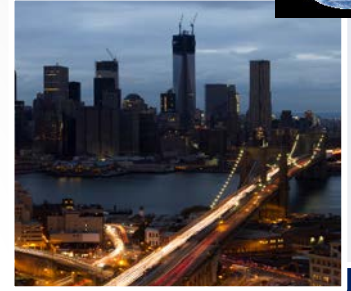
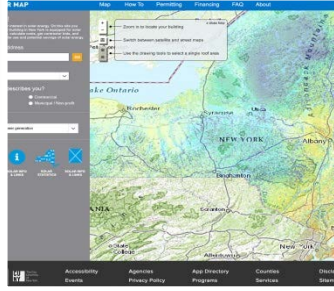


Building a Path to Solar+Storage in NY

Central Hudson Solar Summit
Laurie Reilly
Daniella Leifer
Sustainable CUNY



Sustainable CUNY



Solar Infrastructure

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

Mapping the Way

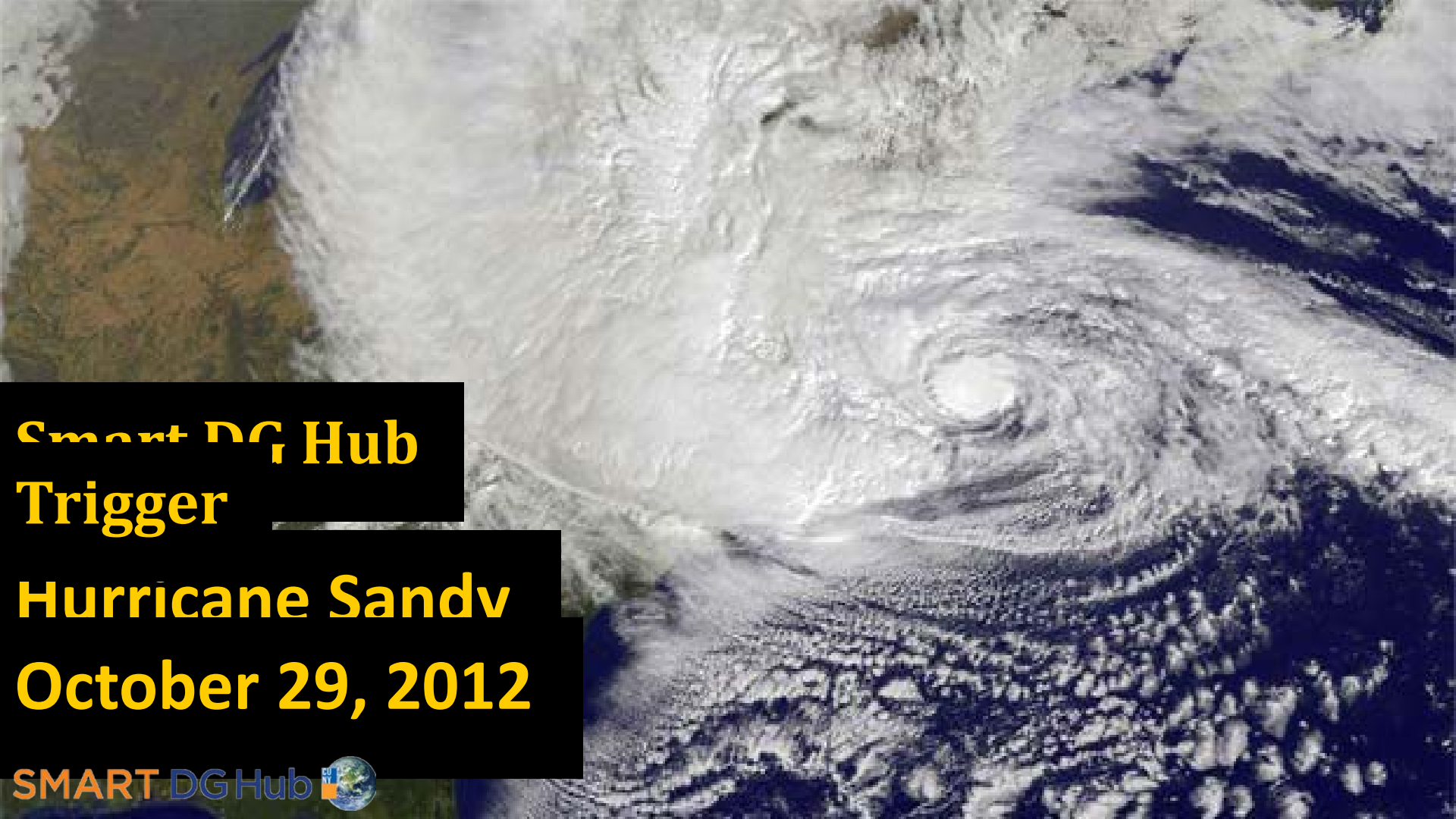
- One stop Portal
- Solar Maps
- Data Analytics
- Roadmaps

Accessing Solar

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

Resiliency

- Smart DG Hub
- Solar-plus-storage
- Critical Facility Support

A satellite image of Hurricane Sandy, showing a well-defined eye and a dense, swirling cloud structure over the ocean. The eye is a bright white circle in the center of the storm. The surrounding clouds are dark and textured, indicating heavy precipitation and wind. The ocean surface is visible in the lower right corner, showing a grid-like pattern of latitude and longitude lines.

**Smart DG Hub
Trigger
Hurricane Sandy
October 29, 2012**



**Hardware
Technologies**

Policy & Legal

**Smart DG
Hub**

**Software
Technologies**

**Economics &
Finance**

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

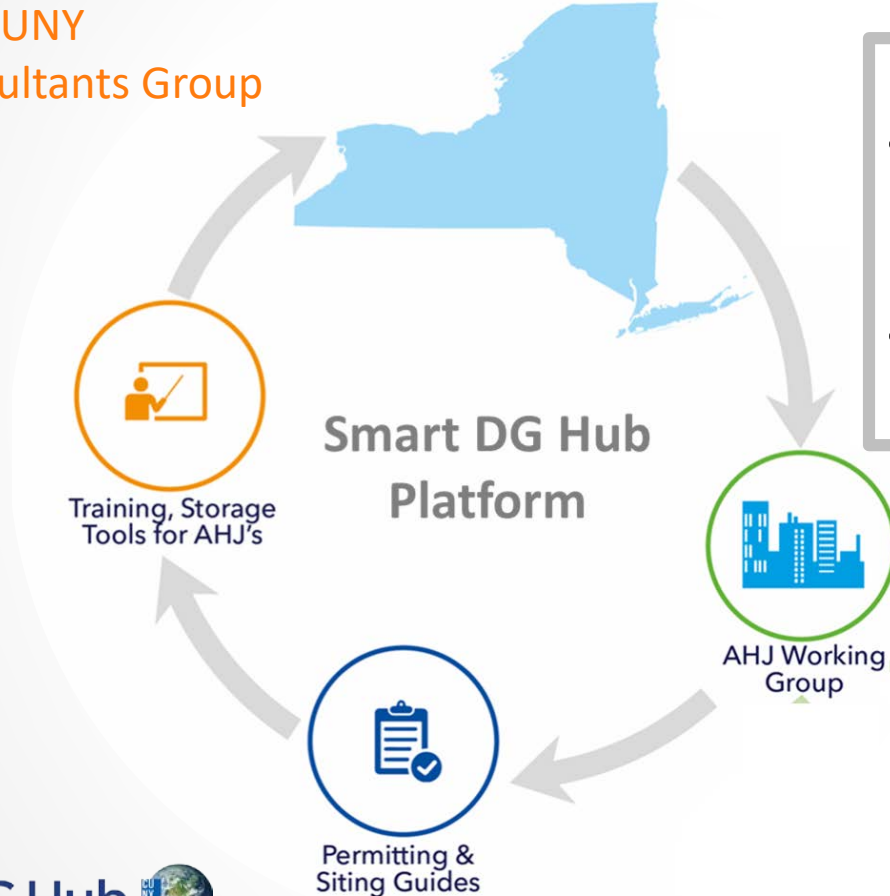


VALUE OF RESILIENCY PROJECT



Smart DG Hub- Reducing Soft Costs

Sustainable CUNY
Meister Consultants Group
DNV-GL



Phase 1

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

Smart DG Hub- Reducing Soft Costs

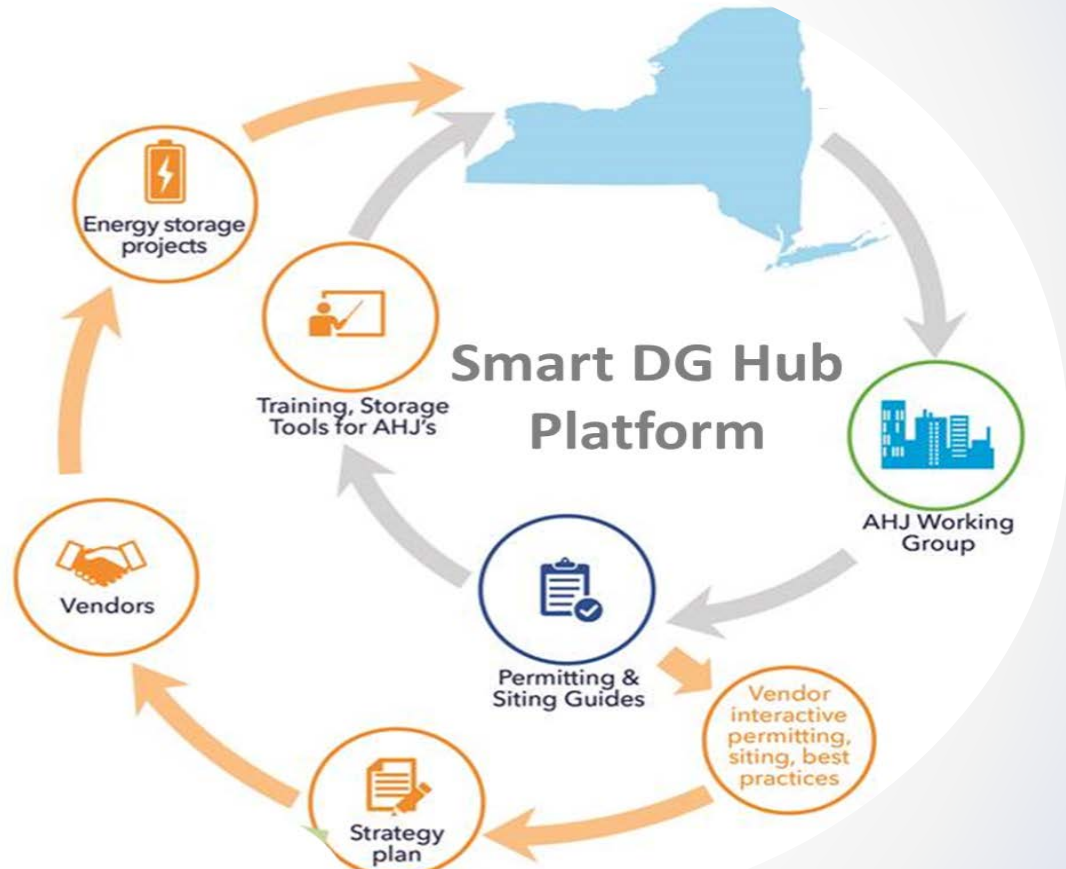
Sustainable CUNY

Meister Consultants Group

DNV-GL

Phase 2

- **Best Practices Guidance for Energy Storage Vendors**



Development of NYC Li-ion ESS Permitting Guidelines – Review & Lessons Learned

NYC Permitting Guidelines Development – March 2017 to present



Project Overview

Sustainable CUNY – one of four grant recipients under NYSERDA's Energy Storage Soft Costs Reduction Initiative



Permitting
Development,
Training &
Assistance



Vendor
Outreach &
Education



Customer
Analysis,
Identification &
Outreach



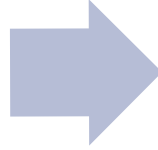
M&V and
Performance
Analysis



Phase 1: Permitting Development - Big Picture

1A: Develop Best Practices and Permitting Guides for Siting Energy Storage in NYC

- Weekly facilitated mtgs with FDNY & DOB
- Identify siting/permitting requirements for outdoor Li-ion batteries; other chemistries

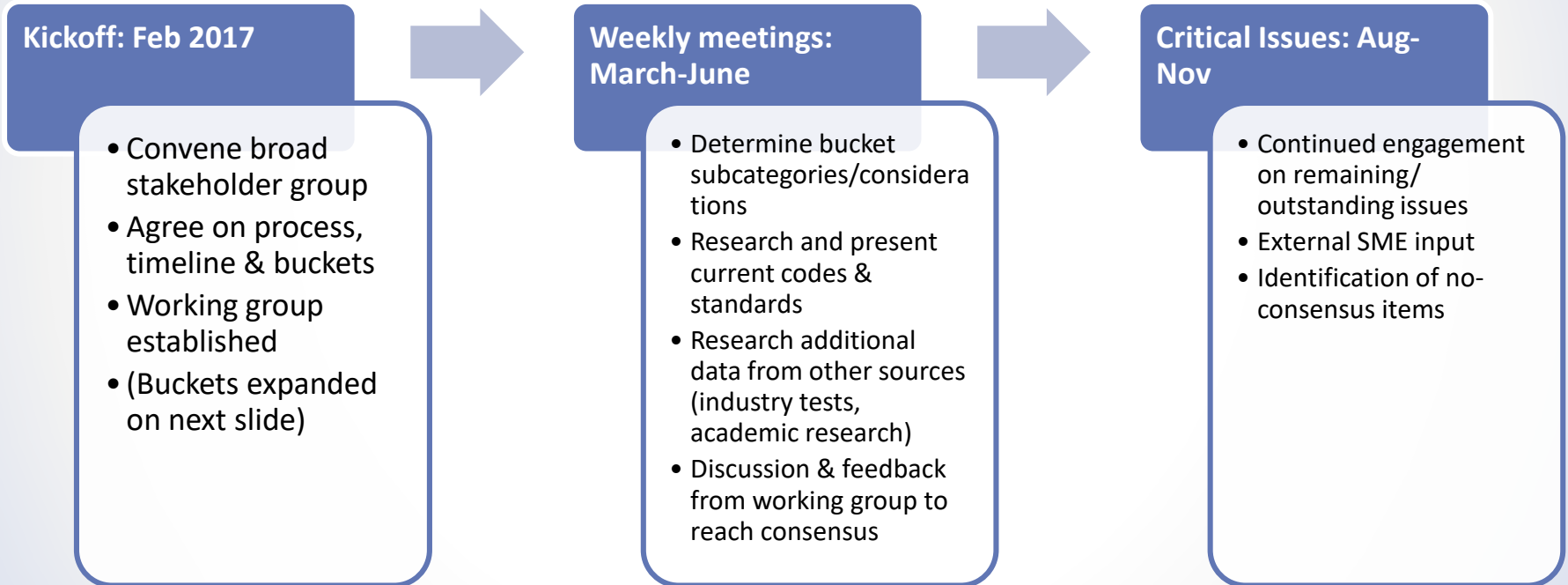


1B: Use outcomes to facilitate development of AHJ customized permitting and review processes (state-wide)

- Categorical logic model, templates, best practices guidelines
- Live trainings, webinars, podcasts
- Direct technical assistance

Phase 1A: NYC Permitting Guidelines Development

Framework/process:



Bucket/sub-buckets & main considerations

Fire Protection

- Define fire protection requirements for mfrs & developers
- Define fire suppression & extinguishing techniques to support FDNY SOP development
- Support development of threshold quantities and MAQ

Ventilation & Exhaust

- Identify ventilation & exhaust req's (rates, airflow) – normal ops, emergency ops/ fire/explosion
- Support development of MAQ and threshold quantities.

Lifecycle Management

- Identify information to be provided by the project developer relating to physical system management
- Develop replicable process/template for applicants.
- Provide sufficient information to support FDNY SOP development

Status Communications

- On site signaling
- Automatic malfunction response
- Offsite signaling
- Personnel response

Cascading Protection

- Technology specs
- Technology features and functioning
- UL listings
- Safety concerns addressed

Signage

- Posting locations
- Information requirements
- Physical requirements

Siting

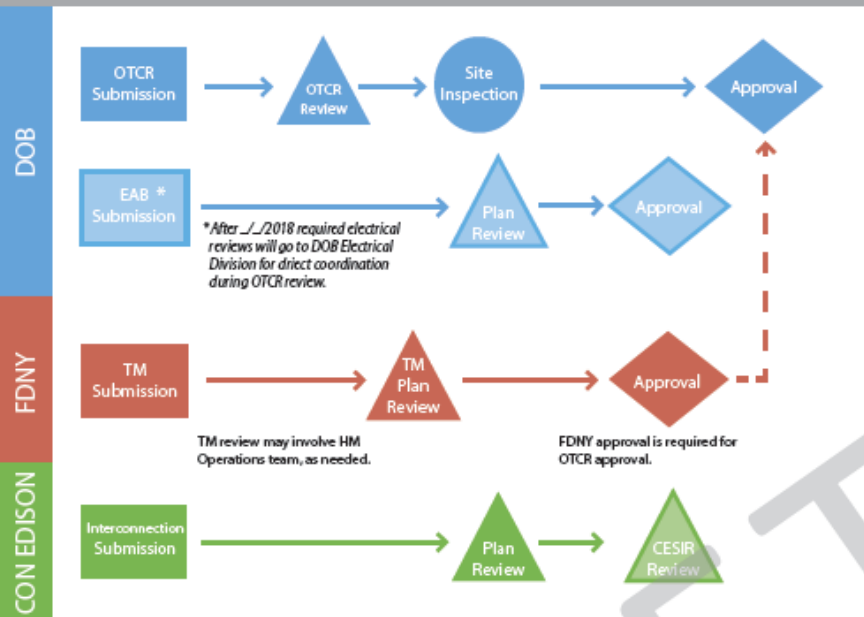
- Identify siting requirements to minimize risk of and from fire
- Allow emergency exit and access as necessary

NYC Permitting Development – Initial Deliverables

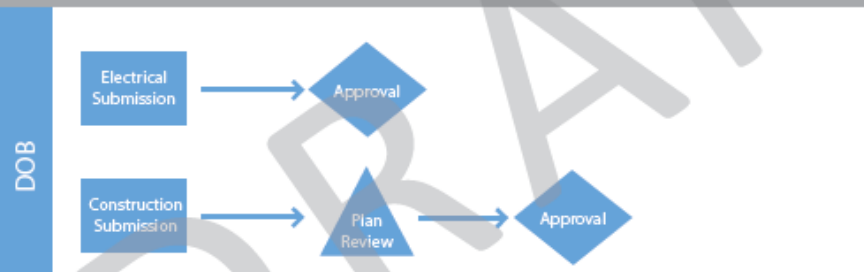
1. **Recommendations List:** a consolidated spreadsheet containing specifications and possible code language
 - Organized along bucket categories & three size categories
2. **Li-ion ESS Permitting Guide:** comprehensive guide to navigating permitting process in NYC, with developer checklists
3. Preparation/groundwork for indoor permitting guidelines development

	DNV GL Recommendation	Basis for recommendation	Recommendation		
Bucket / topic			Small	Medium	Large
1. Fire protection and suppression					
Threshold values for all chemistries; any unlisted chemistry is considered "other" and must be specially approved by AHJ - Remains to be finalized at meeting on 10/27	Lead acid: Small = < 70 kWh; Medium = >70 kWh - <1 MWh; Large = >1 MWh, for grid applications	Small: IFC; Med/Large: Lead acid's maturity in the market, and performance history	Lead acid: ≤70 kWh	Lead acid: >70 kWh and ≤ 1 MWh	Lead acid: >1 MWh, for grid applications
	Nickel cadmium: Small = < 70 kWh; Medium = >70 kWh - <1 MWh; Large = >1 MWh	Small: IFC; Med/Large: Nickel cadmium's maturity in the market, and performance history.	Nickel cadmium: ≤70 kWh	Nickel cadmium: >70 kWh and ≤ 1 MWh	Nickel cadmium: > 1 MWh
	Li Ion: Small = < 20 kWh; Medium = >20 kWh - <250 kWh; Large = >250 kWh	Small: IFC, market availability, and heat load risk; Med: Market availability and average	Li-ion: ≤20 kWh	Li-ion: >20 kWh and ≤ 250 kWh	Li-ion: > 250 kWh
	Flow: Small = < 20 kWh; Medium = >20 kWh - <250 kWh; Large = > 250 kWh, potential to be treated as	Small: IFC; Med/Large: potentially containerized at smaller capacity, inherently capable of	Flow: ≤20 kWh	Flow: >20 kWh and ≤ 250 kWh	Flow: > 250 kWh, potential to be treated as chemical storage
	Capacitors: Small = 3 kWh; Med/Large = require testing; Sodium: Remove,	Per IFC, minimal data availability encourages full review with other	Other: 0 kWh	Other: > 0 kWh	Other: > 0 kWh
Hazard/risk/failure analysis	FMEA or other approved HMA for generic product available as approved by AHJ for small and medium; large needs site specific FMEA	Industry best practices.	FMEA (done in accordance with IEC 60812) for generic product available, approved by NYS PE.	FMEA (done in accordance with IEC 60812) for generic product available, approved by NYS PE.	FMEA (done in accordance with IEC 60812) conducted for the specific site, approved by NYS PE. If available as part of UL
Sprinkler/sprayer requirement	None required for small and medium. Large container require dry sprinkler; not inside cabinets. Approximately 0.1 GPM/kg battery for such systems	Con Ed Test Report	No requirement	No requirement. If multiple systems are installed in an area under threshold, further testing/modeling/analysis	Dry pipe sprinkler required if system (either in one container or in multiple containers or cabinets) exceed large threshold. FDNY must be

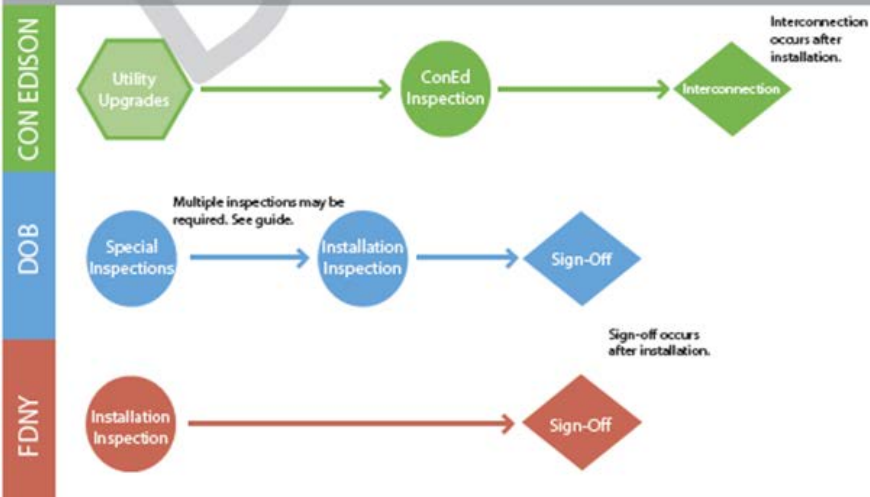
STEP 1: These steps initiate the permitting process.



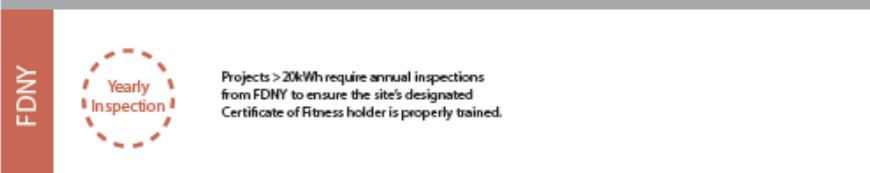
STEP 2: These steps occur after OTCR approval. Submissions may be made in parallel. Construction may begin after the permits below are obtained.



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.





SOLAR+STORAGE RESOURCES



INTERCONNECTION AND PERMITTING RESOURCES



FINANCING OPTIONS RESOURCES



ZONING RESOURCES



SURVEY RESOURCES



ARCHIVED REPORTS

Two major industry developments

<p>NFPA 855: Standard for the Installation of Stationary ESS</p>	<p>Establishes criteria for minimizing the hazards associated with energy storage systems. Draft version released for public comment in 2017; final version scheduled for release in 2020.</p>
<p>UL 9540/9540A: Product listing/certification for ESS</p>	<p>World's first industry safety standard/listing specifically for stationary ESS (9540), and test method for evaluating fire & explosion impacts (9540A). 9540 published in 2014, 9540A released in Nov. 2017.</p>

What's Next?

- Completion of NYC AHJ work (outdoor), throughout 2018 bring this to other AHJ's across NYS via trainings & technical assistance.
- Vendor-oriented work

Phase 1B:

Additional AHJ Permitting Assistance

Technical Assistance:

- Direct technical assistance for AHJ's on evaluating/creating local permitting guides
- Assist AHJs with ESS application reviews
- Assist AHJs to streamline interagency review and approval processes

Resources & Training:

- Create training tools based on materials created under NYC permitting development process
- Training opportunities to be provided state-wide – in-person, webinars, podcasts

Technical Assistance Areas

- Recent TA requests:
 - Provide vendor guidance for current ESS permitting process
 - Assist AHJ decision-making with unique vendor project requests
 - Assist with AHJ “roadmapping” to identify site selection criteria for public ESS installations
- Anticipated TA requests
 - Provide AHJs/municipalities with adaptable templates/models and tools
 - Decision-making support for development of AHJ permitting processes – what criteria are most important/relevant for this particular community?
 - Preparing/training local code enforcement officials to review plans/projects
 - Provide vendors with clarifications/guidance
 - Facilitate input/communication between vendors and AHJs

→ AHJ Working Group – currently recruiting

Phase 2:

Vendor Best Practices

Vendor outreach & education around permitting/siting

- Distribute key energy storage permitting information and best practices as these are developed

Best practices guidance & tools/resources

- Interactive Permitting Vendor Guides for individual AHJs
- Location- and facility-specific best practices & guidance on siting ESS and attaining compliance



Current Vendor Resources

- VRLA (valve-regulated lead-acid) [NYC ESS Permitting & Interconnection Guide](#)
- Solar installers – new to energy storage? [Storage 101 FAQ](#) and [Fact Sheets](#)
- [Webinars](#) – energy storage opportunities & storage intro
- Get on our lists to receive info & updates
 - Smart DG Hub Roundtable
 - [NYSolar Smart newsletter](#)
 - LinkedIn/Facebook

Contacts

Contact the Sustainable CUNY Smart DG Hub or visit our resources online:

www.smartdghub.com

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