

# The Energy Storage Systems Permitting and Interconnection Process Guide For New York City



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## INTRODUCTION

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The NYSolar Smart Distributed Generation (DG) Hub is a comprehensive effort to develop a strategic pathway to a more resilient distributed energy system in New York that is supported by the U.S. Department of Energy and the State of New York. This DG Hub guide is designed to provide building owners and project developers with an understanding of the permitting and interconnection requirements and approval processes for energy storage systems (ESS) in New York City. Familiarity with these processes can lower project soft costs (i.e. non-hardware costs) and expedite the installation process.

ESS are increasingly paired with solar PV systems to create resilient PV systems. In contrast to traditional back-up generators, day-to-day operations of solar+storage systems for commercial customers can generate revenue streams, offering resiliency and economic benefits to the host site. This guide is intended to complement the [NYC Solar Permitting Process Guide](#), which explains the permitting and interconnection requirements and approval processes for solar PV systems in New York City.

For information on other aspects of the resilient PV market, please see the companion factsheets on solar+storage hardware components, economics and finance, and a glossary of solar+storage terms at [www.cuny.edu/DGHub](http://www.cuny.edu/DGHub).

### About the Energy Storage Systems Permitting and Interconnection Process Guide

This guide covers permitting and interconnection requirements and processes for commercial-scale ESS in NYC that are used for purposes other than uninterruptible power supply (UPS). These other purposes may include, but are not limited to peak shaving, load shifting, demand response, and ancillary services like frequency regulation.

### Development of the Process Guide and Updates

The DG Hub Policy and Legal Working Group supported the development of this document with input from the NYC Department of Buildings (DOB), the Fire Department of the City of New York (FDNY), and Consolidated Edison (Con Edison). These three authorities may have additional requirements that are not captured in this fact sheet; the information included in this Process Guide is subject to change. To keep this Process Guide up to date, please email [DGHub@cuny.edu](mailto:DGHub@cuny.edu) with any suggested revisions.

### Process Guide Contents

The Energy Storage Systems Permitting and Interconnection Process Guide outlines the permitting and approval processes for the three authorities—NYC DOB, FDNY, Con Edison—involved in permitting and interconnecting ESS in NYC. It provides an overview, summary and general timeline of the ESS permitting processes, as well as a breakdown of each authority’s specific process presented in a table format. Each table outlines:

- What approvals are needed
- The required submission documents
- How to submit the requisite materials
- The required fees
- A timeline
- A summary of key steps
- A point of contact for any questions or concerns

## Summary of the Permitting and Interconnection Process for ESS in NYC

Proper permitting and interconnection of ESS improves the operation of ESS as well as the safety of occupants and emergency personnel confronting the ESS at the host site in the event of a fire or other failure.

Obtaining the required permissions to deploy ESS in New York City is a multifaceted process. It involves three separate authorities, the submission of multiple documents, the payment of various fees, reviews by various boards, as well as multiple inspections.

The following table outlines the permits, required reviews and approvals required for the deployment of ESS in NYC. For an explanation of the acronyms below, see the [key terms](#) section on page 20.

Summary of the Permitting and Interconnection Process for ESS in NYC		
Authority	Required Reviews	Required Approvals
DOB	OTCR Material Acceptance IRB and BSB Review <sup>1</sup>	OTCR Approval
	EAB Review <sup>2</sup>	EAB Approval
	Development Hub	Electrical Permit Construction Permit <sup>3</sup>
FDNY	Technology Management Review Hazardous Materials Review	Letter of No Objection
Con Edison	Distributed Generation Group CESIR <sup>4</sup>	Interconnection Approval

<sup>1</sup> Some batteries, including Valve-Regulated Lead-Acid batteries (VRLA), are exempted from BSB and IRB review. For an updated list of exempt battery types visit [DOB's website](#).

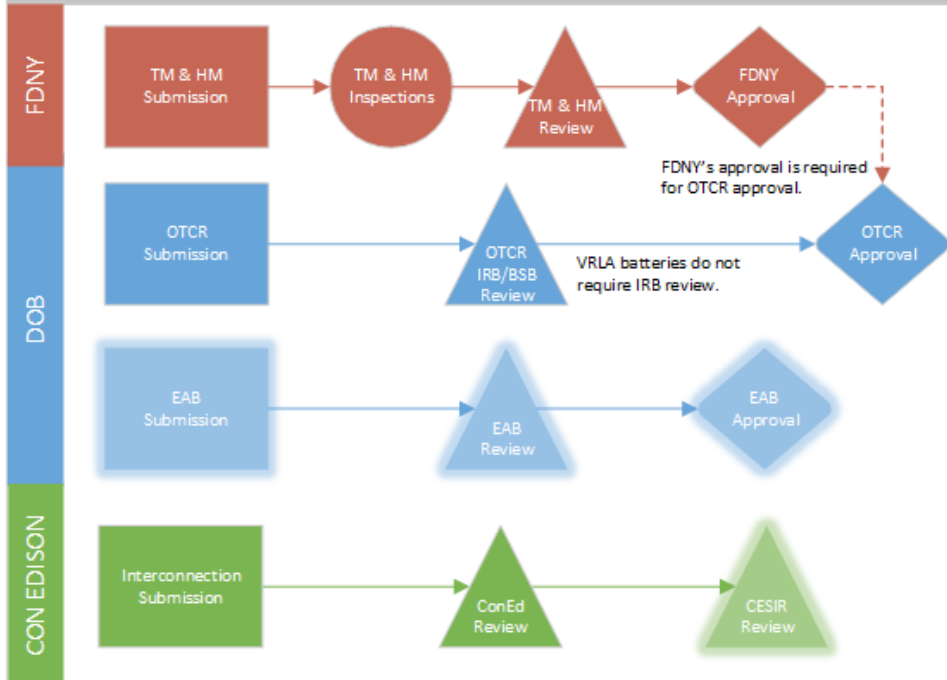
<sup>2</sup> EAB review is only required for ESS systems that are 1000 KVA or greater, that connect to electrical services of 1,000 KVA and larger, and that are above 600 volts (irrespective of KVA rating). See Electrical Code Rules ([§34-05](#)) for more information.

<sup>3</sup> Construction permits may not be required for some ESS projects; see Chapter 1 of the NYC Administrative Code ([Section 28-105](#)) for more information. However, construction permits are required for solar installations.

<sup>4</sup> CESIR review is not always required. Con Edison will inform applications if CESIR review is required.

# ESS Permitting and Interconnection Process for NYC

**STEP 1:** These steps initiate the permitting process. Submissions may be made in parallel.



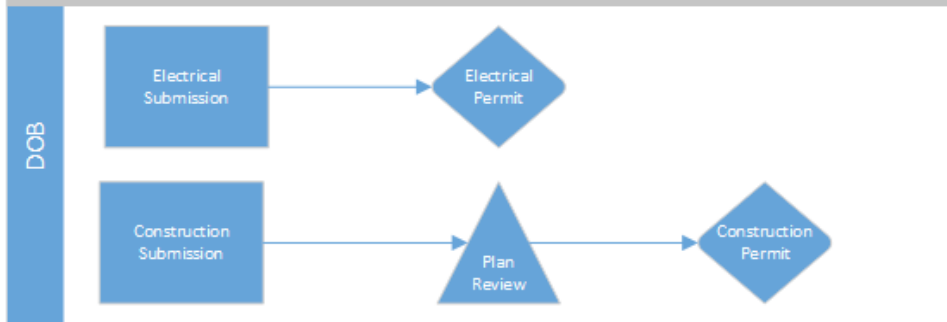
## KEY



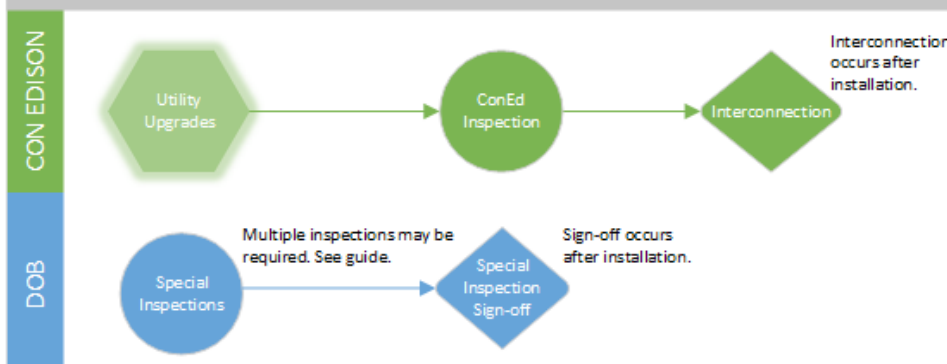
## ACRONYMS

- TM: Technology Management
- HM: Hazardous Materials
- OTCR: Office of Technical Certification and Research
- IRB: Innovation Review Board
- BSB: Buildings Sustainability Board
- EAB: Electrical Advisory Board
- CESIR: Coordinated Electric System Integration Review

**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.



## TIMELINE

The timeline for these processes vary by battery type, completeness of required documentation, and other factors. Applicants may need to re-submit documentation, as requested. Currently, FDNY, DOB and Con Edison cannot provide a projected timeline.

## Submission Considerations

Submissions to the various agencies may be made in parallel, as noted in the ESS flow chart steps on the previous page. It is recommended that project developers initiate FDNY review once designs are approximately 80% complete. As fire codes may require alterations to plans, it is not recommended that engineering work stamped by a professional engineer (PE) be completed prior to submitting application paperwork to FDNY. The DOB may allow for partial submissions of required documents. It may be beneficial to the applicant to submit all documents, except for documents requiring a PE stamp, until FDNY issues a Letter of No Objection. Please contact [OTCR@Buildings.nyc.gov](mailto:OTCR@Buildings.nyc.gov) to confirm.

In the aftermath of Hurricane Sandy it was determined that while the solar arrays on NYC rooftops at that time sustained little or no damage during the storm, they were unable to supply critically needed power during the subsequent outage. While the capability exists, in order to tap into this resource on a broad scale, key issues such as system design, costs, technology integration, incentive structure, codes and regulations need to be examined. Sustainable CUNY formed the Smart Distributed Generation Hub to address these issues and create a pathway to the marketplace for resilient systems.

## THE PERMITTING AND INTERCONNECTION PROCESSES BY AUTHORITY

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### The NYC Department of Buildings (DOB) Process

Obtaining permission to install an ESS through the NYC Department of Buildings (DOB) requires the following: (1) The Office of Technical Certification and Research (OTCR) site-specific material acceptance, (2) an Electrical Permit, and (3) a Construction Permit. An Electrical Advisory Board (EAB) review may also be required for some systems.

The OTCR ESS process for material acceptance involves site-specific approval for equipment. The OTCR will only need to review ESS that do not function as either an emergency power supply or an uninterruptible power supply (UPS). These two uses are outlined in the [2008 NYC Construction Codes](#). Other uses are reviewed according to the NYC Building Code, [Alternative Materials](#). The OTCR receives recommendations from the BSB and IRB for approving an ESS.

## DOB's OTCR Process for Material Acceptance of Battery Storage Technologies

<b>OTCR Approval</b>	<p>OTCR site-specific material acceptance is required for ESSs: 1) exceeding 50 gallons for flooded lead-acid, nickel cadmium or VRLA (see NYC Building Code (BC) Section 509, <a href="#">Table 509</a>); or 2) exceeding 1,000 pounds for lithium-ion and lithium metal polymer (see NYC BC Section 509, <a href="#">Table 509</a>). For battery technologies not referenced above, contact OTCR for threshold limitations.</p> <p>Relevant codes: See <a href="#">1 RCNY §101-12</a> and the <a href="#">NYC Construction Codes Article 113</a>.</p> <p>Note: Some battery types, like VRLA, are exempt from BSB and IRB review. For an updated list of exempt battery types visit <a href="#">DOB's website</a>.</p>
<b>Required Submission Documents</b>	<ul style="list-style-type: none"> <li>• Site-specific approval application (<a href="#">OTCR-2</a>)</li> <li>• All applicable documents in accordance with the <a href="#">OTCR Battery Checklist</a></li> </ul> <p>Note: The applicant can be anyone associated with the project, including the owner, PE/RA, and manufacturer, among others.</p>
<b>How to Submit</b>	<p><b>In-person or via mail:</b> Office of Technical Certification and Research, 280 Broadway, 7th Floor, New York, NY 10007</p>
<b>Fee</b>	\$600 per OTCR2 application (non-refundable)
<b>Timeline</b>	The timeline depends on the technology type, DOB's experience with that technology, and applicant's complete and accurate submission of requested information. Currently, DOB cannot provide an estimated timeline.
<b>Summary of key steps</b>	<ol style="list-style-type: none"> <li>1. Applicant submits the completed OTCR-2 and the required battery checklist items. OTCR will provide required documentation to BSB and IRB.</li> <li>2. OTCR reviews project submission documents. OTCR may request clarifications from the applicant.</li> <li>3. Applicant presents project details and technology at a joint meeting before the BSB and IRB. Some technology may not require IRB and BSB review—see <a href="#">DOB website</a>.</li> <li>4. IRB and BSB review project and offer recommendations to the commissioner. DOB's EAB (see below) and FDNY also offer recommendations.</li> <li>5. OTCR makes final decision. OTCR mails applicant a letter of acceptance, conditional acceptance or rejection. Letter of acceptance or the conditional acceptance letter may establish special inspection requirements. OTCR also posts its determination on <a href="#">BIS</a>.</li> <li>6. Once the required permits and permissions are obtained, the developer installs project.</li> <li>7. If a "special inspection" is required (as required in BC Chapter 17 or prescribed by OTCR), then a third party will perform the inspection on behalf of the DOB. (See <a href="#">BC Chapter 17</a>)</li> </ol>
<b>Contact</b>	<a href="mailto:OTCR@Buildings.nyc.gov">OTCR@Buildings.nyc.gov</a> , 212.393.2626

## DOB's Electrical Permit and EAB Approval of Battery Storage Technologies

<b>Electrical Permit and EAB Approval</b>	<p>Electrical permits are required for all ESS installations. EAB review may be required. See the note below and the Electrical Code Rules (<a href="#">§34-05</a>) for more information.</p> <p>Notes:</p> <p>(1) EAB approval is typically only required when ESS connect to a building with an electrical service that is 1000 kVA or larger. If the ESS is under 1,000 kVA and less than 600 volts, EAB will use an <a href="#">expedited approval process</a>.</p> <p>(2) EAB material acceptance review is not required for ESS. ESS components (batteries, inverters, wiring and enclosure) are required to be listed to UL standards in accordance with the <a href="#">Battery Checklist</a>. Currently, ESS components are not required to be listed together as a single system.</p>
<b>Required Submission Documents</b>	<ul style="list-style-type: none"> <li>• <b>Electrical Permit:</b> <a href="#">ED16a</a>, equipment specification sheets, and a single or three-line electrical diagram (diagram required on-site during inspections).</li> <li>• <b>EAB Application:</b> Cover letter, payment, and two (2) sets of drawings. See Electrical Code Rules (<a href="#">34-05</a>) for cover letter and drawings requirements.</li> </ul> <p>Requirement: Paperwork must be filed by a NYC Electrical Licensee or NYS Licensed Professional Engineer. See the DOB <a href="#">Forms</a> page for more information, and <a href="#">instructions</a> on completing the ED16a.</p>
<b>How to Submit</b>	<ul style="list-style-type: none"> <li>• <b>Electrical Permit:</b> May be submitted <a href="#">online</a> or in <a href="#">hardcopy</a></li> <li>• <b>EAB Application:</b> Pay fees in-person at 280 Broadway. Take the receipt in-person to 1 Centre Street, Room 2337, New York, NY 10007</li> </ul> <p>Note: Find more information on the EAB submittal process <a href="#">here</a>.</p>
<b>Fee</b>	<ul style="list-style-type: none"> <li>• <b>Electrical Permit:</b> Fees vary. There is a \$40 fee for each electrical permit plus an additional range of fees depending on the equipment installed and other work done. See NYC Electrical Code (<a href="#">§27-3018</a>) for more detail.</li> <li>• <b>EAB:</b> \$650 per application (for all 1,000 KVA projects).</li> </ul> <p>Note: Fees are non-refundable. Checks and money orders accepted; make payable to “Department of Buildings.”</p>
<b>Timeline</b>	<ul style="list-style-type: none"> <li>• <b>Electrical Permit:</b> Instantaneously upon application submission. Applicants should wait to submit the Electrical Permit until after OTCR approval is given.</li> <li>• <b>EAB Decision:</b> EAB aims to issue a decision within 1-2 weeks after its monthly EAB meeting (or 4 weeks after applicant’s submission).</li> </ul> <p>Note: The EAB meets monthly. New submissions must be made at least eight (8) business days prior to the date of the scheduled meeting. See EAB <a href="#">Schedule</a>.</p>

*continued*



<p><b>Summary of key steps</b></p>	<ol style="list-style-type: none"> <li>1. If EAB approval is not required, then the applicant submits an electrical permit application (electronically) once OTCR approval is given, and skips to Step 8.</li> <li>2. If EAB approval is required, then the applicant submits an application to the EAB (hardcopy, in person) and waits to submit for the electrical permit until after EAB and OTCR approval are given. If the equipment operates above 600V, applicant must request special permission before commencing of electrical work.</li> <li>3. EAB reviews the project through an <a href="#">expedited review process</a> at its monthly board meeting. EAB publishes the results of its decision and notifies the applicant on its <a href="#">homepage</a>.</li> <li>4. Applicant reviews EAB’s decision by searching the monthly links under EAB’s homepage under “Board Meetings, Summary, Outcomes and Calendar Numbers.”</li> <li>5. Applicant reviews and addresses any comments EAB presents.</li> <li>6. If the project is approved, then applicant should submit the approval number (found in the monthly results of the Advisory Board Calendar) as an amendment to its electrical permit application.</li> <li>7. If the project is denied, then applicant must respond to the comments and submit updated plans to the EAB for approval.</li> <li>8. Developer installs project once required permits and permissions are obtained.</li> <li>9. Applicant requests an electrical inspection <a href="#">online</a>.</li> <li>10. Inspector inspects the system.</li> </ol> <p>Note: Find full instructions on EAB submissions <a href="#">here</a>, and instructions on completing the ED16a <a href="#">here</a>.</p>
<p><b>Contact</b></p>	<p>EAB: <a href="mailto:EAB@buildings.nyc.gov">EAB@buildings.nyc.gov</a>, 212.393.2985  Electrical permit: 212.393.2441</p>

## DOB's Construction Permit for Battery Storage Technologies

<p><b>Construction Permit</b></p>	<p>Construction permits are required in accordance with Chapter 1 of the NYC Administrative Code (<a href="#">Section 28-105</a>). A construction permit will not be issued until both the OTCR2 and electric permit have been approved.</p> <p>Note: Construction permits may not be required for some ESS projects.</p>
<p><b>Required Submission Documents</b></p>	<p>Forms to submit prior to DOB approval:</p> <ul style="list-style-type: none"> <li><a href="#">PW1 – Plan/Work Approval (PW1 User Guide)</a></li> <li><a href="#">PW3 – Cost Estimate</a></li> <li><a href="#">TR1 – Technical Report: Statement of Responsibility</a></li> <li><a href="#">TR8 – Technical Report: Statement of Responsibility</a></li> <li><a href="#">Asbestos Abatement Form</a> (if there is risk of asbestos contamination)</li> </ul> <p>Architectural Drawings and Electrical Diagram (see the <a href="#">Development Hub's Guide</a> for full service review and the National Electric Code Section 690.1).</p> <p><a href="#">C408.2- Commissioning and completion requirements</a> (see page 57)</p> <p>Forms to submit prior to construction:</p> <ul style="list-style-type: none"> <li>• <a href="#">PW2 – Work Permit Application</a></li> </ul> <p>Sign-off forms to submit after installation:</p> <ul style="list-style-type: none"> <li>• <a href="#">PW7 – Letter of Completion</a></li> <li>• <a href="#">Final PW3 – Cost Affidavit</a></li> <li>• <a href="#">Final TR1 – Technical Report</a></li> <li>• <a href="#">Final TR8 – Technical Report: Statement of Responsibility</a></li> <li>• <a href="#">C408.2.4- Commissioning reports</a> (see page 57)</li> </ul> <p>Requirements:</p> <p>(1) Paperwork must be filed by a registered design professional, expeditor, contractor, registered special inspection agency, etc.</p> <p>(2) Commissioning is a requirement for every energy storage project, regardless of size. The specific requirements are defined in Section <a href="#">C408.2</a> of the Energy Code (but the rule to support commissioning is still in development).</p> <p>Note: Additional forms and inspections are required for solar projects. For more information see the <a href="#">NYC Solar Permitting Process Guide</a>. Solar projects are required to satisfy C408 requirements.</p>
<p><b>How to Submit</b></p>	<ul style="list-style-type: none"> <li>• <a href="#">Online (through Hub Full Service)</a></li> <li>• <b>In-person:</b> See list of <a href="#">Borough Offices</a></li> </ul> <p>Note: Solar projects seeking the NYC Property Tax Abatement (PTA) must file online.</p>
<p><b>Fee</b></p>	<p>Varies, see 2014 NYC Construction Code (§1-112) for more detail.</p> <p>Use <a href="#">PW3</a> to complete a cost estimate.</p>
<p><b>Timeline</b></p>	<p>Plan examiners aim to issue permits within 2-3 weeks of submission.</p>

*continued*

<p><b>Summary of key steps</b></p>	<ol style="list-style-type: none"> <li>1. Applicant determines if building requires an asbestos investigation.</li> <li>2. Asbestos investigator completes survey report, if required.</li> <li>3. Applicant submits construction permit forms, drawings, and the commissioning and equipment functional performance testing plans. Applicant pays fees online.</li> <li>4. DOB reviews the application. It may request clarifications from the applicant.</li> <li>5. If requirements are met, then DOB issues permit.</li> <li>6. Once required permits and permissions are obtained, developer begins installation project.</li> <li>7. Functional performance testing of equipment must be conducted and registered design professional or approved agency provides a “Preliminary Commissioning Report” of test procedures and results to the building owner.</li> <li>8. Building owner provides the code official with a “letter of transmittal” demonstrating the owner has received the Preliminary Commissioning Report.</li> <li>9. A registered design professional or approved agency must prepare a “Final Commissioning Report” for the building owner and submit a certification to the DOB with applicable fees.</li> <li>10. Applicant submits the sign off documents and requests a Construction Inspection <a href="#">online</a>.</li> <li>11. If inspections and paperwork are approved, then DOB issues Construction Sign-off in BIS.</li> </ol>
<p><b>Contact</b></p>	<p>212.639.9675</p>

## DOB's Resources for Permitting ESSs

<p><b>General DOB</b></p>	<p><a href="#">DOB website</a></p> <p><a href="#">Building Information System (BIS)</a></p> <p><a href="#">NYC Development Hub</a></p> <p><a href="#">Codes and Reference</a></p>
<p><b>OTCR/IRB/BSB</b></p>	<p><a href="#">OTCR page</a></p> <p><a href="#">RCNY Excerpt on OTCR</a></p> <p><a href="#">OTCR Forms</a></p> <p><a href="#">IRB page</a></p> <p><a href="#">BSB page</a></p> <p>OTCR Bulletin (coming)</p>
<p><b>EAB</b></p>	<p><a href="#">EAB page on DOB website</a></p> <p><a href="#">RCNY Excerpt on EAB</a></p> <p><a href="#">EAB Service Update on Expedited Review Process</a></p> <p><a href="#">2015 EAB Meeting Schedule</a></p>
<p><b>Electrical Permit</b></p>	<p><a href="#">E-filing website</a></p> <p><a href="#">Electrical Forms</a></p> <p><a href="#">NYC Electrical Code page on DOB website</a></p> <p><a href="#">Administrative Sections of the 2011 NYC Electrical Code</a></p>
<p><b>Construction Permit</b></p>	<p><a href="#">E-filing website</a></p> <p><a href="#">Construction Forms</a></p> <p><a href="#">NYC 2014 Construction Codes page</a></p> <p><a href="#">Administrative Sections of the 2014 NYC Building Code</a></p> <p><a href="#">Section ECC C408: System Commissioning</a></p>

## The Fire Department of the City of New York (FDNY) Process

These guidelines are intended for indoor valve-regulated lead acid (VRLA) energy storage systems (ESS). Guidelines for other battery chemistries have not yet been developed. Projects are evaluated on a site by site basis. As such, FDNY may have additional requirements that are not captured in this fact sheet, and information included in this fact sheet is subject to change. To assist DG Hub in keeping this document up to date, please email information which departs from this fact sheet to [DGHub@cuny.edu](mailto:DGHub@cuny.edu).

Fire Department of New York (FDNY) Application Process for ESS	
<b>Required Submission Documents</b>	<ul style="list-style-type: none"> <li>• <a href="#">TM-1</a> (Application for Plan Examination)</li> <li>• Supporting Documentation               <ul style="list-style-type: none"> <li>- Plans showing proposed location</li> <li>- Narrative with a description of the system</li> <li>- Cut sheets of system components</li> <li>- Installation manuals</li> <li>- Other pertinent information as requested by FDNY</li> <li>- UL listing and certification (compliance to 1973 and other pertinent UL certifications)</li> </ul> </li> </ul>
<b>Who can submit the application</b>	The TM-1 application shall be prepared by a registered design professional or an expert in the subject field.
<b>When to submit</b>	Submissions to FDNY and the DOB can be made in parallel. If a DOB job number has been issued, include this under item #7 on the TM-1.
<b>How to submit</b>	<p><b>In-person:</b> Window #8, 1st Floor, 9 Metrotech Center, Hours: M–F, 8am–3pm</p> <p><b>Mail:</b> Fire Department of City of New York            Bureau of Fire Protection            Technology Management            9 MetroTech Center, Third Floor, Room 3W-2            Brooklyn, NY 11201-3857</p>
<b>Fee</b>	<p>\$420 per TM-1 application (non-refundable)</p> <p>Credit cards, checks, and money orders are accepted</p>
<b>Timeline</b>	Applications are typically reviewed within 10–20 business days. This timeline may increase if additional site visits or other information is required, or if the FDNY is unfamiliar with the battery technology being considered.
<b>Summary of Key Steps</b>	<ol style="list-style-type: none"> <li>1. Applicant submits paperwork</li> <li>2. FDNY will contact the applicant to schedule a site visit*</li> <li>3. FDNY will review the application</li> <li>4. FDNY will notify the applicant of its decision; a Letter of No Objection will be issued to the applicant and DOB if approved</li> </ol> <p>*Two site visits may be necessary if Technology Management and Hazardous Materials are unable to schedule a joint site visit.</p>
<b>Contact</b>	718.999.2405

## Recommended Language for Indoor VRLA Battery Systems

The following information should be included in the application and supporting documentation.

### Site Description

- State if the building is of non-combustible construction
- Building use (commercial, multifamily, multi-use, etc.)
- Description of where ESS is located within the building and adjacent rooms
- Use of location where ESS is housed (ex. ESS located in parking garage)
- Access to energy storage system equipment
- Description of HVAC system for building as a whole, and details for location of the ESS

### Building Fire Protection Systems Description

- Description of sprinkler system for building, and details for location of the ESS
- Standpipe locations near system location
- Emergency Exit locations nearest to the ESS
- Location of fire hydrants nearest to the building

### ESS Description

- Total system size (kWh and kW)
- IEEE standards met (see [DOB IEEE guidelines](#))
- Batteries
  - Total number of batteries
  - Chemistry (i.e. VRLA)
  - Voltage
  - UL Listing
- Battery encasement
  - Number and type of racks
  - Number, type, and dimensions of cabinets
  - Ventilation method for hydrogen off-gassing; calculations are required only the first time an individual battery technology is submitted
- Inverter
  - Size
  - Type
  - UL Listing
  - Monitors for: over current, over temperature
- Software
  - Battery management system (BMS)
    - Description of BMS
    - Monitor for: battery voltage, battery temperature; string voltage, and string current
- Safety measures
  - Additional safety monitors not captured in the system description
    - Ex. Hydrogen sensors, ground fault protection, etc.
  - Sequence of events if malfunction happens at battery or system level
    - Explain how software detects malfunctions

- Explain automatic shutdown capabilities and how staff are notified if software detects a problem
- Process to shut down system
  - Use of manual shut off switches
    - Location of shut off
  - Use of software to shut down
    - List who has access to these systems
  - Specify any existing dangers
    - Ex. Isolation of the system does not remove any charge present in the batteries.

### Requirements for Indoor VRLA Battery Systems (subject to change)

- Approval required from:
  - NYC Department of Buildings (given after FDNY Letter of No Objection)
  - Any other agencies having jurisdictions
- Building ventilation:
  - During normal operations shall be adequate to ensure no off-gassing is maintained to a safety level required by all NYC codes
  - During fire conditions shall be adequate to ensure that building occupants are not affected by any toxic vapors produced from the ESS during the fire
- Sprinkler or fire suppression system:
  - Shall protect the enclosure in which the batteries are installed
  - Shall meet the design requirements required by the New York City Fire Code, Building Code, and all other applicable codes and standards
- Enclosure of ESS:
  - Shall be installed in a location that meets codes
- Surrounding hazards:
  - Shall be relocated away from the ESS or satisfactorily safeguard
- ESS placement (guidelines below may vary on a site by site basis):
  - Shall provide for a clear, unobstructed path between the ESS and the nearest exit
  - Shall be such that the weakest cabinet (blowout) location is not facing the first responders during their approach toward the ESS
- Shall allow for a minimum of 10 feet of clear space in front of the ESS
  - Shall be at least 10 feet away from any flammable or combustible material
- Openings around duct, wall and floor penetrations in close proximity to the ESS
  - Shall be sealed to prevent fire or smoke spread
- ESS checks by an authorized individual possessing a valid Certificate of Fitness issued by the FDNY:
  - Shall be performed per the certificate of fitness requirements.
- Critical alarms:
  - Shall result in notification for potential evacuation by the building authority
- Signage for the ESS:
  - Shall be provided on and near the system per the code requirements
- A placard shall be placed in the building superintendent's office and in the lobby stating:
  - Location of batteries
  - Contact number of the Certificate of Fitness Holder
  - Other hazardous material in proximity to the battery installation

- Floors and areas the batteries serve
- Type of battery system and the material hazard
- Location of shut-off switch and controls
- Name and phone number of the service/maintenance company
- Access to the Building Information Card (if applicable)
- Other protocols relevant to the ESS
- Materials that can be produced during hazardous decomposition
- Fire extinguishers:
  - Shall be provided in accordance with [NYC Fire Code Section 906](#)
- Emergency procedures detailing shutdown of the ESS:
  - Shall be posted near the ESS, the building superintendent's office, and in the lobby
- Acid neutralizing material:
  - Shall be kept in close proximity to the battery installation
- All means of egress
  - Shall be maintained with tenable conditions and be free of smoke, toxic/corrosive vapors and heat



## The Con Edison Process

Interconnection of Solar and ESS with Con Edison	
<b>Con Edison Interconnection</b>	<p>Projects that combine solar and ESS will need to file two separate applications: one for solar and one for the ESS. Applications will follow the <a href="#">New York State Standardized Interconnection Requirements</a> (SIR).</p> <p>Note: From an interconnection perspective, ESS will be treated as a generator under the SIR process.</p>
<b>How to initiate the process</b>	<p>Applicant creates service requests on the <a href="#">Project Center</a>. See <a href="#">here</a> for more details.</p> <p>Note: Projects that combine solar and storage should be noted as such in the “Scope of Work” field on the application form with reference to any available Con Edison case numbers for these projects.</p>
<b>When to submit</b>	<p>Submissions to ConEdison can be made in parallel to DOB and FDNY submissions. If a DOB job number has been issued, include this in the Project Center project description.</p>
<b>How to submit</b>	<p>Online through <a href="#">Project Center</a>. See <a href="#">here</a> for more detail.</p>
<b>Fees</b>	<p>Fees for the separate solar and ESS applications will follow the SIR:</p> <ul style="list-style-type: none"> <li>• <b>Systems ≤ 50 kW:</b> No application fee</li> <li>• <b>Systems &gt; 50 kW:</b> \$350 (returned if not used for upgrades)</li> <li>• <b>Systems requiring Coordinated Electric System Integration Review (CESIR):</b> This is a site-specific cost. <ul style="list-style-type: none"> <li>- To determine if a CESIR is required, Con Edison will assess site-specific factors such as service to the building and local network conditions.</li> </ul> </li> <li>• <b>Systems requiring Utility’s System Modification:</b> This is a site-specific cost.</li> </ul> <p>Note: Applications can be processed before the fee is collected. Con Edison will contact the applicant to request payment if it is needed.</p>
<b>Forms and required documents</b>	<p>The application package consists of the following:</p> <ol style="list-style-type: none"> <li>1. Letter of Authorization</li> <li>2. Signed Standardized Contract (Appendix A)</li> <li>3. Signed Standardized Application (Appendix B)</li> <li>4. \$350 application fee (see fee details above)</li> <li>5. Three line diagram of the system (see <a href="#">here</a> for more detail)</li> <li>6. Manufacturer data sheets</li> <li>7. Copy of the verification test procedure</li> <li>8. Completed Application Form G (required for net metering or standby service rate applications)</li> </ol> <p>Note: All forms are available online and can be uploaded to Project Center. Alternatively, forms may also be requested from the Energy Services Representative.</p>

*continued*

<p><b>Timeline</b></p>	<p>Application review times vary. The timelines below are indicative of Con Edison review times as per the NYS SIR. They do not include requests for missing information, iterative design reviews, additional inspections that may be required, or changes to project parameters. These timelines should be reviewed as a minimum for interconnection. Applicants can track the status of their job on online through the Project Center's "My Projects" tab or by communicating with their Customer Project Manager (CPM), who is assigned after the applications are submitted.</p> <ul style="list-style-type: none"> <li>• <b>10 business days</b> or less for Con Edison to acknowledge receipt of the initial service request; applicant will be notified if any information is missing.</li> <li>• <b>15-20 business days (no more than 60 business days)</b> for Con Edison to complete preliminary review of the system design.</li> <li>• <b>If required—60 business days</b> or less for Con Edison to complete CESIR.</li> <li>• <b>10 business days</b> or less after Con Edison receives the certification documentation for it to issue a Final Acceptance Letter.</li> </ul>
<p><b>Recommended Steps for systems 25 kW to 2 MW</b></p> <p>(For systems &lt; 25 kW, see Con Edison's <a href="#">Interconnection Requirements/Process</a>)</p>	<p>The following steps are recommended to complete the interconnection process for solar and ESS:</p> <ol style="list-style-type: none"> <li>1. Applicant submits paperwork on Project Center. <ul style="list-style-type: none"> <li>• Remember: Solar and ESS are treated individually in terms of paperwork. The applicant specifies in application that it is a solar and storage project in the Scope of Work section and references a case number, if available.</li> </ul> </li> <li>2. Con Edison acknowledges the application has been received by emailing the applicant and assigning a Customer Project Manager (CPM).</li> <li>3. Applicant emails the CPM to confirm the project is reviewed jointly as a solar and storage system.</li> <li>4. Con Edison starts application review.</li> <li>5. Con Edison notifies applicant if application is complete or missing documentation.</li> <li>6. Con Edison starts preliminary review of the system once the application is complete.</li> <li>7. Con Edison communicates preliminary review findings, including potential estimated upgrade costs. The preliminary review may indicate that a CESIR is required to determine the costs of upgrades or interconnection solutions.</li> <li>8. If a CESIR is required, then applicant commits to a CESIR via e-mail or by paying for any CESIR review costs that Con Edison identified.</li> <li>9. If a CESIR is required, then Con Edison completes a CESIR and provides costs of upgrades or the interconnection solution to applicant. The CESIR costs will be site-specific.</li> <li>10. Applicant commits to pay for the utility construction of Utility System Modification, if required.</li> <li>11. If a modification is required, then Con Edison will provide a general timeframe for the project, and the utility completes the required work.*</li> <li>12. Con Edison issues an "Approval to Build" Letter.</li> <li>13. The system is installed.*</li> <li>14. Applicant emails the CPM to request an inspection.</li> <li>15. Applicant's facility is tested in accordance with the SIR.</li> <li>16. Cost Reconciliation and Final Acceptance Letter emailed to applicant.</li> </ol> <p>* Steps 7 and 9 may occur in parallel once the contractor agrees to pay for the upgrade.</p>

*continued*

<b>Inspections</b>	<p>Provided free of charge by Con Edison as per above Process Steps.</p> <p>PV systems &lt;25 kW may self-certify. PV systems &gt;25 kW and all ESS must complete an on-site verification test and inspection.</p> <p>Note: Work with your Con Edison CPM to coordinate solar and storage inspections.</p>
<b>Questions</b>	<p>Questions should be directed to the Con Edison CPM.</p>

## Net Metering Guidelines

Net metering solar with energy storage is permissible under the following scenarios:

1. If solar and ESS are not electrically connected, and are connected behind two separate meters, then the solar system may net meter.
  - Note that the ESS may not net meter in this scenario.
2. If the solar and ESS system are connected behind one meter, and if the ESS is configured to shut off or ramp down if/when solar energy begins to export onto the grid, then the solar system may be net metered.
  - This configuration requires additional review time and/or inspections by Con Edison to ensure proper relay settings.
3. If the solar and ESS system uses one meter and is configured such that the ESS is only charged from the solar array (i.e. ESS is unable to charge from the grid), then the system may net meter.
4. If the solar and ESS system uses one meter and is configured such that the ESS is only used during grid outages (for example, via an automatic transfer switch), then the system may net meter.

## Tariff Guidance for Solar and ESS Customers

As of August 2015:

Con Edison customers with solar systems 2 MW (AC) and under are eligible for net metering under Con Edison's [Rider R](#). ESS may be incorporated into these solar installations as described above to retain net metering eligibility.

If ESS customers do not choose to net meter, they may be subject to standby rates, as per Con Edison General Rule 20. Standby rates are applicable to customers who draw power from Con Edison to supplement onsite generation.

The following ESS customers may opt-in to Standby rates:

- Customers who have <50kw contract demand (maximum demand usage over the last 24 months is under 50 kW) and who are either:
  - Installing an ESS inverter that is less than 15% maximum potential demand
  - OR
  - Customers who would otherwise receive service under SC 1, SC 2, or the energy-only rate of SC 12, provided that they commence operation of their on-site generation facility on or before May 31, 2019.

If you are interested in standby rates, please contact [dgexpert@coned.com](mailto:dgexpert@coned.com).

Applicants should contact [dgexpert@coned.com](mailto:dgexpert@coned.com) to determine which rate options are available for their projects.

## Approved Inverters

Con Edison accepts inverters on the Public Service Commission's (PSC) approved equipment list. For a list of approved equipment see [Equipment Certified Since 2011](#) on the PSC's website.

## KEY TERMS

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**Building Information System (BIS):** The Department of Building's (DOB) online database of NYC property profiles, licensing and licensee information, buildings violations, and complaints, among other information. BIS provides the public with real-time access to DOB data and information.

**Buildings Sustainability Board (BSB):** The DOB's Buildings Sustainability Board (BSB) reviews and evaluates new renewable energy and other technologies related to environmental sustainability that are not addressed in the New York City Construction Code.

**Coordinated Electric System Interconnection Review (CESIR):** The Coordinated Electric System Interconnection Review (CESIR) are detailed engineering studies that assess the impact of interconnecting large amounts of distributed generation (DG) onto the grid. The CESIR identifies upgrades to the grid that may be required to accommodate the DG.

**Electrical Advisory Board (EAB):** The DOB's Electrical Advisory Board (EAB) is a board of industry experts appointed by the DOB Commissioner that meets monthly to provide advice on approving the use of electrical appliances, devices and materials that are not addressed in or not generally allowed by the Electrical Code. The EAB also approves specific electrical installations. Note: See the Rules of the City of New York ([RCNY §34-05](#)) for more information on the EAB.

**Energy Storage System (ESS):** Energy Storage System (ESS) are systems that enable the storage of energy and the charging and discharging of power. ESS in this Guide refers to systems that use battery technologies to store energy.

**Innovation Review Board (IRB):** The DOB's Innovation Review Board (IRB) reviews new technologies, design or construction techniques, materials or products, or specific projects that will use them to determine their environmental and sustainability benefits. The IRB also makes recommendations on the conditions and purposes that each technology may be used in New York City. In addition, the IRB streamlines approvals of specific innovative projects.

**Office of Technical Certification and Research (OTCR):** The DOB's Office of Technical Certification and Research (OTCR) both oversees technical certifications of approved agencies and entities performing inspections, tests, and material approvals, as well as evaluates new technologies that enhance safety, sustainability and efficiency. Note: See [RCNY §101-12](#) for more information on OTCR.

**Resilient PV:** Resilient PV are solar and energy storage systems that can function during outages.

**Rules of the City of New York (RCNY):** The Rules of the City of New York (RCNY) are the City's officially compiled approximately 6,000 rules.

### About

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## DEPARTMENT OF BUILDINGS BATTERY CHECKLIST

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### Appendix A – Required Supporting Documentation



Provide the following information electronically. Each numbered section below must be included under a separate electronic folder. Provide a separate document with a descriptive name or subfolder for each bulleted item listed under each heading. A hardcopy of the required information may also be provided in a 3-ring binder.

1. **Project Information**
  - Location/Address
  - Building Owner
  - Statement that project meets Con Ed/NYSERDA technical requirements for approved incentive program
  - Building Permit - Provide NYC DOB Job# (If no building permit is required then applicant (PE/RA) should provide a statement regarding work to be performed, i.e., no alteration to building, no changes to egress or C of O)
  - Electrical Permit – Provide NYC DOB Job#
  
2. **Battery Properties and Characteristics**
  - Description of chemistry (include a schematic showing how the battery works)
  - Physical Dimensions
    - Size, battery (L, W & H)
    - Size, Rack (L, W & H)
    - Weight
  - Hazard classification and quantity per classification
  - Chemical classification and quantity per classification
  - Electrical characteristics and capacity
    - Battery capacity
    - Demand/ICAP
  - Expected lifespan for the battery
  - Are batteries sealed?
  
3. **Hazardous Issues – provide information, including worst case conditions, on the following hazards related to the battery technology**
  - Thermal runaway properties
  - Hydrogen and/or oxygen production (explosion potential)
  - Corrosive spills/electrolyte leakage
  - High temperature
  - Other, please identify
  
4. **Plans and Statements**
  - Architectural Plans (locating of batteries, obstructions, egress features, etc.)
  - Flood Zone statement (signed by NYS PE) – Where an Battery ESS's will be installed within the Special Flood Hazard Area a utility certification shall be submitted in accordance with BC G104.5. This certification will serve to document that the installation complies with the applicable requirements of Appendix G of the New York City Building Code.
  
5. **Recommended Design Features (provide general requirements and project-specific information, show on plans where applicable)**
  - Room enclosure (hourly rating)
  - Fire suppression requirements
  - Venting requirements
  - Special structural considerations
  - Electrical
  - External containment

- Suggested peer review requirements

## 6. Certification and Testing

- UL 1973 (Battery) – provide web link from certification database
- UL 1741 (inverter) – provide web link from certification database
- Additional abuse/failure testing (if any)

## 7. System Monitoring

- Provide description of the battery management system (BMS) including the following features:
  - Communication protocols.
  - Provision for auxiliary outputs (for controlling/signaling output).
  - Provision for auxiliary inputs (fire alarm connection/ emergency power off).
  - Capability of disconnecting individual battery/ string of batteries under emergency shutdown.
  - Remote monitoring 24/7 for early warning (cloud).

## 8. Operating precautions

- Incident training manual including the following;
  - MSDS, SDS
  - OSHA HCS
  - Emergency shutdown procedures
  - Emergency first-aid requirements
  - Emergency Response Plan
  - Operation and training program and manual
  - Safety and Handling Guidelines
  - Safety and Warning Signage

## 9. Additional Requirements

- Maintenance /Service Plans – Include details for continuing support of existing product such as replacement parts (batteries) will be achieved, especially compatibly with later generations of batteries that will differ in chemistry and electrical characteristics.
- Recycling plan – Include details for recycling of battery materials when decommissioned
- Code Analysis (prepared and signed by NYS PE) – A code analysis shall be presented in tabular format. Support documentation shall be provided to substantiate the analysis. This analysis should include, but not be limited to comparison of requirements for standby power, emergency power or uninterrupted power supplies and hazardous classifications.
  - MC 502.4 & MC 502.5 (Exhaust Requirements)
  - BC 509 (separation of incidental use areas)
  - BC 903 (automatic sprinkler detection)
  - BC 904 (alternative automatic fire-extinguishing systems)
  - BC 907. 2 (fire alarm and detection systems)
  - FC 608 (requirements for battery storage systems)
  - BC 307
- Risk Analysis (prepared and signed by NYS PE) – The Risk Analysis shall include a tabulated summary of hazards as indicated below and detailed mitigation measures used to lower the severity level of the hazard. The tables shall include the following:
  - Identification of Hazards. A table shall be provided that identifies Hazard Modes as it pertains to the battery technology proposed and shall include, but not limited to, the following:
    - o Electrical; External Short-Circuit, Internal Cell Fault, Abnormal Charge, Overcharge, Over-Discharge, Soft Short
    - o Thermal; External and Internal Fire, Elevated Temperature, Energetic Failures (Thermal Runaway), Thermal Abuse
    - o Mechanical; Crush, Nail Intrusion, Shock, Drop, Poor Cell Design, Vibration
    - o System; Contactors Fail Closed, Loss of HV Continuity, Chassis Fault, BMS Fault
  - Severity Levels of Hazards (EUAR).
  - Likelihood Levels
  - Hazard Modes and Risk Mitigation Analysis
  - Battery Safety Gap Analysis

The Risk Analysis shall document the methodology and cite any recognized standards used in the analysis.

The risk analysis shall be signed and sealed by a NY State Professional Engineer.

Suggested Guideline(s):

- Analysis of Battery Safety and Hazards' Risk Mitigation, by Cyrus N. Ashtiani.
- NFPA- Lithium Ion Batteries Hazard and Use Assessment