

# 2019 NYC Solar Installer Workshop

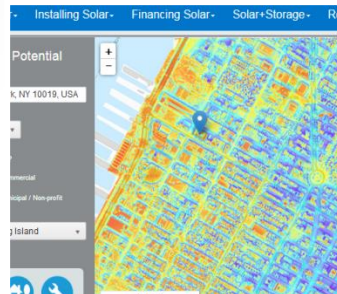


Sustainable CUNY

# Con Edison Housekeeping

- *In case of emergency*
  - Dial 911 or alert the Security Desk
  - Con Edison's TLC Address: 43-82 Vernon Blvd, LIC, NY
  - In the event of an emergency, audible alarm & visible strobes will be activated; follow announcement instructions
  - Post evacuation assembly area is the 3<sup>rd</sup> row of the parking lot
- *Rest rooms*
  - Located on the south side of the building & opposite the cafeteria
- *Con Edison's Learning Center is a Smoke Free Facility*
  - Designated smoking areas are in the front & rear of the building
- *WiFi guest access*
  - Connect to SSID "CEGuest"
  - Username: SolarWorkshop
  - Password: HE@GQ8QX

# Sustainable CUNY- Smart DG Hub



## Solar Infrastructure

- Permitting
- Zoning
- Grid Analysis
- Policy Support
- Installer Roundtable

## Mapping the Way

- One stop Portal
- Solar Maps
- Data Analytics
- Roadmaps

## Accessing Solar

- Group Purchasing
- Community Shared Solar
- Education
- NY Solar + Storage Summit

## Resiliency

- Solar + storage
- Critical Facility Support
- Reducing Storage Soft Costs
- Resilient Storage Project

# Outreach & Training



## Solar Installer Roundtables

Sustainable CUNY convenes the NYC, NYS and DG Hub Installer Roundtables with a collective membership of over 500. The roundtables are forums for exchanging information, workshop opportunities, RFP and RFI notices, and industry updates.

## Workshops and Training

Sustainable CUNY regularly provides workshops for NYC and NYS Solar installers, storage vendors, agencies and first responders as well as jurisdictions across the State.

## Solar Connect

The NY Solar Map gives consumers the option to go beyond just viewing the solar potential of their property. They can choose to take action by connecting with solar installers in several ways.



# Mayor Raises the NYC Solar Goal to 1,000 MW by 2030

## Sets First Storage Goal

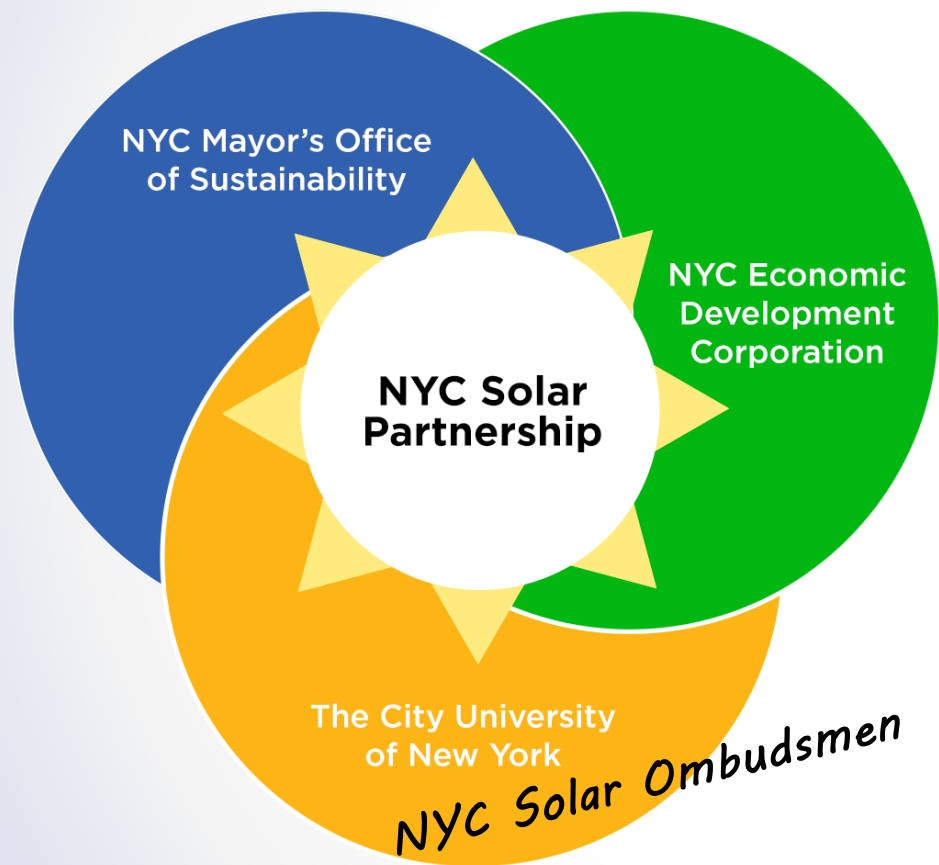


- Further reduce barriers to investing in solar power
- Attract and support solar energy companies
- Increase solar capacity: clean, renewable energy for NYC

# NYC SOLAR PARTNERSHIP



## Solarize NYC | Shared Solar NYC



- Formed in 2006 and led by **Sustainable CUNY**
  - Third party brings stakeholders to the table
  - Market and data analysis
  - Dedicated Solar & DG Ombudsmen
  - NYS Solar Map and portal
- **Mayor's Office and NYC EDC**
  - Policies and programs that support solar and economic development
  - Active engagement
  - Vast network of resources



## WELCOME TO THE SHARED SOLAR NYC GATEWAY

[Participate](#)



### HOST

Lease your roof space to generate revenue



### SUBSCRIBE

Sign up for community shared solar information



### DEVELOPER

See community shared solar developer options



### ACCESSOLAR

Learn more about NYCHA's ACCESSolar program

## NYC SOLAR PARTNERSHIP

SOLARIZE NYC | SHARED SOLAR NYC

[Home](#) [Participate](#) [About](#) [NYC Solar Partnership](#) [Login](#)

### Participate as a Developer

Select “**Solar Contractor**” if you are interested in only the installation (construction) of the community solar systems.

Select “**Subscriber Manager**” if you are interested in managing the relationship among the community solar subscribers, the community solar system owner, and the utility.

Select “**Community Shared Solar Developer**” if you are interested in the installation (construction) of the community solar systems as well as managing the relationship between the community solar subscribers and the utility.



SOLAR CONTRACTOR



SUBSCRIBER MANAGER



CSS DEVELOPER



## NYC SOLAR PARTNERSHIP

SOLARIZE NYC | [SHARED SOLAR NYC](#)

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### Participate in ACCESSolar

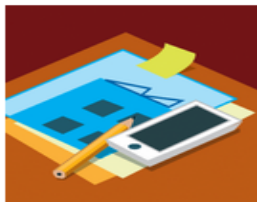
Select **"Learn More"** if you are interested in learning more about the ACCESSolar program.

Select **"ACCESSolar Developer"** if you are a developer interested in teaming up with ACCESSolar Community Board Organizations and Non-profits to install shared solar systems on smaller public housing sites.

Select **"ACCESSolar CBO/Non-profit"** if you are a CBO/Non-profit interested in teaming up with ACCESSolar Developers to install shared solar systems on smaller public housing sites.



LEARN MORE ABOUT  
ACCESSOLAR



ACCESSOLAR DEVELOPER

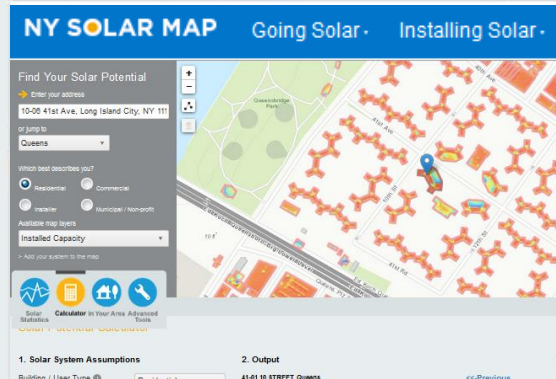


ACCESSOLAR  
CBO/NON-PROFIT

# NYCHA 25 MW SOLAR PROGRAM

25 MW of Solar Capacity on NYCHA Properties By 2025

Two Programs



CUNY's NYC solar ombudsmen provide the technical analysis and guidance for NYCHA's solar program

# NYCHA's 25 MW Solar Program

## First of its Kind Program with Options for Roofs Large and Small

### Commercial Solar Program

- Large sites (campuses with individual roofs over 40 kW)
- Commercial-scale developers
- Lease payment to NYCHA required
- Standard procurement process

### Accelerating Community Empowered Shared Solar (ACCESSolar)

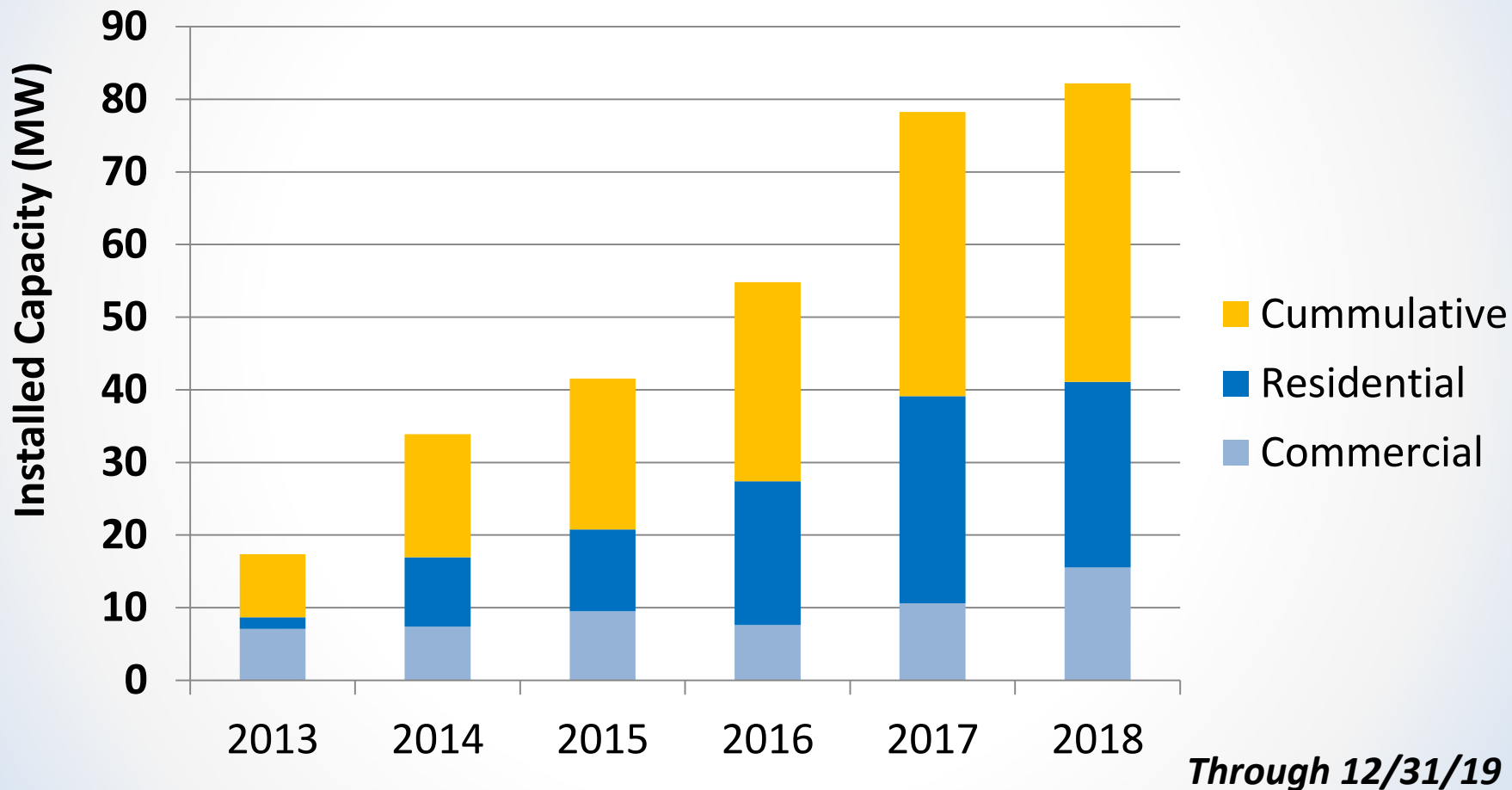
- Smaller and more scattered sites
- Focus on local developers working with CBOs/non-profits
- Lease payments a secondary concern
- Greater emphasis on LMI subscribers and job training

# ACCESSolar Overview & Goals

- Contribute to NYCHA's 25 MW goal by making smaller roofs available
- Expand solar business opportunities for small local businesses and MWBEs
- Provide job training and green job opportunities for NYCHA residents
- Offer renewable power to low- and moderate-income subscribers in NYC

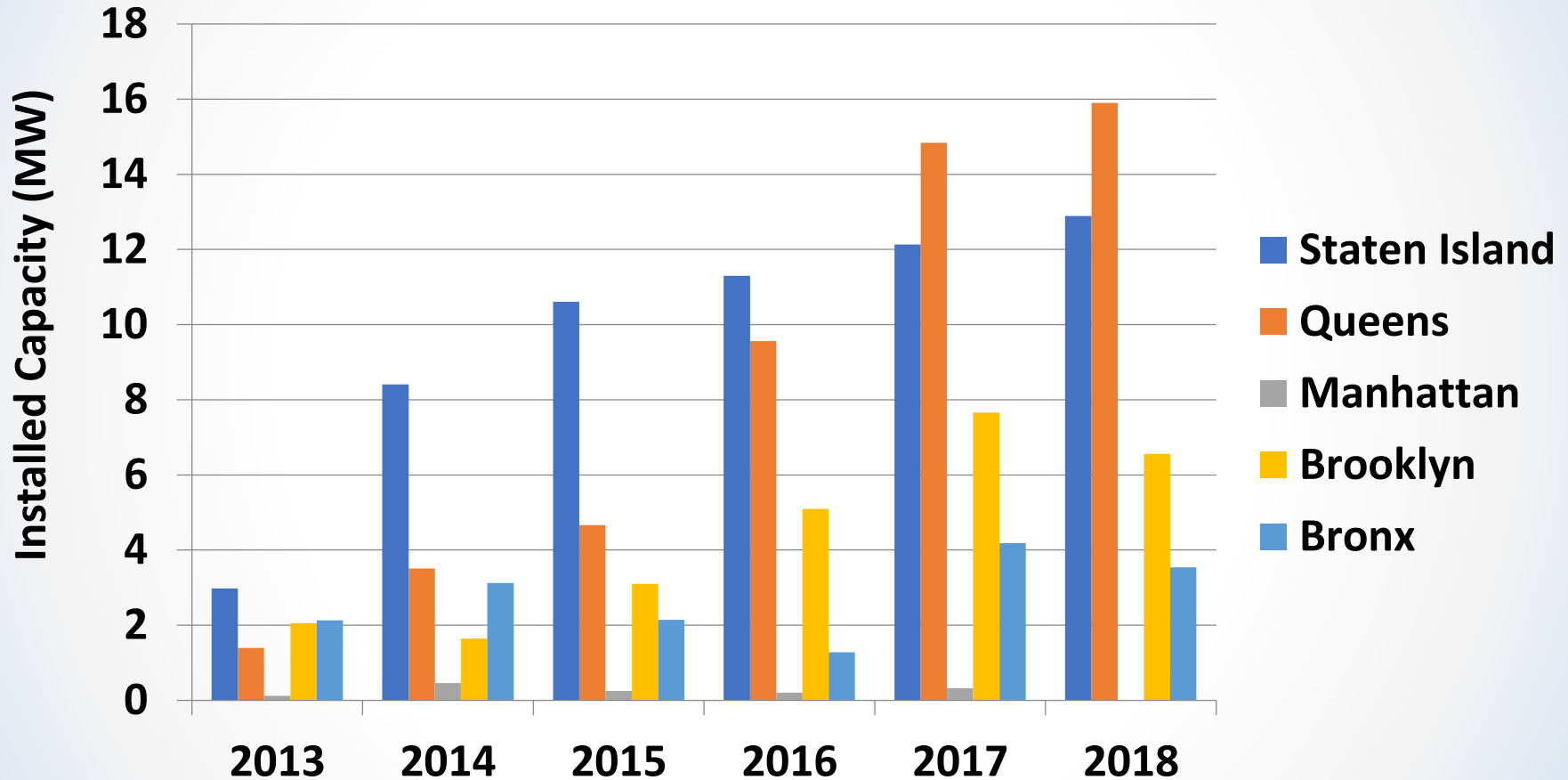


# Solar Capacity in New York City





# Solar Capacity By Borough





**Hardware Technologies**

**Policy & Legal**

**Smart DG  
Hub**

**Software  
Technologies**

**Economics &  
Finance**

# U.S. Storage Growth/Forecast

U.S. Annual Energy Storage Deployment Forecast, 2012-2023E (MWh)



Source: GTM Research / ESA [U.S. Energy Storage Monitor](#)

# NYS Goal

**3,000 MW of ESS by 2030**



## Challenges Include-

- **There is no single definitive set of standards currently in force for energy storage**
- **New York is a home rule state**

## The Path

- **Leverage platform that was utilized to create infrastructure for solar, initially in NYC, that was adapted for AHJ diverse needs across the state**
- **Provide guidance and TA to AHJ's across the state**

# NYSERDA's Energy Storage Soft Costs Reduction Initiative

**Permitting  
Development,  
Training &  
Assistance**



**Customer  
Analysis,  
Identification &  
Outreach**



**Vendor  
Outreach &  
Education**

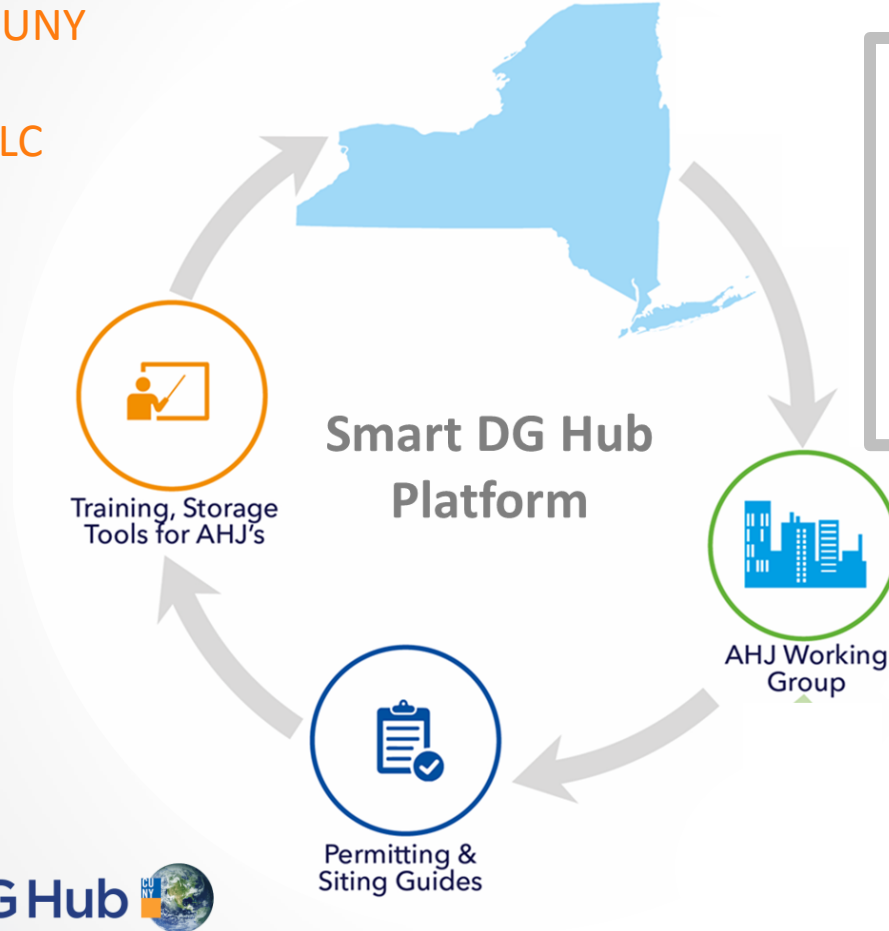


**M&V and  
Performance  
Analysis**



# Reducing Storage Soft Costs

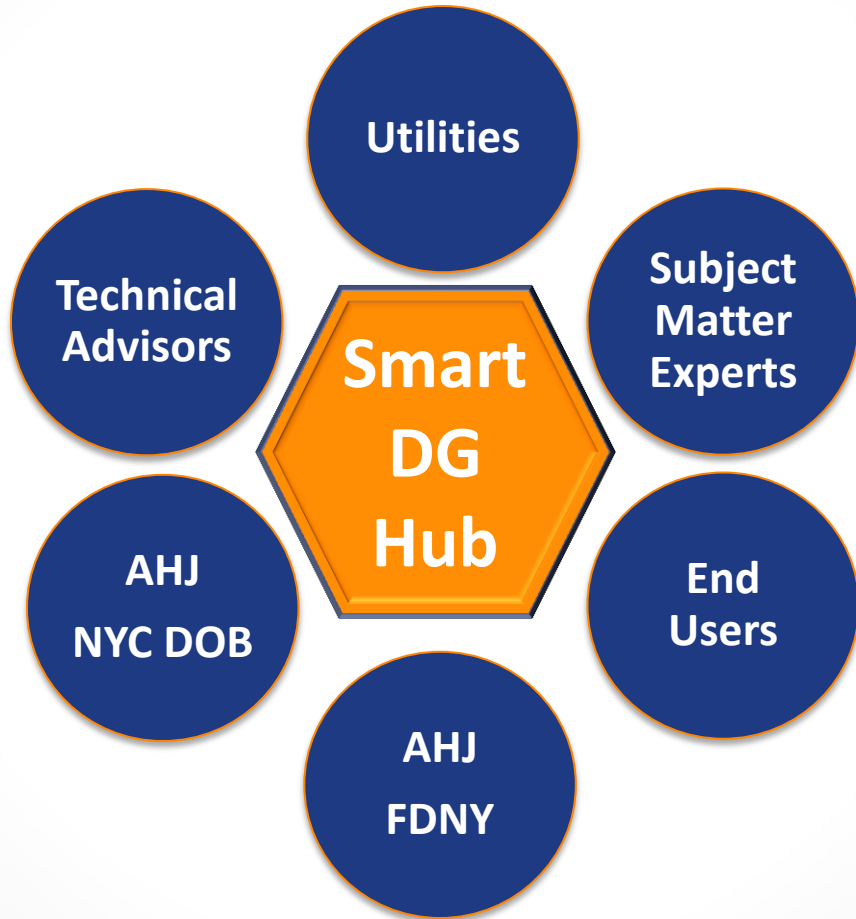
Sustainable CUNY  
DNV-GL  
PGR Group, LLC



## Phase 1

- Develop NYC Storage Permitting Guides
- Facilitate Permitting Guidance For NY AHJs

# Reducing Storage Soft Costs - Engaging the Stakeholders



# NYC Permitting Process

## Where we started

- ✓ Guide for ESS, relating exclusively to Lead Acid systems

## 2017 and 2018 Focus

- ✓ Considered broad areas of technical concern
- ✓ Published Outdoor and rooftop Lithium ion ESS Permitting Guide for NYC

## Current Focus

- Data collection to provide additional certainty and support rule development
- Indoor installations discussions in process, weekly meetings
- Goal: Development of an **“New York City Energy Storage System Permitting Guide: Large Scale Fire Test Data Utilization”** using 9540a criteria

# Industry and Stakeholder Expertise

- DNV GL / Con Ed / NYSERDA testing experience
- DNV GL general battery expertise, based on interactions with manufacturers and verification efforts on systems in service
- FDNY field experience
- Current NYC Fire, Building, Mechanical, and Electrical code
- Current and developing standards
  - NFPA 855 (draft), NFPA body of standards as applicable
  - Proposal F95
  - IFC – 2018 and 2021 (draft)
  - IBC – 2018
  - NEC 2017
  - UL body of certification requirements/standards as applicable

# Safety Guidelines/Standards





# Outdoor Li-Ion ESS Size Ranges

**Small       $\leq 20\text{kWh}$**

**Medium       $> 20\text{kWh} - \leq 250\text{kWh}$**

**Large       $> 250\text{kWh}$**

# ESS Locations/Placement

2 types

Front meter,  
“Utility Side”



Utility

Behind the meter,  
“Customer Side”



Residential



Commercial

# Bucket/sub-buckets & main considerations

Fire Protection	Ventilation & Exhaust	Lifecycle Management	Status Communications	Cascading Protection	Signage	Siting
<ul style="list-style-type: none"><li>• Define fire protection requirements for mfrs &amp; developers</li><li>• Define fire suppression &amp; extinguishing techniques to support FDNY SOP development</li><li>• Support development of threshold quantities and MAQ</li></ul>	<ul style="list-style-type: none"><li>• Identify ventilation &amp; exhaust req's (rates, airflow) – normal ops, emergency ops/ fire/explosion</li><li>• Support development of MAQ and threshold quantities.</li></ul>	<ul style="list-style-type: none"><li>• Identify information to be provided by the project developer relating to physical system management</li><li>• Develop replicable process/template for applicants.</li><li>• Provide sufficient information to support FDNY SOP development</li></ul>	<ul style="list-style-type: none"><li>• On site signaling</li><li>• Automatic malfunction response</li><li>• Offsite signaling</li><li>• Personnel response</li></ul>	<ul style="list-style-type: none"><li>• Technology specs</li><li>• Technology features and functioning</li><li>• UL listings</li><li>• Safety concerns addressed</li></ul>	<ul style="list-style-type: none"><li>• Posting locations</li><li>• Information requirements</li><li>• Physical requirements</li></ul>	<ul style="list-style-type: none"><li>• Identify siting requirements to minimize risk of and from fire</li><li>• Allow emergency exit and access as necessary</li></ul>

# Outdoor Li-ion Guide

## Energy Storage System Permitting and Interconnection Process Guide For New York City Lithium-Ion Outdoor Systems

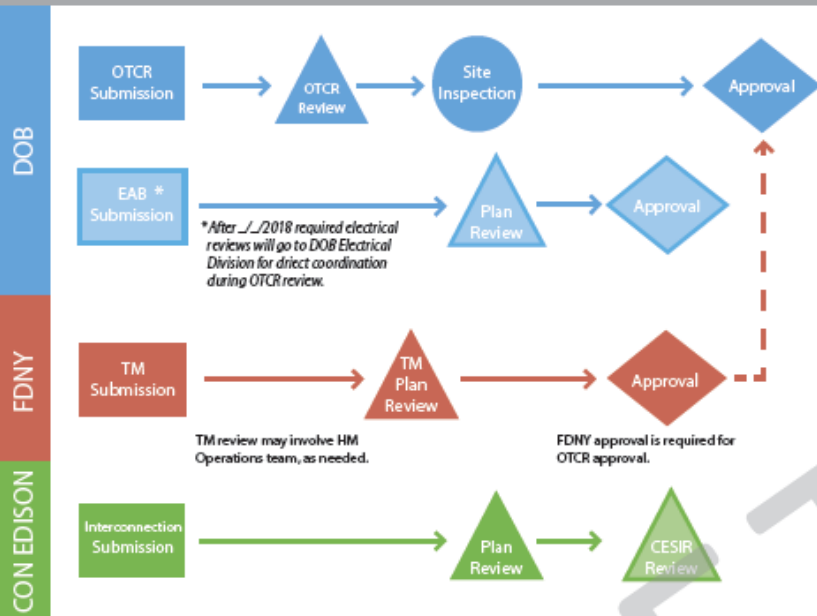


With Technical Assistance Provided by DNV GL

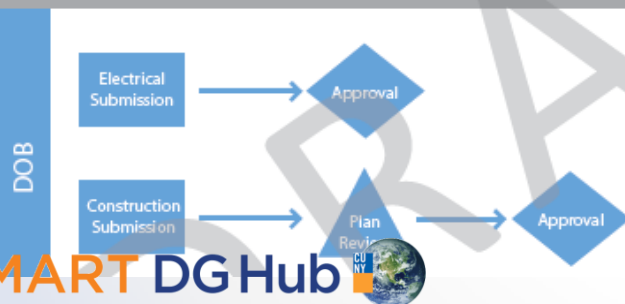
April 2018

Permitting and Interconnection			Permitting and Interconnection		Permitting and Interconnection		Permitting and Interconnection Process Guide For New York City Lithium-Ion Outdoor Systems
<b>APPLICANT CHECKLIST</b> The following checklist requirements for permit documentation and details with further details as			Fire analysis	Based on UL 9540 test laboratory.	Deflagration venting and exhaust	Based on explosion and deflagration exhaust, flame, or oil from combustible material.	<sup>1</sup> Siting requirements: <ul style="list-style-type: none"> <li>Must demonstrate compliance with NYC zoning requirements per zoning area and equipment category.</li> <li>Description of access to energy storage system equipment and clearly defined and maintained means of egress as required by code (both Fire and Building Codes' Chapter 10, as applicable).</li> <li>Individual containers may not exceed 53' x 8.6' x 9.6'.</li> <li>Must indicate distance from other site features, regardless of proximity to energy storage system, covering at least:                             <ul style="list-style-type: none"> <li>Minimum of 10' from: Lot lines, public ways, buildings (and air intakes or openings such as doors and windows), stored combustible material, hazardous material, high piled stock, other exposure hazards, means of egress, and required exits;</li> <li>OR can install a line of protection if approved by AHJ;</li> <li>OR if explosion and fire analysis using data obtained from UL 9540A testing demonstrates otherwise and is not in conflict with zoning or building code. DOB requires review and approval of data obtained under UL 9540A testing.</li> </ul> </li> <li>Indicate location and distance from fire hydrants and standpipes, as applicable.</li> <li>Location of shut-off and electrical disconnects on site must be specified on plans or described and should be within line of sight or clearly signed, and be compliant with NEC Article 706 and ADA.</li> <li>If installation on rooftop below 100 ft, description of how installation complies with NYC Fire Code 504.4.</li> </ul>
<b>Documentation</b>			FMEA	Generic FMEA re-stipulated requirement by NYS PE. Site specific FMEA 9540 certification requirements as	Installation and commissioning plans	Plan should include authority.	
FDNY	TM-1	Application	Battery specification	If not included in including total nu	Operations and maintenance plan	O&M manual provided that maintenance m 107.7, available for i provided at the requ representative in a li Department Person systems shall be liste	<sup>2</sup> Adjacent to building requirements: <ul style="list-style-type: none"> <li>Must be under 20 kWh.</li> <li>Building must be non-combustible;                             <ul style="list-style-type: none"> <li>OR a 1-hour fire rated assembly over the existing building surface that extends 5 feet on either side of the container and 10 feet in the direction of expected flame travel in the event of a fire.</li> </ul> </li> <li>AND installed at least 5 ft. from any openings in walls (windows, doors, vents, etc.) and 10 ft. from required exit;</li> <li>OR where insufficient space, a non-combustible or 1-hour fire rated assembly barrier may be put in place, if approved by AHJ.</li> <li>UL 9540A test results may be submitted to OTCR for evaluation. OTCR may omit the above requirements based on their evaluation.</li> </ul>
	TM-2	Certificate	Inverter specification	If not included in including confirm is approved or ap applicable), and i	Decommissioning and disposal plan	Description of plan information, recycling transportation plan.	
DOB	OTCR-2	Site specific	System encasement specification	If not included in including confirm is approved or ap applicable), and i	Emergency management plan	Plan must be available least: 1) List of consi detected and assess shut-down procedur aware of; 4) Emerg SME, operators, own applicable; 5) Respo (including spill contr repair, and/or syste	<sup>3</sup> Over 20kW system site requirements are to be evaluated on a case by case.
	ED16-A	Electrical					
Site plans	PW1	Application	Communication and controls specification	If not included in including: 1) desc string, and batter 2) approved ener current, voltage, case of emergenc indicator (screen active, faulted); 4 operation ranges	Signage	Signage must compl the container and at additionally be label code, or as required	<sup>4</sup> Applicability pending UL 9540A testing results.
	PW3	Project co					
Other structures on site	TR1	Technical	Monitoring and alarms specification	If not included in for smoke, gas, a visual alarms in t suppression syste required.	Roof structural analysis	If installed on a roof structurally capable	<sup>5</sup> Spill Control and Neutralization Requirements: <ul style="list-style-type: none"> <li>For free-flowing electrolyte, method and materials shall be capable of neutralizing a spill of the total capacity from the largest cell or block to a pH between 5-9.</li> <li>For immobilized electrolyte, the method and material shall be capable of neutralizing a spill of 3% of the capacity of the largest cell or block to a pH between 5-9.</li> </ul>
Site use	TR8	Technical					
Site characteristics		Flood, sea	Fire protection system description	Drawing of suppl results*. Water p calculations. If system is instal suppression syst to Fire Departme provided.	Roof materials descriptions	Description of buildi combustible assem combustible, extend If installed on dunn If installed on dunn	<sup>6</sup> Signage Requirements: <ul style="list-style-type: none"> <li>Dimensions at least 8.5" x 11".</li> <li>Made of durable material.</li> <li>Must have non-glare finish, and characters must contrast with background.</li> <li>If sign fades, a new one must replace it.</li> <li>Characters must be a minimum of 0.5" in height.</li> <li>Sign must be securely attached at approximately 5 ft.</li> <li>Sign will include following or equivalent:</li> </ul>
System description		A system d descriptio total syste					
Single line drawing		Demonstr energy sto and inter or emerge	Non-water suppression system	If installed, specifi name, system de position within c			
UL 1793		Certificati					
UL 1741		Certificati	Specification for ventilation and exhaust system	Specification sh maintain safe ten maintain LFL bel			
UL 9540		Generic sy					
UL 9540A		UL 9540A conducted testing sh once.	Explosion analysis	Based on t test labora			

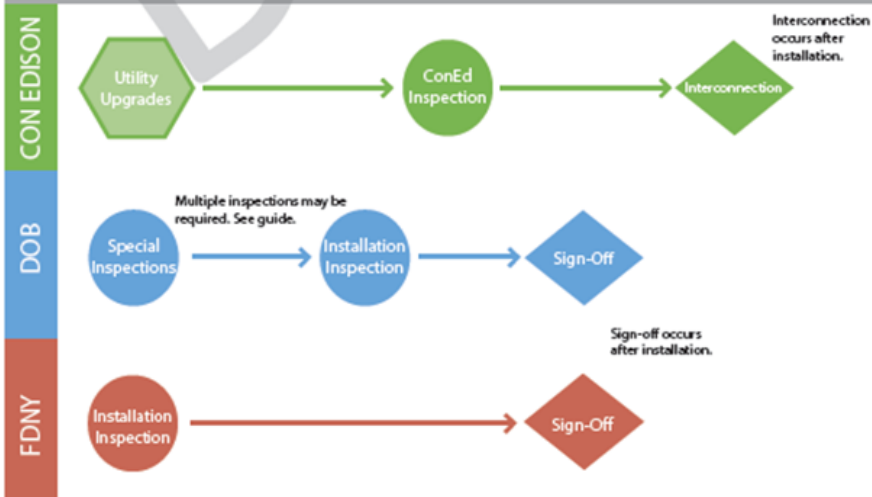
## STEP 1: These steps initiate the permitting process.



## STEP 2: These steps occur after OTCR approval. Submissions may be made in parallel. Construction may begin after the permits below are obtained.



## STEP 3: These steps occur during ESS installation. Inspections may occur in parallel.



## STEP 4: These steps begin after project sign-off and continue for the life of the system.



# 9540A Data Utilization Guide – Topic Areas



## THERMAL RUNAWAY

- Test methodology
- Initiation method
- Preventative controls



## FIRE SPREAD

- Unit spacing
- Fire and smoke detection
- Fire suppression



## EXPLOSION

- Deflagration hazards
- Ventilation and exhaust requirements
- Threat to nearby people and buildings



## TOXICITY

- IDLH levels
- Ventilation requirements



## PERFORMANCE-BASED DESIGN

- Modeling to take into account varying installation environments, system sizes, sprinkler systems, etc.
- Validated models
- Definition of worst case scenario



# EPRI SHINES – Queen's College



- Solar + Storage project being developed at CUNY Queen's College with EPRI, NYPA, Solar Liberty, Enel X, NEC
- Solar PV DC System Size: 50 kW
- ESS System Size:
  - Capacity: 200 kWh
  - Power: 100 kW
- Using the 9540A testing data from SHINES as a case study to inform our effort to develop the criteria for **Large Scale Fire Test Data Utilization**



Do you have case study you would like to share? Contact [dghub@cuny.edu](mailto:dghub@cuny.edu)

## SMART DG HUB

The City University of New York formed the Smart Distributed Generation Hub (Smart DG Hub) to develop a strategic pathway to a more resilient distributed energy system, and won Federal and State support for the projects outlined below.

### Resources

The Smart DG Hub, working in collaboration with NYS municipalities and [partners](#) across the state, has developed an extensive portfolio of educational resources about solar+storage, including guidance for permitting these systems in NYC. [SOLAR+STORAGE RESOURCES](#)



CRITICAL FACILITY SOLAR+ EVALUATOR



RESILIENT SOLAR PROJECT



VALUE OF RESILIENCY PROJECT



## STORAGE RESOURCES



STORAGE PERMITTING



ROADMAP | SURVEYS



CASE STUDIES | FACT SHEETS | GUIDANCE



STORAGE MAPPING TOOLS



STORAGE WEBINARS



ADDITIONAL RESOURCES



# NEW YORK + Storage SOLAR SUMMIT



**Save the Date**

**NY Solar+Storage Summit**

**JUNE 13<sup>th</sup>**

**[nysolar@cuny.edu](mailto:nysolar@cuny.edu)**



slido

Join at  
**slido.com**  
**#NYC**