature)

_____

(Name of person signing proposal)

_____

(Name of business)

Appendix 4: Sample Land Lease Agreement

The workable version of this document can be found at nyserda.ny.gov/SolarGuidebook, under the Municipal Solar Procurement Toolkit tab.

SOLAR LEASE AGREEMENT
COVER SHEET

This Solar Lease Agreement (consisting of this Cover Sheet, the Terms and Conditions, all Exhibits referenced herein and attached hereto, this "Agreement") is made and entered into as of the Effective Date and between the parties listed below.

Party A, as Lessee: **Developer Name,** ("Entity Name")	Party B, as Lessor: **Name,** a New York municipality (the "Village/Town/City/County")
Contact: Name Title Number	Contact: Name Title Number
Premises Location: Address City, NY Zip	Duration: Date of Agreement: Date ("***Effective Date***")
Pricing: Development Period Payment: XX per year Term Rent: XX per year Term Rent Adjustment: X % increase per year	Commercial Operation Date: TBD Term: Initial Term: 25 years from the System's Commercial Operation Date, with option to extend the Lease Term for up to four (4) additional and successive period of five (5) years

Town and Developer shall each be referred to in this Agreement individually as a "***Party***" and, together, as "***Parties***".

RECITALS:

WHEREAS, Town owns and occupies the land located at Address in Village/Town/City/County, New York described in Exhibit A attached hereto (the "***Premises***") and desires to lease a portion of the Premises (the "***Lease Area***", defined below) to Entity Name;

WHEREAS, the Premises is the site of a landfill which is the subject of a closure plan approved by the New York State Department of Environmental Conservation.

WHEREAS, the Town desires that Entity Name install the System, to be located at the Premises, and Entity Name is willing to perform the installation of the System; and

WHEREAS, Entity Name further desires to lease the Lease Area and the Easements from the Town, and to operate and maintain the System, and provide other services in accordance with the terms and conditions set forth herein.

AGREEMENT

NOW, THEREFORE, in consideration of the mutual promises set forth herein, and other good and valuable consideration, the receipt and sufficiency of which are hereby acknowledged, the Parties hereby agree as follows:

1. Each of the following documents shall be deemed part of this Agreement and are incorporated herein by this reference as though set forth herein in their entirety:

- Terms and Conditions
- Exhibit A, Premises Legal Description
- Exhibit B, Lease Area Description & Design Layout
- Exhibit C, Guaranty

2. This Agreement constitutes the entire agreement and understanding between Entity Name and the Town with respect to the subject matter hereof and supersedes all prior agreements, written or verbal, if any, between them relating to the subject matter hereof, which are hereafter of no further force or effect. The Terms and Conditions and the Exhibits, referred to herein, are integral parts hereof and are made a part of this Agreement by reference. In the event of a conflict between the provisions of this Agreement and those of any Exhibit, the provisions of this Agreement shall prevail over the terms of the Exhibit and any Exhibit shall be corrected accordingly if inconsistent with this Agreement.

3. This Agreement may only be amended, modified, or supplemented by an instrument in writing executed by duly authorized representatives of the Town and Entity Name.

4. This Agreement shall be governed by, and construed and enforced in accordance with, the laws of the State of New York without reference to its principles or conflicts of laws.

5. The relationship between Entity Name and the Town shall not be that of partners, agents, or joint ventures, and nothing contained in this Agreement shall be deemed to constitute a partnership or agency agreement between them for any purposes, including federal income tax purposes. Entity Name and the Town, in performing any of their obligations hereunder, shall be independent contractors and shall discharge their contractual obligations at their own risk. Neither Party has the right to create an obligation for the other Party.

6. This Agreement may be executed by facsimile or scanned signatures transmitted by electronic mail and/or in one or more counterparts, each of which when so executed and delivered shall be deemed an original, but all of which taken together shall constitute but one and the same original.

(Signatures appear on the following page.)

IN WITNESS WHEREOF, the duly authorized officers of the Parties have executed this Solar Lease Agreement as an instrument under seal as of the Effective Date.

Entity Name	Town
By: Signature_____	By: Signature_____
Name: Name	Name: Name
Title: Title	Title: Title

ACKNOWLEDGMENT

(Entity Name)

Notary Public Statement, Seal, and Signature

TERMS AND CONDITIONS

THIS SOLAR LEASE AGREEMENT ("***Agreement***") is made and entered into as of this Day of Month, Year (the "***Effective Date***"), by and between the **Village/ Town/ City/ County Name**, a municipality of the State of New York ("***Village/ Town/ City/ County***") and **Entity Name**, a New York limited liability company ("***Entity Short Name***"). Town and Entity Short Name are sometimes hereinafter referred to individually as a "***Party***" and collectively as the "***Parties***."

ARTICLE 1 - DEFINED TERMS; RULES OF INTERPRETATION

1.1 Defined Terms.

Capitalized terms used in this Agreement shall have the meanings ascribed to them in this Agreement, or as otherwise set forth below.

"***Agreement***" means this Solar Lease Agreement, including the Solar Lease Agreement Cover Sheet, all Exhibits and attachments hereto.

"***Applicable Legal Requirements***" means any present and future law, act, rule, requirement, order, by-law, ordinance, regulation, judgment, decree, or injunction of or by any Governmental Authority, ordinary or extraordinary, foreseen or unforeseen.

"***Bankrupt***" means that a Party or other entity (as applicable): (i) is dissolved (other than pursuant to a consolidation, amalgamation or merger); (ii) becomes insolvent or is unable to pay its debts or fails (or admits in writing its inability) generally to pay its debts as they become due; (iii) makes a general assignment, arrangement or composition with or for the benefit of its creditors; (iv) has instituted against it a proceeding seeking a judgment of insolvency or bankruptcy or any other relief under any bankruptcy or insolvency law or other similar law affecting creditor's rights, or a petition is presented for its winding-up, reorganization or liquidation, which proceeding or petition is not dismissed, stayed or vacated within twenty (20) Business Days thereafter; (v) commences a voluntary proceeding seeking a judgment of insolvency or bankruptcy or any other relief under any bankruptcy or insolvency law or other similar law affecting creditors' rights; (vi) seeks or consents to the appointment of an administrator, provisional liquidator, conservator, receiver, trustee, custodian or other similar official for it or for all or substantially all of its assets; (vii) causes or is subject to any event with respect to it which, under the Applicable Legal Requirements of any jurisdiction, has an analogous effect to any of the events specified in clauses (i) to (vi) inclusive; or (viii) takes any action in furtherance of, or indicating its consent to, approval of, or acquiescence in, any of the foregoing acts.

"***Business Day***" means any day except a Saturday, Sunday, or a Federal Reserve Bank holiday.

"***Casualty Date***" shall have the meaning set forth in § 11.2.

"***Commercial Operation Date***" means the tenth (10th) day after the Town's receipt of a Completion Notice for the System.

"***Completion Notice***" means a notice from the Entity Name to the Town when the System is generating electric power and has been accepted for continuous commercial service by the LDC.

"***Development Period Payment***" means an annual rent amount of $XX, paid on a prorated basis for use of the Premises for the number of days from the Effective Date to the Commercial Operation Date.

"***Dispute***" shall have the meaning set forth in §14.1.

"***Easements***" mean the easements granted pursuant to § 2.1, and which area(s) may be later defined by the Parties.

"***Effective Date***" is the date first set forth in the introductory paragraph of this Agreement.

"***Environmental Attributes***" means any offset, credit, benefit, reduction, rebate, financial incentive, tax credit and other beneficial allowance that is in effect as of the Effective Date or may come into effect in the future, including, to the extent applicable and without limitation, RECs, Solar RECs, carbon credits, Green-e products, investment tax credits, production tax credits, forward capacity market credits or other credits earned by or in connection with, or otherwise attributable to, the System, or the electricity produced by the System, under or with respect to the Federal Clean Air Act (including, but not limited to, Title IV of the Clean Air Act Amendments of 1990), any state or federal renewable portfolio standard or renewable

energy standard or other portfolio purchase mandate or requirement, including the renewable portfolio standard of the State of New York, the Regional Greenhouse Gas Initiative or any statute or regulation implementing the foregoing, any federal or other applicable act or regulation relating to carbon emissions or a cap or other limitation thereupon or any other state, federal or other Governmental Authority act, law or regulation that provides offsets, credits, benefits, reductions, allowances or incentives of any kind or nature related to electricity generation, generation capacity or emissions (or the lack or avoidance thereof).

"***Equipment Leasing Party***" means, if applicable, any Person to whom Entity Name transferred the ownership interest in the System, subject to a leaseback of the System from such Person.

"***Events of Default***" means a Town Event of Default or a Entity Name Event of Default.

"***Financing Party***" or "***Financing Parties***" means any and all Persons or successors in interest thereof, directly or indirectly, (i) lending money, (ii) extending credit, (iii) investing equity capital or (iv) providing or financing any System or other arrangement including tax equity investments for or in connection with any of the following: (a) the construction, term or permanent financing of the System; (b) working capital or other ordinary business requirements of the System (including the maintenance, repair, replacement or improvement of the System); (c) any development financing, bridge financing, credit support, credit enhancement or interest rate protection in connection with the System; or (d) the purchase of the System and the related rights. For avoidance of doubt, "Financing Party" shall include an Equipment Leasing Party, if any, and any Person providing any of the foregoing categories of financing to Equipment Leasing Party with respect to the System.

"***Force Majeure Event***" means an event, occurrence or circumstance, or combination thereof, beyond the reasonable control of a Party which wholly or partly prevents or delays the performance of any obligation arising under this Agreement, and is not the result of the negligence of the Claiming Party, and which by the exercise of reasonable due diligence, the Claiming Party is nonetheless unable to overcome or avoid or cause to be avoided, including, but not limited to: (a) acts of God, terrorism, war, blockade, riot, civil disturbance or sabotage; (b) any effect of unusual natural elements, including fire, subsidence, earthquakes, floods, lightning, tornadoes, unusually severe storms, or similar cataclysmic occurrence or other unusual natural calamities; (c) environmental and other contamination at or affecting the Premises, the Lease Area, the System or a Party's obligations hereunder, except as may be caused by the negligence or affirmative act of a Party; (d) explosion, accident or epidemic; (e) failure of a Governmental Authority to issue any permits properly applied for or to take any other action required to be taken by such Governmental Authority; (f) failure of an LDC to issue any permissions properly applied for and diligently pursued in good faith, or to take any other action required to be taken by such LDC; and (g) general strikes, lockouts or other collective or industrial action by workers or employees, or other labor difficulties; provided, that neither the lack of money nor changes in market conditions shall constitute a Force Majeure Event.

"***Governmental Authority***" means the United States of America, the State of New York, and any political or municipal subdivision thereof (including but not limited to the Town), and any agency, department, commission, board, bureau, or instrumentality of any of them, and any independent electric system operator.

"***Hazardous Materials***" means those substances defined, classified, or otherwise denominated as a "hazardous substance," "toxic substance," "hazardous material," "hazardous waste," "hazardous pollutant," "toxic pollutant" or oil in the Applicable Legal Requirements or in any regulations promulgated pursuant to the Applicable Legal Requirements.

"***Interest Rate***" means a fluctuating interest rate per annum equal to the sum of the lesser of (i) the Prime Rate as stated in the "Bonds, Rates & Yields" section of The Wall Street Journal on the Effective Date and thereafter on the first day of every calendar month, plus two (2) percentage points, or (ii) the maximum rate permitted by Applicable Legal Requirements. In the event that such rate is no longer published in The Wall Street Journal or such publication is no longer published, the Interest Rate shall be set using a comparable index or interest rate selected by Town and reasonably acceptable to Entity Name. The Interest Rate hereunder shall change on the first day of every calendar month. Interest shall be calculated daily on the basis of a year of 365 days and the actual number of days for which such interest is due. In no case shall the Interest Rate for this Agreement be less than XX% per year.

"***Landfill***" means the landfill on the Premises, including, without limitation, any waste and other materials within such landfill, the landfill cap, the area below such membrane, any fill placed over the membrane and all structures, equipment, fixtures and improvements installed on the Premises by the Town and/or its agents and/or contractors, including without limitation the landfill cap, drainage, and gas venting structures and apparatus referenced in the closure plan with respect to such landfill. To avoid doubt, "Landfill" does not include the System.

"***Landfill Closure Plan***" means the closure plan required by the December 14, 1988 NYS DEC order of consent and approved by the NYS DEC, as same may be amended from time to time with the approval of the NYS DEC.

"***LDC***" means the regulated electric local distribution company that provides electric distribution service to the municipality in which Town is located, which as of the Effective Date is Local Distribution Company/ Local Utility Company.

"***LDC System***" means the electric distribution system operated and maintained by the LDC.

"***Lease Area***" means the portion of the Premises in which the Town grants Entity Name a lease to allow the installation, operation, repair and removal of the System, which area shall include the Easements, and means the real property depicted in the plan attached as Exhibit B until the Lease Area is further defined as follows: Within sixty (60) days of the Commercial Operation Date, Entity Name shall, solely at its' expense, obtain a survey of the portion of the Premises determined to be the final Lease Area, and that survey or plot plan shall be an amendment to this Agreement as a new Exhibit B, and the Lease Area shall then mean the portion of the Premises defined by the survey. Further, the Lease Area does not consist of any portion of the Landfill but does include any areas impacted by incidental subsurface penetration in installing the System in accordance with the Projects Plans and Applicable Legal Requirements.

"***NYS DEC***" means the New York State Department of Conservation.

"***Entity Name Indemnified Parties***" shall have the meaning set forth in § 13.2.

"***Entity Name's Maintenance Obligations***" shall have the meaning set forth in § 5.1.1.

"***Entity Name Property***" shall have the meaning set forth in § 2.6.1. "Permitted Repair Period" shall have the meaning set forth in § 11.2.

"***Person***" means any individual, partnership, corporation, limited liability company, business trust, joint stock company, trust, unincorporated association, joint venture, firm, or other entity, or a Governmental Authority.

"***Premises***" has the meaning set forth in Exhibit A and shall include the Lease Area.

"***System***" means the solar electric generating facility to be installed in the Lease Area, including but not limited to the System Assets, which produces electricity.

"***System Assets***" means each and all of the assets of which the System is comprised, including Entity Name's solar energy panels, mounting systems, carports, tracking devices, inverters, integrators and other related equipment and components installed on the Premises, electric lines and conduits required to connect such equipment to the LDC delivery point, protective and associated equipment, improvements, metering devices, fencing and other tangible and intangible assets, including System electricity production and Environmental Attributes, and permits, property rights and contract rights reasonably necessary for the construction, operation, and maintenance of the System.

"***Term***" shall have the meaning set forth in § 3.1 herein.

"***Term Rent***" means, after the Commercial Operation Date, an annual amount equal to $XX escalating at X% annually. The Town acknowledges that this rent constitutes fair market value rent payable in an arms-length transaction.

"***Termination Date***" means the earlier to occur of (i) the last day of the Term, and (ii) the date of termination of this Agreement as the result of an Event of Default.

1.2 Rules of Interpretation.

Section headings are for convenience only and shall not affect the interpretation of this Agreement. References to sections are, unless the context otherwise requires, references to sections of this Agreement. The words "hereto", "hereof" and "hereunder" shall refer to this Agreement as a whole and not to any particular provision of this Agreement. The word "including" shall be deemed to be followed by the words "without limitation". In the event of any conflict between the text of this Agreement and the contents of an Exhibit hereto, the text of this Agreement shall govern.

ARTICLE 2 - THE PREMISES

2.1 Lease Area.

The Town, for and in consideration of the covenants and agreements on the part of Entity Name contained in this Agreement, does hereby lease to Entity Name, and Entity Name does hereby take from the Town, upon and subject to the conditions hereinafter expressed, the Lease Area for the sole and exclusive use of constructing, operating, maintaining, repairing and removing the System. Entity Name's use of the Lease Area is subject to all Applicable Legal Requirements

2.2 Easements.

The Town further grants the following easements ("***Easements***") to Entity Name, during the period commencing on the Effective Date of this Agreement and ending upon the expiration or earlier termination of the Term:

2.2.1 a non-exclusive easement for access to the Lease Area across or through the external portion of the Premises and any surrounding or adjacent area owned or leased by the Town which is necessary in such location and of such dimensions as determined by the LDC and approved by the Town, which approval shall not be unreasonably withheld, conditioned or delayed by the Town in its reasonable discretion, to gain access to the System;

2.2.2 a non-exclusive use right of an area on the Premises to be used solely for System construction, repair and removal; and

2.2.3 an easement for the installation, operation and maintenance of electric lines necessary to interconnect the System to the LDC's electric distribution System in such location and of such dimensions as determined by the Town in its reasonable discretion which shall not be unreasonably withheld, conditioned or delayed.

2.2.4 The preliminary location of such Easements are set forth on Exhibit B attached hereto and such Exhibit will be supplemented prior to the start of construction of the System subject to the approval of the Town which shall not be unreasonably withheld.

2.3 File Notice of Lease.

Parties agree that this Agreement shall not be recorded, but the Parties shall execute and record a Notice of Lease that shall describe the Lease Area and Easements and shall otherwise be reasonably acceptable to both Parties. Any subsequent amendments of this Agreement, including all easements subsequently entered into in accordance with ARTICLE 3 hereof, shall be reflected by filing with the County an appropriate Notice of Amendment to Lease. All recordation shall be at Entity Name's expense.

2.4 Town Representations and Warranties.

The Town represents and warrants that:

2.4.1 It has no knowledge of any violation of the Landfill Closure Plan with respect to Premises and no event or condition has occurred which with the passage of time or giving of notice would constitute such a violation;

2.4.2 It has no knowledge of any violations of Applicable Legal Requirements with respect to the Premises or any event or condition having occurred which with the passage of time or giving of notice would constitute such a violation.

2.5 As-Is Lease of the Lease Area and Easements.

2.5.1 Entity Name accepts the Lease Area after a full and complete examination thereof, as well as the title thereto, and knowledge of its present uses and non-uses. Except as expressly provided herein, Entity Name accepts the Lease Area in the condition or state in which it now is without any representation or warranty, express or implied in fact or by law, by the Town or any person purporting to represent the Town and without recourse against the Town, as to the title thereto, the nature, condition or usability thereof or the suitability of the Lease Area for the use or uses to which the Lease Area or the Premises or any part thereof may be put as authorized hereby.

2.5.2 Except as expressly provided herein, the Town shall not be required to furnish any services or facilities or to make any repairs or alterations in or to the Lease Area or the Premises.

2.5.3 Notwithstanding anything contained in this ARTICLE 2, neither Entity Name nor any entity which enters into a sublease with Entity Name with respect to all or any portion of the Premises, shall be liable for: (i) the Landfill; (ii) any conditions on the Premises arising from or related to acts or omissions occurring prior to the Effective Date or (iii) any "release" of any Hazardous Materials from the Premises from the Landfill, unless, and to the extent, caused wholly or partly by Entity Name or any of its related entities, contractors, invitees or licensees.

2.5.4 The parties acknowledge that since this Lease Area is a landfill, that Town is required by law to monitor and/or maintain the Lease Area. Thus, so far as between the Parties, Entity Name shall, at its sole cost and expense, maintain and operate the System which shall not penetrate the cap of the landfill. Town shall continue to maintain and operate the landfill. Entity shall maintain the ground cover, including regular mowing of vegetation consistent with the operation requirements of a photovoltaic system. Jurisdiction shall have the right to enter on the premise to maintain and monitor the cap as needed, provided that they provide reasonable notice of their entrance.

2.6 Ownership of the System.

2.6.1 **Title to System.** Subject to the rights provided to the Town pursuant to other terms hereof, the System and all alterations, additions, improvements or installations made thereto by Entity Name and all Entity Name property used in connection with the installation, operation and maintenance of the System is, and shall remain, the personal property of Entity Name ("Entity Name Property"). In no event shall any Entity Name Property be deemed a fixture, nor shall the Town, nor anyone claiming by, through or under the Town (including but not limited to any present or future mortgagee of the Premises) have any rights in or to the Entity Name Property at any time except as otherwise provided herein. Except as provided otherwise herein, the Town shall have no ownership or other interest in the System or any System Assets or other equipment or personal property of Entity Name installed on the Premises, and Entity Name may remove all or any portion of the System or any System Assets at any time and from time to time as further provided in and subject to, this Agreement. Without limiting the generality of the foregoing, Town hereby waives any statutory or common law lien that it might otherwise have in or to the System and other System Assets or any portion thereof, but such waiver shall not extend to claims by the Town in the System Assets based upon a default by Entity Name hereunder.

2.6.2 **Security Interests in System.** The Town acknowledges and agrees that Entity Name may grant or cause to be granted to a lender a security interest in the System and in Entity Name's rights to payment under the Agreement, and Town expressly disclaims and waives any rights in the System at law or in equity pursuant to this Agreement. Any security interest shall be subordinate to the interest of the Town in the Premises and subject to the terms and conditions of this Agreement; provided however the Town shall execute, or use best efforts to cause any holder of an interest in the Premises senior to that of Entity Name to execute, a form of a non-disturbance agreement reasonably acceptable to the Financing Party and the Town or such other holder.

2.7 No Expenditures.

Entity Name and the Town acknowledge and agree that the Town shall not be required, except as expressly provided herein, to make any expenditure, incur any obligation, or incur any liability of any kind whatsoever in connection with this Agreement or the ownership, construction, operation, maintenance, repair, or removal of the System

2.8 No Additional Use.

Except with the prior express written consent of the Town, Entity Name shall not use the Lease Area for any use other than the installation, operation, maintenance, repair and removal of the System.

ARTICLE 3 – TERM

3.1 Term.

The term of this Agreement (the "***Term***") shall commence on the Effective Date and shall remain in effect until the twenty fifth (25th) anniversary of the Commercial Operation Date.

3.2 Termination.

If Lessee delivers the Exercise Notice prior to the Commercial Operation Date, then Lessee shall have the option, in its sole discretion, to terminate the Agreement at any time before the Commercial Operation Date.

3.3 Late Payment.

If any payment is not paid when due under this Agreement, it shall earn interest at the rate of the lesser of (i) XX (XX%) per month (and pro-rated for a partial month) and (ii) the maximum amount allowed by law from the time when the payment was due until the time it is paid.

ARTICLE 4 – RENT

4.1 The Development Period Payment.

Entity Name shall pay the Development Period Payment. The Development Period Payment, prorated for the number of days from the Effective Date to the Commercial Operation Date, shall be due on the Commercial Operation Date. Following the Commercial Operation Date, the Development Period Payment shall cease.

4.2 The Term Rent.

Entity Name shall pay the Term Rent. The payment of the Term Rent shall be payable in advance and due annually no later than XX (XX) days following the annual anniversary of the Commercial Operation Date.

4.3 Term Rent Adjustment.

The Term Rent shall increase by an amount of XX% per year starting on the first (1st) anniversary of the Commercial Operation Date.

ARTICLE 5 – DUTIES OF PARTIES

5.1 Maintenance; Repairs; Non Interference.

5.1.1 Entity Name shall, at its sole cost and expense, (i) take good care of the System, conduct all required maintenance of the System and make all repairs thereto, interior and exterior, structural and non-structural, ordinary and extraordinary, foreseen and unforeseen, and shall maintain and keep the System in safe, first class order, repair and condition, free and clear of any hazards or dangerous conditions and (ii) mow the grass and otherwise maintain all vegetation and otherwise comply with all standards and conditions required under the Legal Obligations, applicable to the operation and maintenance of the System including without limitation standards recommended by the NYS DEC (the "***Entity Name Maintenance Obligations***")

5.1.2 Except as expressly provided in § 5.1.1 or elsewhere in this Lease, the Town will continue to have responsibility for all obligations with respect to the Landfill, including maintaining the Landfill and making all repairs and replacements to the Landfill, interior and exterior, structural and non-structural, ordinary and extraordinary, foreseen and unforeseen, except to the extent of any required as a result of any act, or failure to act, by Entity Name or any of its related entities, contractors, invitees or licensees, and except any required in connection with Entity Name's activities pursuant to and in accordance with this Agreement.

5.1.3 Nothing in this Agreement shall limit the Town's ability and obligation to maintain the Premises in a reasonable manner consistent with the Town's current and past practices and the terms of this Agreement.

5.1.4 To the extent required to comply with Applicable Legal Requirements, the Town may construct, reconstruct, modify or make alterations to the Premises; provided, however, that in no event shall such activities shade the System or otherwise materially interfere with the operation of the System or Entity Name's rights hereunder. Any such material interference with the operation of the System or Entity Name's rights hereunder which is caused by a Town Event of Default shall be governed by ARTICLE 10.

5.1.5 Entity Name shall make all arrangements for and pay directly to the entity providing the service, before delinquent, all charges for all utilities and services furnished to or used by it, including without limitation, gas, electricity, water, steam, telephone service, trash collection and connection charges. The Town shall have no duty or liability to Entity Name with respect to the maintenance, repair, upgrade, or replacement of any utilities, including, without limitation, any electrical transmission or distribution lines, whether such lines are owned by the Town or any third party. In the event that Entity Name desires to undertake maintenance, repair, upgrade, replacement or security activities with respect to electrical transmission or distribution lines owned by the Town, Entity Name may do so at Entity Name's expense subject to the prior written approval of the Town, which shall not be unreasonably withheld.

5.1.6 Extension Option. Entity Name shall have the option to extend the Lease Term for up to four (4) additional and successive period of five (5) years beginning on the day following the Expiration Date of the then-current Lease Term, by giving notice (the "Extension Exercise Notice") to Town no less than ninety (90) days prior to the then-current Expiration Date, and without the requirement of any further action on the part of either Town or Entity Name.

5.2 Compliance with Laws; Professional Standards.

5.2.1 Entity Name, at Entity Name's expense, shall diligently and fully comply with all Applicable Legal Requirements governing its use and occupancy of the Lease Area and the construction, maintenance, repair, and removal of the System. In addition, Entity Name shall ensure that the System is operated and maintained in a professional manner by appropriately trained and qualified individuals.

5.2.2 The Town, at the Town's expense, shall diligently and fully comply with all Applicable Legal Requirements governing the Landfill, including the closure of the Landfill and the maintenance, repair and upkeep of the Landfill, except to the extent of conditions caused wholly or partly by any act, or failure to act, by Entity Name of any of its related entities, contractors, invitees, or licensees. In addition, the Town shall ensure that such obligations are performed in a professional manner by appropriately trained and qualified individuals.

ARTICLE 6 – CONSTRUCTION AND OPERATION OF PERMITTED USE

6.1 General Description.

Except as otherwise specified herein, the System shall conform to Exhibit B of this Agreement. Any material modification or deviation from the design as depicted in Exhibit B shall require the subsequent consent of the Town, which consent will not be unreasonably withheld, conditioned or delayed.

6.2 Governmental Approval.

Except as otherwise specified herein, or otherwise obtained prior to the Effective Date, Entity Name will obtain at its sole cost all approvals and permits required under the Applicable Legal Requirements for Entity Name's use of the Lease Area for the System from any Governmental Authority having jurisdiction. Entity Name will promptly inform the Town of all significant developments relating to the issuance of such approvals or permits. The Town will reasonably cooperate with Entity Name in procuring such approvals, except as expressly set forth herein this Agreement does not impose an affirmative obligation on the Town to issue or procure any approval or to engage in any action or inaction inconsistent with the proper exercise of the Town's regulatory authority). If any changes in such plans and/or specifications are required by any Governmental Authority, then Entity Name shall submit such changes, if any, to the Town for its approval, and such approval shall not be unreasonably conditioned, withheld or delayed. Entity Name will be required to keep any such approvals current and in full effect during the Term.

6.3 Completion Requirements.

Entity Name may perform construction at the Premises between the hours of 7:00 a.m. and 7:00 p.m., Monday through Saturday, unless otherwise limited by local ordinance and shall do so in reasonable coordination with the Town and in a manner which limits inconvenience to and interference with the Town and the Town's invitees' and employees' use of the Premises to the extent commercially practical. Entity Name shall grant the Town and its authorized representative's access to and the right, but not the obligation, to observe installation and any significant repairs to or replacement of the System at all times provided that neither the Town nor its authorized representatives shall interfere with the installation or repair work or use or move any Entity Name equipment or the System without written authorization from Entity Name.

6.4 Access to and Use of the Premises.

Entity Name and its sub-contractors, agents, consultants, and representatives shall have reasonable access at all reasonable times (including under emergency conditions) to the Lease Area for the purpose of construction, operation, inspection, maintenance, repair and removal of the System, and to any documents, materials and records of the Town relating to the Premises that Entity Name reasonably requests in conjunction with these activities. During any such activities, Entity Name, and its sub-contractors, agents, consultants and representatives shall comply with the Town's reasonable safety and security procedures (as may be promulgated from time to time), and Entity Name and its sub-contractors, agents, consultants and representatives shall conduct such activities in such a manner and such a time and day as to cause minimum interference with the Town's other activities.

Through the Option Term and Lease Term and through the Removal Date, Entity Name shall have the rights to perform (or cause to be performed) all tasks necessary or appropriate, as reasonably determined by Lessee, to carry out the activities set forth in the Agreement, including, without limiting the generality of the foregoing, the right (i) to design, construct, install, and operate the System, (ii) to maintain, clean, repair, replace, add to, remove or modify the System or any part thereof as determined to be necessary by Entity Name in its sole discretion and in accordance with the Permits and Applicable Laws, (iii) to use any and all appropriate means of restricting access to the System and Premises, including without limitation, the construction of a fence or other encumbrances existing on the Premises determined to be necessary by lessee in its sole discretion and in accordance to the Permits and Applicable Laws. Except as may otherwise be specifically agreed upon by the Parties or as expressly set forth herein, Entity Name shall be responsible for all costs of designing, permitting, construction, installation, operation, and maintenance of the System, and System Removal.

6.5 As-built Plans.

Within ninety (90) days following the issuance of the Completion Notice, Entity Name shall prepare and deliver to the Town detailed as-built plans accurately depicting the System including, without limitation, all wiring, lines, conduits, piping and other structures or equipment, certified to the Town. Entity Name shall also deliver to the Town a certification from its engineer, who shall be duly licensed in the State of New York, that the System has been constructed in accordance with all approved plans and specifications.

6.6 Operations.

Entity Name shall submit to the Town annually a written summary of operations which shall include any material modifications and a summary of the amount of production for the preceding twelve (12) months.

6.7 Removal of the System.

6.7.1 Within ten (10) days following the anniversary of the Commercial Operation Date, if the Parties have determined that this Agreement will definitely terminate at the 25th anniversary of the Commercial Operation Date without extension or replacement and that the Town has determined that it wishes that the System be removed from the Premises at the Termination Date of this Agreement, then (i) Entity Name shall provide to the Town the estimated cost of System removal, and (ii) the Parties shall meet and discuss the options for removal of the System, and (iii) if the Town requests, Entity Name shall post a bond or provide another financial assurance to the Town, in form and amount reasonably satisfactory to the Town, to demonstrate its ability to satisfy the financial costs of the removal of the System from the Premises. Upon the Termination Date, Entity Name shall at its sole cost and expense remove from the Premises all of the tangible property comprising the System, including but not limited all structures built by the Entity Name, any fencing and/or barriers to secure the System and

any System mounting and other support structures, not later than 360 days after such Termination Date and shall return the Lease Area to the same condition as it was in on the Effective Date (including uniform grass coverage for areas impacted) except for any reasonable use and wear or damage by casualty or eminent domain. Lessee shall return the Premises "as is" with all vegetation, trails or roadways, utilities and site conditions existing as of the expiration of the Lease Term and shall have no obligation to restore the Premises to their condition prior to the Effective Date.

6.7.2 Entity Name shall repair any damage it causes in connection with such removal not related to ordinary use and wear at its sole cost and expense.

6.7.3 If Entity Name fails to remove or commence substantial efforts to remove the System within 180 days of the expiration of the date that the Agreement terminates, the Town shall have the right, at its option, to possession, use of and ownership of the System including the right, without limit, to remove and to sell same, and restore the Lease Area to its original condition (other than ordinary wear and tear) and Entity Name shall reimburse the Town for reasonable out-of-pocket costs and expenses incurred by the Town in removing, storing and selling the System and in restoring the Lease Area.

6.7.4 The provisions of this Section 6.7 shall survive the Termination Date of this Agreement.

ARTICLE 7 – LIENS

7.1 No Liens.

Entity Name shall not create, or suffer to be created or cause to remain, and shall promptly discharge, any mechanic's, laborer's or materialman's lien, or any other lien upon the Premises and Entity Name will not suffer any other matter or thing arising out of Entity Name's use and occupancy of the Premises whereby the estate, rights and interests of the Town in the Premises or any part thereof might be impaired, except in accordance with and subject to the provisions of this Agreement.

7.2 Discharge.

If any mechanic's, laborer's or materialman's or other lien shall at any time be filed against the Premises, Entity Name, within sixty (60) days after notice to Entity Name of the filing thereof, shall cause such lien to be discharged of record by payment, deposit, bond, insurance, order of court of competent jurisdiction or otherwise. If Entity Name shall fail to cause such lien to be discharged within the period aforesaid, then, in addition to any other right or remedy, the Town may, but shall not be obligated to, discharge the same either by paying the amount claimed to be due or by procuring the discharge of such lien by deposit or by bonding. Any amount so paid by the Town and costs reasonably incurred by the Town in connection therewith, together with interest thereon at the Interest Rate from the respective dates of the Town's making of the payment of the cost and expenses, shall be paid by Entity Name to the Town within ten (10) Business Days of the Town's invoice therefor.

7.3 Town's Obligations.

The Town shall not directly or indirectly cause, create, incur, assume or suffer to exist any liens on or with respect to the System or any interest therein.

ARTICLE 8 – RIGHT TO INSPECT AND ENTER

8.1 Inspection and Entry.

During the course of construction and completion of the System and any substantial alteration thereto, Entity Name shall maintain all plans, shop drawings, and specifications relating to such construction which the Town, whose agents or contractors may examine at reasonable times upon reasonable prior notice for the purpose of determining whether the work conforms to the agreements contained or referenced in this Agreement. The Town may, upon reasonable prior notice to Entity Name by telephone or otherwise, enter upon the Lease Area and inspect the System for the purpose of ascertaining its condition or whether Entity Name is observing and performing the obligations assumed by it under this Agreement, all without hindrance or molestation from Entity Name. Entity Name shall obtain the Town's prior written approval of any proposed substantial alteration, other than alterations required by any Applicable Legal Requirement, and such approval shall not be unreasonably withheld, conditioned or delayed.

8.2 Notice of Damage.

The Town shall promptly notify Entity Name of any matter it is aware of pertaining to any damage to or loss of the use of the System or that could reasonably be expected to adversely affect the System.

ARTICLE 9 – ASSIGNMENT AND SUBCONTRACTING

9.1 Successors and Assigns; Subcontracting.

This Agreement shall inure to the benefit of and shall be binding upon the Parties and their respective permitted successors and assigns; provided, that Entity Name in its discretion may elect to use such certified and licensed subcontractors as it may choose in performing any of its obligations hereunder and performance of any obligation of Entity Name by any such subcontractor shall satisfy such obligation to the extent of such subcontractor's performance.

9.1.1 **Assignment by Town**. The Town shall not sell, transfer, assign, pledge or cause to be assumed (together, "***Assign***"; and any such action, an "***Assignment***") this Agreement, in whole or in part, without the prior written consent of Entity Name and its applicable Financing Parties.

9.1.2 **Assignment by Entity Name**. Entity Name may with the prior written notice to and the prior written consent of, the Town in each instance, except as provided for in §9.2 this ARTICLE 9, assign this Agreement, in whole or in part. Any assignment shall be conditioned upon the assignee explicitly assuming in writing all of Entity Name's obligations under this Agreement. Entity Name shall deliver to the Town thirty days' (30) advance written notice of its intent to assign this Agreement. Entity Name shall also have the right to enter into one or more subleases with respect to this Agreement and/or to assign any rights under this agreement to any purchaser(s) of metering credits.

9.2 Consent to Assignment for Financing or Leasing.

Entity Name may seek financing for the ownership of all or a portion of the System under this Agreement, whether by a sale-leaseback of all or a portion of the System from an Equipment Leasing Party or entering into other arrangements with a Financing Party in the form of an equipment lease, finance lease, debt, equity, tax equity or other financing arrangement. Entity Name may collaterally assign or assign fully in connection with any financing of the System (which may, in connection with such Assignment, permit the Financing Party to further assign collaterally), its rights, and/or obligations hereunder for purposes of securing such financing or leasing arrangement. The Town hereby consents to any such Assignment, provided that:

9.2.1 Such Assignment shall not create any lien or other encumbrance on the Premises other than Entity Name's rights and obligations contemplated in this Agreement nor on any other real or personal property located on the Premises other than the System; and all provisions regarding the entry onto and use of the applicable Lease Area shall remain in effect;

9.2.2 If Entity Name assigns this Agreement, or any portion hereof, to a Financing Party as provided herein, the Town acknowledges and agrees that such Financing Party shall not be personally liable for the performance of such assigned obligations hereunder except to the extent of the interest of the Financing Parties in the System. Notwithstanding any such Assignment to one or more Financing Parties or a designee thereof, Entity Name shall not be released and discharged from and shall remain liable for any and all obligations to the Town arising or accruing hereunder (and, in the case of a partial Assignment, for the obligations accruing after the date of such Assignment with respect to obligations accruing under the unassigned portion of the Agreement).

9.2.3 The Town agrees to sign, execute and deliver or cause to be delivered each such consent to assignment, legal opinion, instrument or other document as Entity Name or its Financing Parties, if any, may reasonably request to satisfy the requirements of any Financing Party with respect to or in connection with any financing or leasing of the System. The Town also agrees, to the extent required by a Financing Party, if any, to provide Entity Name and/or a Financing Party with such information about the Town or the Premises as Entity Name, a Financing Party may reasonably request, provided that Entity Name shall be responsible for any expense incurred by Town in connection therewith, and provided further that the Town shall not be required to disclose any information deemed confidential under any Applicable Law.

9.2.4 Entity Name shall be responsible to reimburse the Town for all costs and expenses incurred in connection with the Town's obligations hereunder in connection with any System Financing including, without limitation by reason of specification, reasonable attorney, engineer and other consultant fees and disbursements.

9.3 Rights of Financing Parties.

9.3.1 **Rights Upon Event of Default.** Notwithstanding any contrary term of this Agreement:

(a) The Financing Party, as owner of the System, or as collateral assignee of this Agreement, shall be entitled to exercise, in the place and stead of Entity Name, any and all rights and remedies of Entity Name under this Agreement in accordance with the terms of this Agreement. The Financing Party shall also be entitled to exercise all rights and remedies of owners or secured parties, respectively, generally with respect to this Agreement and the System;

(b) The Financing Party shall have the right, but not the obligation, to pay all sums due under this Agreement and to perform any other act, duty or obligation required of Entity Name thereunder or cause to be cured any default of Entity Name hereunder in the time and manner provided by the terms of this Agreement. Nothing herein requires the Financing Party to cure any default of Entity Name under this Agreement or (unless the Financing Party has succeeded to Entity Name's interests under this Agreement) to perform any act, duty or obligation of Entity Name under this Agreement, but the Town hereby gives it the option to do so;

(c) Upon the exercise of remedies, including any sale of the System by the Financing Party, whether by judicial proceeding or under any power of sale contained therein, or any conveyance from Entity Name to the Financing Party (or any assignee of the Financing Party) in lieu thereof, the Financing Party shall give notice to the Town of the transferee or assignee of this Agreement. Any such exercise of remedies shall not constitute a default under this Agreement;

(d) Upon any rejection or other termination of this Agreement pursuant to any process undertaken with respect to Entity Name under the United States Bankruptcy Code, at the request of Financing Party made within ninety (90) days of such termination or rejection, the Town shall enter into a new agreement with Financing Party or its assignee having substantially the same terms and conditions as this Agreement.

9.3.2 **Right to Cure.**

(a) Town will not exercise any right to terminate or suspend this Agreement unless it shall have given the Financing Party prior written notice of its intent to terminate or suspend this Agreement, as required by this Agreement, specifying the condition giving rise to such right, and the Financing Party shall not have caused to be cured the condition giving rise to the right of termination or suspension within thirty (30) days after such notice or (if longer) the periods provided for in this Agreement; provided that if such Entity Name default reasonably cannot be cured by the Financing Party within such period and the Financing Party commences and continuously and diligently pursues curing of such default within such period, such period for cure will be extended for a reasonable period of time under the circumstances, such period not to exceed additional ninety (90) days. The Parties' respective obligations will otherwise remain in effect during any cure period.

(b) If the Financing Party or its assignee (including any purchaser or transferee), pursuant to an exercise of remedies by the Financing Party, shall acquire title to or control of Entity Name's assets and shall, within the time periods described in this Agreement, cure all defaults under this Agreement existing as of the date of such change in title or control in the manner required by this Agreement and which are capable of cure by a third person or entity, then such Person shall no longer be in default under this Agreement, and this Agreement shall continue in full force and effect.

ARTICLE 10 – DEFAULT AND REMEDIES

10.1 Entity Name Events of Default and Town Remedies.

10.1.1 **Entity Name Events of Default.** Entity Name shall be in default of this Agreement (a "Entity Name Event of Default") if any of the following shall occur:

(a) Entity Name fails to pay when due any sum of money becoming due to be paid to the Town under this Agreement, whether such sum be any installment of the rent reserved by this Agreement, any other amount treated as additional rent under this Agreement, or any other payment or reimbursement to the Town required by this Agreement, whether or not treated as additional rent under this Agreement, and such failure shall continue for a period of twenty (20) business days after written notice that such payment was not made when due;

(b) Entity Name fails to perform or observe any material term or condition of this Agreement, including any violation by Entity Name of Applicable Legal Requirements and/or any negligent or wrongful actions by Entity Name which cause damage to the membrane or other landfill feature which violates the NYS DEC closure plan with respect to the Landfill

and such failure is not cured within thirty (30) days after written notice of such failure to Entity Name, which period shall be extended for an additional period not to exceed thirty (30) days if such failure cannot be cured within such initial 30-day period provided Entity Name has commenced such cure within such period and is diligently prosecuting the same to completion;

(c) Entity Name is Bankrupt;

(d) Entity Name vacates or abandons the Premises;

(e) Entity Name's interest in this Agreement devolves upon or passes to any Person, whether by operation or law or otherwise, except as expressly permitted hereunder.

10.1.2 **Town Remedies.** Upon a Entity Name Event of Default, the Town shall have the option to pursue any one or more of the following remedies without any notice or demand whatsoever, concurrently or consecutively and not alternatively:

(a) the Town may terminate this Agreement;

(b) Upon any termination of this Agreement, whether by lapse of time or otherwise, Entity Name shall surrender possession and vacate the Lease Area immediately and deliver possession thereof to the Town, and the Town may enter into and upon the Lease Area in such event and to repossess the Lease Area and to expel or remove Entity Name and any others who may be occupying or be within the Premises, and to remove Entity Name's signs and other evidence of tenancy and all other property of Entity Name therefrom, subject only to the provisions in § 6.6 on Removal of the System, without the Town being deemed in any manner guilty of trespass, eviction or forcible entry or detainer and without incurring any liability for any damage resulting therefrom, Entity Name waiving any right to claim damages for such re-entry and expulsion, and without relinquishing the Town's right to rent or any other right given to the Town under this Agreement or by operation of law. The Town may, but need not, enter into a new lease of the Lease Area or any part thereof for such rent and upon such terms as the Town, in its sole discretion, shall determine (including the right to re-lease the premises upon such terms as the Town desires, including without limitation a greater or lesser rent, or for a greater or lesser term than that remaining under this Agreement and the right to change the character or use made of the Premises). In connection with or in preparation for any re-leasing, the Town may, but shall not be required to, make repairs or alterations to the Premises to the extent the Town deems necessary or desirable, and Entity Name shall, upon demand, pay the cost thereof, together with Town's expenses of re-leasing;

(c) Until such time as the Town shall elect to terminate the Agreement and shall thereupon be entitled to recover the amounts specified herein, Entity Name shall pay to the Town upon demand the full amount of all rent, including any amounts treated as additional rent under this Agreement and other sums reserved in this Agreement for the remaining Term, together with the costs of repairs or alterations and the Town's expenses of re-letting and the collection of the rent accruing therefrom (including attorney's fees and disbursements), as the same shall then be due or become due from time to time, less only such consideration as the Town may have received from any re-leasing of the Premises; and Entity Name agrees that the Town may file suits from time to time to recover any sums falling due under this section as they become due. Any proceeds of re-leasing by the Town in excess of the amount then owed by Entity Name to the Town from time to time shall be credited against Entity Name's future obligations under this Agreement (unless previously terminated) but shall not otherwise be refunded to Entity Name or inure to Entity Name's benefit;

(d) the Town, without being under any obligation to do so and without waiving any Entity Name default, may remedy any state of facts constituting a default for the account of Entity Name, immediately upon notice in the case of emergency or if necessary to protect public health or safety, or to avoid forfeiture of a material right, or in any other case, but only provided Entity Name shall have failed to remedy such default within thirty (30) days, or such longer period as may be required due to the nature of such other default (provided Entity Name has commenced and is diligently prosecuting a cure), after the Town notifies Entity Name in writing of the Town's intention to remedy such other default. All costs reasonably incurred by the Town to remedy such default (including, without limitation, all reasonable and documented attorney's fees and disbursements), shall be at the expense of Entity Name;

(e) Regardless of whether the Town exercises its rights pursuant to § of this Agreement, it shall have the right, but not the obligation, and to the extent permitted by Applicable Legal Requirements, to take possession of the System until Entity Name demonstrates to the reasonable satisfaction of the Town that the events giving rise to the Event of Default have been cured, and that Entity Name has taken all reasonably necessary steps to ensure that such events shall not re-occur. The Town shall not be liable to Entity Name for any damages, losses or claims sustained by or made against Entity Name

as a result of the Town's exercise of possession and operational control of the System except to the extent such damages, losses or claims result from the negligence or willful misconduct of the Town. The Town shall, if taking operational control of the System, recognize the right of any subtenant of which the Town has actual knowledge if such subtenant is then in full compliance with all of its obligations under the applicable sublease of the Premises. The Town shall, however, be entitled to demand that any payments due to Entity Name from any such subtenant be made to Town until the Event of Default has been cured. No subtenant shall incur any liability to Entity Name by reason of compliance or non-compliance with any such demand;

(f) If, on account of any breach or default by Entity Name in Entity Name's obligations under the terms and conditions of this Agreement, it shall become necessary or appropriate for the Town to employ or consult with an attorney concerning, or to enforce or defend, any of Town's rights or remedies arising under this Agreement or to respond to or interpret an inquiry of Entity Name under the Agreement, Entity Name agrees to pay all of the Town's attorney's reasonable and documented fees and court costs so incurred. Entity Name expressly waives any right to trial by jury.

10.1.2 Pursuit of any of the foregoing remedies shall not preclude pursuit of any of the other remedies provided in this Agreement or any other remedies provided by law (all such remedies being cumulative), nor shall pursuit of any remedy provided in this Agreement constitute a forfeiture or waiver of any rent due to the Town under this Agreement or of any damages accruing to the Town by reason of the violation of any of the terms, provisions and covenants contained in this Agreement.

10.1.3 No act or thing done by the Town or any of its agents, officers or employees during the Term shall be deemed a termination of this Agreement or an acceptance of the surrender of the Premises, and no agreement to terminate this Agreement or accept a surrender of said Premises shall be valid, unless in writing signed by the Town.

10.2 Town Events of Default and Entity Name Remedies.

10.2.1 **Town Events of Default.** The Town shall be in default of this Agreement (a **"Town Event of Default"**) if any of the following shall occur:

(a) Any representation or warranty by the Town herein is incorrect or incomplete in any material way, or omits to include any information necessary to make such representation or warranty not materially misleading, and such defect is not cured within fifteen (15) days after receipt of notice from Entity Name identifying the defect;

(b) the Town obstructs installation of the System or fails to take any actions necessary for the interconnection of the System required hereunder;

(c) The Town fails to perform or observe any material term or condition of this Agreement including, without limitation, violation of any Applicable Legal Requirements which materially interferes with the operation of the System with respect to the Landfill or the Landfill Closure Plan and such failure is not cured within: (A) thirty (30) days if the failure involves a failure to make payment when due or maintain required insurance; or (B) sixty (60) days if the failure involves an obligation other than payment, after receipt of notice from Entity Name identifying the failure, unless the Town, prior to the expiration of either of said periods, contests any claimed failure on its part and thereafter continues to diligently do so;

(d) the Town is Bankrupt;

(e) the Town's interest in this Agreement devolves upon or passes to any Person, whether by operation or law or otherwise, except as expressly permitted hereunder.

10.2.2 **Entity Name Remedies.** Upon a Town Event of Default, Entity Name may exercise any one or more of the following remedies:

(a) terminate this Agreement; and/or

(b) pursue any other remedies available at law or in equity.

ARTICLE 11 – CASUALTY; FORCE MAJEURE

11.1 If the Premises is damaged by fire or other casualty whatsoever so that such damage may reasonably be expected to materially and adversely disrupt the Entity Name's operations at the Premises for more than three hundred and sixty five (365) consecutive days, then the Entity Name may at any time following such fire or other casualty so long as such material and adverse disruption is continuing, terminate this Agreement upon sixty (60) days written notice to the Town.

11.2 In the event of the damage to or destruction of the Landfill and/or the System by fire, explosion, the elements or otherwise during the Term, or such partial damage or destruction thereof as to render the Lease Area and/or the System wholly untenantable or unfit for occupancy, or should the Landfill be so badly damaged that the same cannot (notwithstanding the Town's exercise of due diligence) be repaired within the "Permitted Repair Period" or should the System be so badly injured that the same cannot (notwithstanding Entity Name's exercise of due diligence) be repaired within the "Permitted Repair Period" then and in any case the Term shall, at the option of either the Town or Entity Name, cease and become null and void effective as of the date of such damage or destruction (the "Casualty Date").

11.3 The "Permitted Repair Period" means one hundred eighty days (180) from the Casualty Date, provided, however, that Entity Name shall have the right at its option, at any time within sixty (60) days after the Casualty Date, to elect to extend the Permitted Repair Period for an additional one hundred eighty (180) days (in which case the Permitted Repair Period will be three hundred sixty (360) days).

11.4 Upon cessation of the Term as provided in § 11.3, this Agreement shall expire with the same force and effect as though the date set forth in such notice were the date originally set as the expiration date of this Agreement, and the Parties shall make an appropriate adjustment, as of such Termination Date, with respect to payments due to the other under this Agreement. Nothing herein shall relieve Entity Name from its obligations under § 6.7 to restore the Lease Area.

11.5 Should the System be rendered, wholly or partially untenantable and unfit for occupancy, or if the Landfill shall be damaged, but yet be repairable within the Permitted Repair Period:

11.5.1 The Town shall enter and repair the Landfill with reasonable speed, except as to damage caused and to the extent of any damage caused wholly or partly by Entity Name or any of its related entities, contractors, invitees or licensees.; and Entity Name shall enter and repair the System with reasonable speed;

11.6 Force Majeure Event.

11.6.1 Except as otherwise specifically provided in this Agreement, neither Party shall be considered in breach of this Agreement if and to the extent that any failure or delay in such Parties' performance of one or more of its obligations hereunder is attributable to the occurrence of a Force Majeure Event; provided that, the Party claiming a Force Majeure Event shall (a) notify the other Party in writing of the existence of the Force Majeure Event, (b) promptly exercise all reasonable efforts necessary to minimize delay caused by such Force Majeure Event, (c) notify the other Party in writing of the cessation or termination of said Force Majeure Event, and (d) resume performance of its obligations hereunder as soon as practicable thereafter.

11.6.2 Notwithstanding anything in this Agreement to the contrary, if the Town claims relief pursuant to a Force Majeure Event, the obligation of Entity Name to make any rent payment hereunder shall be suspended as of the date that the Force Majeure Event commenced until the Town notifies Entity Name that it has resumed performance of its obligations under the Agreement. If a Force Majeure Event shall have continued for a period of at least 180 consecutive days, then Entity Name may terminate this Agreement upon thirty (30) days' written notice to the Town. If at the end of such thirty (30) day period such Force Majeure Event shall still be continuing, this Agreement shall automatically terminate. Upon such termination, neither Party shall have any liability to the other, subject to any obligations which arose prior to such termination (including the payment of rent, additional rent or other payments adjusted to the date of termination on a pro rata basis) and subject to provisions which expressly survive termination.

ARTICLE 12 – INSURANCE

12.1 Coverages.

Entity Name shall maintain the following insurance coverages in full force and effect throughout the Term:

12.1.1 **Entity Name's Public Liability and Property Damage Insurance.** Entity Name shall obtain and maintain in full force and effect for the entire Term and until all obligations of Entity Name hereunder have terminated, a comprehensive general liability insurance policy providing coverage for all claims for damages because of bodily injury, including death, and for claims for damages, other than to the work itself, to property which may arise out of or result from the Entity Name's operation under this Agreement, whether such operation be by itself or by anyone directly or indirectly employed by Entity Name, or any independent contractor, consultant, or any other person, firm or entity performing work or supplying materials on or to the System, or any other person, firm or entity under Entity Name's direction or control. The insurance shall name the Town as an additional insured and shall be written for not less than $1,000,000 each person, $2,000,000 each occurrence and $3,000,000 aggregate for bodily injury, and $500,000 each occurrence, $1,000,000 aggregate for property damage, or such other amount or amounts as required by law, whichever is greater, and shall include contractual liability applicable to the Entity Name's obligations. Coverage must include the following: premises/operations, elevators and hoists, independent contractors, contractual liability assumed under this Agreement, products/completed operations, broad form property coverage, and personal injury;

12.1.2 **Workmen's Compensation Insurance.** Workmen's compensation insurance must be provided at the Entity Name's expense as required by law;

12.1.3 **Vehicle Liability Insurance.** Entity Name shall take out and maintain at its own expense vehicle liability insurance during the Term of this Agreement. The insurance shall name the Town as an additional insured and shall be written for not less than $1,000,000 each person, $2,000,000 each occurrence and $3,000,000 aggregate for bodily injury and $500,000 each occurrence $1,000,000 aggregate for property damage, or such amount as required by law, whichever is greater, and shall include contractual liability applicable to the Entity Name's obligations. Coverage must include the following: Owned Vehicles, Leased Vehicles, Hired Vehicles, Non-Owned Vehicles;

12.1.4 **All Risk Property Coverage and Boiler and Machinery Coverage, or All Risk Builder's Risk Insurance.** The Entity Name shall take out and maintain, at its own expense, during construction, against damage to the System during the Term in an amount no less than the full replacement cost of the System, with commercial reasonable sub-limits and deductibles. Such insurance shall provide for a waiver of the underwriters' right to subrogation against the Town; and

12.1.5 **Excess Umbrella Liability Insurance.** The Entity Name shall take out and maintain, at its own expense, an Excess Umbrella Liability Insurance policy in an amount not less than five million dollars ($5,000,000).

12.2 Certificates of Insurance.

The Entity Name shall, prior to entry upon the Premises for any purpose authorized hereby, deliver to the Town copies of all insurance policies and certificates of insurance naming the Town as an additional named insured and evidencing all of the foregoing coverages required by this ARTICLE 12, in form and substance satisfactory to the Town, and shall deliver to the Town new policies and certificates thereof so naming the Town for any insurance about to expire at least ten (10) days before such expirations. All such insurance policies shall contain an endorsement requiring thirty (30) days written notice to the Town prior to cancellation or change in coverage, scope or amount of any such policy or policies. Compliance by the Entity Name with the insurance requirement, however, shall not relieve any contractor or subcontractor from liability pursuant to ARTICLE 13.

ARTICLE 13 – INDEMNIFICATION

13.1 Indemnification of Town.

The Entity Name shall indemnify, save harmless and defend the Town and its officers, employees, and agents (collectively, the "***Town Indemnified Parties***") from and against all liabilities, losses, damages, penalties, costs, and expenses, including reasonable attorneys' fees and disbursements, that may be imposed upon or incurred by or asserted against any the Town Indemnified Party by reason of any of the following occurrences during the Term:

13.1.1 Any accident, injury, or damage to any person or property occurring in, on or about the Lease Area or elsewhere arising from or related to the installation, operation, repair, maintenance or replacement of the System caused by (i) the negligence or intentional misconduct of Entity Name or any of its agents, contractors, subcontractors, servants, employees, or invitees; or (ii) any failure on the part of Entity Name or any of its agents, contractors, subcontractors, subtenants, servants, employees, licensees or invitees in, on or about the Premises to fully comply with the Applicable Legal Requirements of any of the Entity Name's other obligations hereunder.

13.1.2 In case any action or proceeding is brought against any Town Indemnified Party by reason of any such claim, the Town may, but shall not be obligated to, elect that Entity Name defend such action or proceeding with counsel approved by the Town. Upon written notice from Town of such election, Entity Name shall defend such action or proceeding at Entity Name's expense to the reasonable satisfaction of the Town.

13.2 Indemnification of Entity Name.

To the extent permitted by Applicable Legal Requirements, the Town shall indemnify, save harmless and defend Entity Name and its officers, employees, agents, and any subtenants of the Leased Area and/or System (collectively, the "***Entity Name Indemnified Parties***") from and against all liabilities, losses, damages, penalties, costs, and expenses, including reasonable attorneys' fees and disbursements, that may be imposed upon or incurred by or asserted against any Entity Name Indemnified Party by reason of any of the following occurrences during the Term:

13.2.1 Any accident, injury, or damage to any person or property occurring in, on or about the Lease Area, the Premises or the System of any part thereof which is caused by (i) the negligence or intentional misconduct of the Town or any of its agents, contractors, subcontractors, servants, employees, or invitees; or (iii) any failure on the part of the Town or any of its agents, contractors, subcontractors, servants, employees, licensees or invitees in, on or about the Premises to fully comply with any of the Town's obligations hereunder.

13.2.2 In case any action or proceeding is brought against any Entity Name Indemnified Party by reason of any such claim, such Entity Name Indemnified Party may, but shall not be obligated to, elect that the Town defend such action or proceeding with counsel approved by such Entity Name.

13.2.3 Indemnified Party. Upon written notice from Entity Name of such election, the Town shall defend such action or proceeding at Town's expense to the reasonable satisfaction of Entity Name.

13.3 Survival.

The provisions of this ARTICLE 13 shall survive the expiration or earlier termination of the Agreement.

ARTICLE 14 – DISPUTE RESOLUTION.

14.1 Binding Arbitration.

The Parties shall meet, confer and negotiate in good faith and attempt to resolve any dispute, controversy or claim arising out of or relating to the Agreement or the breach, interpretation, termination or validity thereof (a "***Dispute***"). Any Dispute that is not settled to their mutual satisfaction within the applicable notice or cure periods provided in this Agreement shall be settled by arbitration between the Parties conducted in White Plains, New York, and in accordance with the Commercial Arbitration Rules of the American Arbitration Association in effect on the date that a Party gives notice of its demand for arbitration under this ARTICLE 14. The submitting Party shall submit such Dispute to arbitration by providing a written demand for arbitration to the other Party and the Parties shall select a single neutral arbitrator. If the Parties cannot agree on a single neutral

arbitrator within fifteen (15) days thereafter, then either Party may request that the American Arbitration Association select and appoint a neutral arbitrator who shall act as the sole arbitrator. The Parties may engage in discovery in connection with the arbitration as provided by the New York statutes and shall be entitled to submit expert testimony or written documentation in such arbitration proceeding. The decision of the arbitrator shall be final and binding upon the Parties and shall be set forth in a reasoned opinion, and award may be enforced thereon by either Party in a court of competent jurisdiction; provided, however, that the arbitrator shall not have the authority to award punitive, exemplary or analogous damages. Any award of the arbitrator shall include interest from the date of any damages incurred for breach or other violation of this Agreement at the Interest Rate. Each Party shall each bear the cost of preparing and presenting its own case, provided, however, that the Parties hereby agree that the prevailing party in such arbitration shall be awarded its reasonable attorney's fees, expert fees, expenses and costs incurred in connection with the dispute. The cost of the arbitration, including the fees and expenses of the arbitrator, shall initially be shared equally by Parties, subject to reimbursement of such arbitration costs and attorney's fees and costs to the prevailing party. The arbitrator shall be instructed to establish procedures such that a decision can be rendered within one-hundred eighty (180) calendar days of the appointment of the arbitrator.

14.2 Exceptions to Arbitration Obligation.

The obligation to arbitrate shall not be binding upon any Party with respect to (a) requests for preliminary injunctions, temporary restraining orders, specific performance, or other procedures in a court of competent jurisdiction to obtain interim relief when deemed necessary by such court to preserve the status quo or prevent irreparable injury pending resolution by arbitration of the actual Dispute or (b) actions to collect payments not subject to a bona fide Dispute or (c) claims permitted hereunder against third parties.

ARTICLE 15 – NOTICES

15.1 Notice.

Unless otherwise provided herein, any notice provided for in this Agreement shall be hand delivered, sent by registered or certified U.S. Mail, postage prepaid, or by commercial overnight delivery service, or transmitted by facsimile, and shall be deemed served or delivered to the addressee or its office when delivered.

15.2 Financing Party Notice.

Any notice or other communication which the Town shall desire or is required to give to or serve upon a Financing Party in accordance with the terms of this Agreement shall be in writing and shall be served in accordance with the provisions of § 15.1, addressed to such Financing Party at such party's addresses provided in writing by a Financing Party or by Entity Name, and any notice or other communication which the Financing Party shall desire or be required to give to or serve upon Town shall be deemed to have been duly given or served if sent in accordance with the provisions of § 15.1 or at such other address as shall be designated by Town by notice in writing given to such Financing Party in accordance with the provisions of this ARTICLE 15.

15.3 Notice Addresses.

Town Address:

Entity Name Address:

15.4 Address for Rent Payment.

All rent payments under this Agreement shall be sent to the Town's address as provide in § 15.3 and shall be sent by regular first-class mail postage prepaid or as otherwise agreed by the Parties.

ARTICLE 16 – MISCELLANEOUS

16.1 No Limitation of Regulatory Authority.

The Parties acknowledge that nothing in this Agreement shall be deemed to be an agreement by the Town to issue or cause the issuance of any approval or permit, or to limit or otherwise affect the ability of the Town or any regulatory authority of the Town, to fulfill its regulatory mandate or execute its regulatory powers consistent with Applicable Legal Requirements.

16.2 Subordination to Existing Leases, Easements and Rights of Way.

Entity Name acknowledges and understands that this Agreement is subject and subordinate to all existing leases, easements, rights of way, declarations, restrictions or other matters of record, and all existing agreements of the Town with respect to the Premises, and the Town represents that there is no restriction by agreement or otherwise which restricts the Town's right to enter into this Agreement or which would impair, interfere with, or be superior to or have priority over the leasehold estate granted hereunder. The Town reserves the right to grant additional licenses, easements, leases or rights of way, whether recorded or unrecorded, as may be necessary, which do not cause shading of the System or otherwise unreasonably interfere with Entity Name's use of the Premises and the operation of the System; provided however the Town shall execute and shall cause any holder of an interest in the Premises senior to that of the Entity Name to execute, a form of a non-disturbance agreement reasonably acceptable to Entity Name, any Financing Party and any subtenant with which the Town has executed a recognition agreement.

16.3 Compliance.

16.3.1 Entity Name shall comply with all Applicable Legal Requirements relating to the System.

16.3.2 The Town shall comply with all Applicable Legal Requirements relating to the Landfill including without limitation, the Landfill Closure Plan, except as to matters resulting wholly or partly by, and to the extent caused by, Entity Name or any of its related entities, contractors, invitees or licensees.

16.3.3 Upon knowingly encountering any Hazardous Materials at the Premises, Entity Name will stop work in the affected area and duly notify the Town and, if required by Applicable Legal Requirements, any Governmental Authority with jurisdiction over the Premises

16.3.4 The Town is not responsible for any Hazardous Materials introduced to the Premises by Entity Name, nor is the Town required to remediate an affected area. Entity Name shall not, and shall not direct, suffer or permit any of its agents, contractors, subcontractors, employees, leases, or invitees at any time to manufacture or dispose of in or about the Premises any Hazardous Materials, including but not limited to flammables, explosives, and radioactive materials. Entity Name agrees to comply with all Applicable Legal Requirements pertaining to the use, storage and disposal of Hazardous Materials (***"Environmental Laws"***) at the Premises. Entity Name shall indemnify, defend and hold harmless the Town and its agents, representatives and employees from any and all liabilities and costs (including any and all sums paid for settlement of claims, litigation, expenses, attorneys' fees, consultant and expert fees) of whatever kind or nature, known, or unknown, resulting from any violation of Environmental Laws caused by Entity Name or Entity Name's agents, contractors, subcontractors, employees, lessees or invitees at the Premises. In addition, Entity Name shall reimburse the Town for any and all costs related to investigation, clean up and/or fines incurred by Town for non-compliance with Environmental Laws, which are caused by Entity Name or Entity Name's agents, contractors, subcontractors, employees, lessees or invitees at the Premises. Town reserves the right to inspect the Lease Area for purposes of verifying compliance with these Hazardous Materials requirements.

16.4 Limited Effect of Waiver.

The failure of either Party to enforce any of the provisions of this Agreement, or the waiver thereof in any instance, shall not be construed as a general waiver or relinquishment on its part of any such provision, in any other instance or of any other provision in any instance.

16.5 Survival.

In addition to the other provisions of this Agreement that shall survive any expiration or termination hereof in accordance with the explicit terms thereof, the provisions of ARTICLE 1 (Defined Terms), ARTICLE 14 (Dispute Resolution), ARTICLE 9 (Assignment and Subcontracting), ARTICLE 15 (Notices), ARTICLE 13 (Indemnification) and ARTICLE 16 (Miscellaneous) shall survive the expiration or termination of this Agreement for any reason; provided, that the survival of any particular provision or set of provisions shall be limited in duration if and to the extent such survival is explicitly limited herein or otherwise limited by Applicable Legal Requirements.

16.6 Severability.

If any term, covenant or condition in this Agreement shall, to any extent, be invalid or unenforceable in any respect under the laws governing this Agreement, the remainder of this Agreement shall not be affected thereby, and each term, covenant or condition of this Agreement shall be valid and enforceable to the fullest extent permitted by Applicable Legal Requirements and, if appropriate, such invalid or unenforceable provision shall be modified or replaced to give effect to the underlying intent of the Parties and to the intended economic benefits of the Parties.

16.7 Non-recourse.

The obligations of the Town and Entity Name under this Agreement are not intended to and shall not be personally binding on, nor shall any resort be had to the private properties of, any of the Town's officers, employees, agents nor of Entity Name's trustees or board of directors and officers, as the case may be, or any beneficiaries, employees, agents or the like thereof. In no event shall the Town ever be liable to the Entity Name for any indirect or consequential damages under the provisions of this Agreement.

16.8 Representations and Warranties.

Each Party hereby represents and warrants to the other, as of date hereof, that:

16.8.1 **Organization.** It is duly organized, validly existing and in good standing under the laws of the state in which the Premises are located, respectively, and has the power and authority to enter into this Agreement and to perform its obligations hereunder.

16.8.2 **No Conflict.** The execution and delivery of this Agreement and the performance of and compliance with the provisions of this Agreement will not conflict with or constitute a breach of or a default under (1) its organizational documents; (2) any agreement or other obligation by which it is bound; (3) any law or regulation.

16.8.3 **Enforceability.** (1) All actions required to be taken by or on the part of such Party necessary to make this Agreement effective have been duly and validly taken; (2) this Agreement has been duly and validly authorized, executed and delivered on behalf of such Party; and (3) this Agreement constitutes a legal, valid and binding obligation of such Party, enforceable in accordance with its terms, subject to laws of bankruptcy, insolvency, reorganization, moratorium or other similar laws.

16.8.4 **No Material Litigation.** There are no court orders, actions, suits or proceedings at law or in equity by or before any governmental authority, arbitral tribunal or other body, or threatened against or affecting it or brought or asserted by it in any court or before any arbitrator of any kind or before or by any governmental authority which could reasonably be expected to have a material adverse effect on it or its ability to perform its obligations under this Agreement, or the validity or enforceability of this Agreement.

(End Terms and Conditions.)

SOLAR LEASE AGREEMENT

EXHIBIT A

PREMISES AND LEGAL DESCRIPTION

That real property at Site Address, as described in the indenture recorded with Organization & Address and The Town, dated Date.

SOLAR LEASE AGREEMENT

EXHIBIT B

LEASE AREA DESCRIPTION & DESIGN LAYOUT

GUARANTY

The Town, a New York municipality (hereinafter referred to as the "Town") and **ENTITY NAME, NY LLC**, (hereinafter referred to as the "Lessee") have entered into a Solar Lease Agreement dated Date (the "Agreement"). In order to induce the Town to enter into, execute and deliver the Agreement, and for other good and valuable consideration, the receipt and sufficiency of which is hereby acknowledged, **Entity Name**, a New York limited liability company with an address of Address, as guarantor (the "Guarantor") hereby warrants, represents, guarantees and agrees with The Town as follows:

1. Guarantor has examined and approved and is fully familiar with all of the terms, covenants and conditions of the Agreement. Guarantor represents that Guarantor shall benefit from the making of the Agreement. Guarantor acknowledges that Guarantor executes and delivers this Guaranty on the understanding that Guarantor's doing so is a condition precedent to the Town's entering into the Agreement, as the Town is relying upon Guarantor's covenants herein in entering into the Agreement with Lessee.
2. Guarantor hereby guarantees and warrants to the Town the full, prompt and complete performance of all of the terms, covenants and conditions of the Agreement on the part of Lessee (collectively, the "Obligations"). Guarantor acknowledges that the intent of this Guaranty is that in the event Lessee does not in any way fully perform any of Lessee's Obligations in a timely manner under the Agreement, Guarantor shall perform any and all of such Obligations.
3. This guaranty is primary, irrevocable, absolute and unconditional and shall not be released, discharged, mitigated, impaired or affected by any amendments, modifications, extensions and/or renewals of the Agreement, or by any waiver or by failure of the Town to enforce any of the terms, covenants and conditions thereof or by any extension of time or indulgence extended by the Town to Lessee; and Guarantor hereby consents that the Town and Lessee may do any of the foregoing without notice to Guarantor during the term of this Guaranty.
4. Guarantor's liability under this Guaranty shall not be deemed to be waived, released, discharged, mitigated, impaired or affected by reason of the release or discharge of Lessee under the Agreement in any bankruptcy, reorganization or insolvency proceedings.
5. Guarantor's liability under this Guaranty shall not be waived, released, discharged, mitigated, impaired or affected in any respect by reason of any action or proceeding taken against Lessee under the Agreement, and in any such action or proceeding, the Town need not include Guarantor as a party thereto. The Town may pursue its remedies under this Guaranty concurrently with or independently of any such action or proceeding against Lessee under the Agreement.
6. The word "Lessee" as used in this Guaranty shall be deemed to and shall include any assignee to whom the Agreement shall have been assigned by Lessee in accordance and in compliance with the provisions thereof.
7. Anything to the contrary contained in the Agreement notwithstanding, Guarantor's liability under this Guaranty shall not be waived, released, discharged, mitigated, impaired or affected in any respect by reason of any assignment of the Agreement by the Town or Lessee, or by any subsequent assignee of the Agreement.
8. The Town may proceed directly against Guarantor under this Guaranty without being required to proceed against Lessee under the Agreement or to the exhaust any other rights or remedies it may have against the Lessee.
9. The Guaranty shall not be changed or terminated orally.
10. This Guaranty shall inure to the benefit of the Town, its successors and assigns, and shall be binding upon Guarantor, its successors and assigns.
11. The Guarantor shall pay the Town's reasonable attorneys' fees, costs, and other expenses incurred in the successful enforcement of this Guaranty against the Guarantor.
12. The Town may, upon written notice, assign this Guaranty to the successor to all of the Town's interest in the Agreement and no assignment or transfer of this Guaranty or the Agreement shall operate to extinguish or diminish the liability of the Guarantor hereunder.
13. It is in furtherance of the company purposes of the Guarantor that the Agreement with Lessee be entered into; and this Guaranty has been duly authorized by its members and by all parties whose consent is required for the execution hereof.

This Guaranty is made as of date

Entity Name, Guarantor

By: _____

Name: _____

Title:_____

5. Model Law for County Land Leases

The workable version of this document can be found at nyserda.ny.gov/SolarGuidebook, under the Municipal Solar Procurement Toolkit tab.

Local Law No. [#] of the year 20[##]

A local law authorizing the County of [ ], notwithstanding Section 215 of County Law of the State of New York, to enter into a lease of County-owned real property for a specific project for a term of up to 45 years.

SECTION 1. Purpose

The County of [ ] seeks to enter into an agreement with [Developer], which agreement shall lease real property owned by the County of [ ] for an initial term of twenty-five years and four additional optional terms of five years each.

SECTION 2. Legal Authority

New York State County Law Section 215 provides that, after determining that a property is no longer needed for public use, a County may sell the property or lease the property for a term not to exceed five years.

New York State Comptroller Opinion 68-857 opines that a municipality may enter into leases for a term in excess of five years if the municipality authorizes such leases by local law.

New York State Municipal Home Rule Law Section 24 provides that any local law that changes a provision of law relating to leasing of real property is subject to referendum on petition (permissive referendum).

SECTION 3. Applicability

The County of [ ], is authorized, notwithstanding Section 215 of the County Law of the State of New York, which is hereby superseded, to enter into a lease of County- owned real property for a specific project for a term of up to [45] years.

This Local Law is applicable to the specific project with [Developer].

SECTION 4. Effective Date

Notice of the adoption of this local law subject to permissive referendum shall be published in the official newspaper of the County.

This Local Law shall take effect at the end of the permissive referendum period upon filing in the Office of the Secretary of State, and if a permissive referendum is held, upon approval at the permissive referendum upon filing in the Office of the Secretary of State.

Questions?

If you have any questions about the municipal solar procurement toolkit, please email questions to cleanenergyhelp@nyserda.ny.gov or request free technical assistance at nyserda.ny.gov/SolarGuidebook. The NYSERDA team looks forward to partnering with communities across the state to help them meet their solar energy goals.

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NYSERDA

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