

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

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NYSERDA

SMART DG Hub 



*With Technical Assistance Provided by DNV GL*

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## INTRODUCTION

The Smart Distributed Generation (DG) Hub, established by Sustainable CUNY of the City University of New York in 2013, is a comprehensive effort to develop a strategic pathway to a more resilient distributed energy system in New York State. The work of the DG Hub is supported by the U.S. Department of Energy, the New York State Energy Research & Development Authority (NYSERDA), the New York Power Authority (NYPA) and the City of New York.

NYSERDA is working to reduce energy storage soft costs (non-hardware costs including permitting, customer acquisition, interconnection, and financing) by at least 25% by December 2019. Sustainable CUNY has been engaged by NYSERDA to help coordinate permitting efforts and has partnered with technical advisors, including DNV-GL, under this comprehensive NYSERDA-sponsored initiative. This includes facilitating development of clear permitting processes for energy storage in New York City and leveraging this work throughout New York State, sharing best practices, helping to reduce the learning curve at Authorities Having Jurisdiction (AHJ) and vendors and bringing clarity to allow the safe installation of energy storage systems (ESS). Familiarity with permitting and interconnection requirements can lower project soft costs and expedite the installation process.

This ***Energy Storage Permitting and Interconnection Process Guide for New York City: Lithium-Ion Outdoor Systems*** is designed to provide building owners and project developers with an understanding of the permitting and interconnection requirements and approval processes for outdoor Lithium-Ion based ESS in New York City. This guide covers ESS that are used for purposes other than emergency power supply or 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

This guide was developed in collaboration with 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 to those outlined herein that are not captured in this process guide. Requirements are subject to change and efforts will be made to keep this guide up to date. Please email [DGHub@cuny.edu](mailto:DGHub@cuny.edu) with any questions or comments.

## PROCESS GUIDE CONTENTS

This Energy Storage Systems Permitting Process Guide for Lithium-Ion Outdoor Batteries outlines the permitting and approval processes for the DOB, FDNY, and Con Edison and provides a breakdown of each authority's specific process presented in a tabular and flowchart format. Each table outlines:

- what approvals are needed
- required submission documents
- how to submit the requisite materials
- required fees
- a timeline
- a summary of key steps
- contact information for questions

## SUMMARY OF THE PERMITTING PROCESS FOR ESS IN NYC

Deploying ESS in New York City involves three separate authorities. The following table outlines the permits, reviews and approvals required across each authority. For an explanation of the acronyms below, see the [KEY TERMS](#) section.

TABLE SUMMARIZING THE PERMITTING PROCESS FOR ESS IN NYC		
AUTHORITY	REQUIRED REVIEWS	REQUIRED APPROVALS
DOB	Office of Technical Certification and Research (OTCR) Material Acceptance Innovation Review Board (IRB) and Building Sustainability Board (BSB) Review <sup>1</sup>	OTCR Approval
	Local DOB Borough Office Development Hub	Electrical Permit & Construction Permit
FDNY	Technology Management and Hazmat Operations Review	Letter of No Objection
Con Edison	Energy Services CESIR <sup>2</sup>	Interconnection Approval

### NOTES ON PERMITTING PROCESS

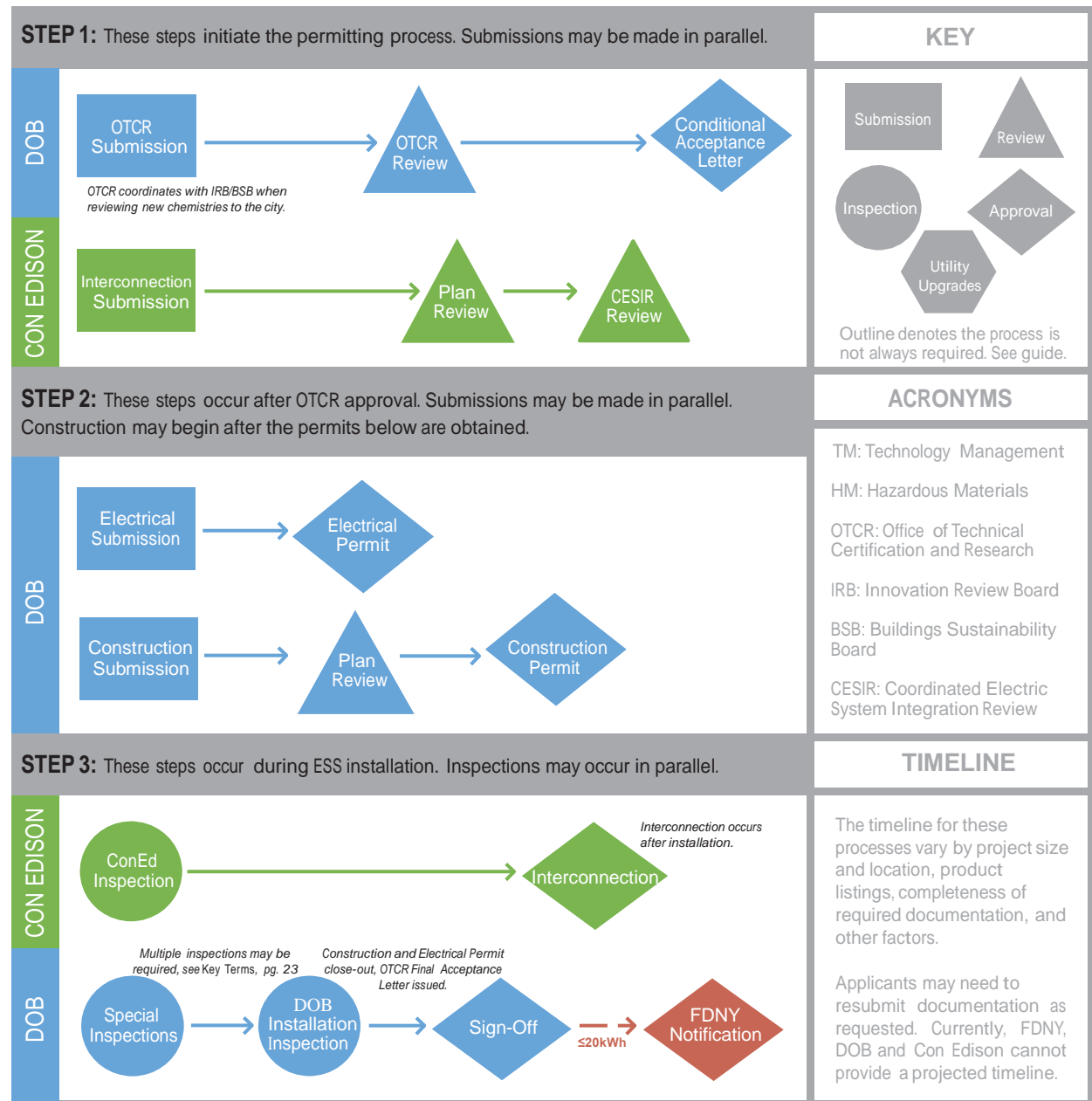
- It may be helpful to send an introductory email to DOB’s OTCR and FDNY to notify that an application is forthcoming, with expected system capacity and anticipated installation timeline.
- It is recommended that project developers initiate FDNY review once designs are approximately 80% complete. As 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 flowcharts on pages 4-6 outline the permitting processes for small, medium, and large systems. The process for small systems differs from the process for medium and large systems which are more similar.
- The flowcharts provide an overall view of the permitting process, and expanded details are listed in the remainder of the Guide.
- UL 9540A testing will be required for all new battery systems, and the results will be used to establish an approved equipment list by FDNY and DOB.

<sup>1</sup> Battery chemistries exempted from IRB and BSB review: Lead Acid, Valve Regulated Lead Acid, Lithium-Ion, and some Flow Batteries. Check with OTCR for updated list of exempted batteries

<sup>2</sup> CESIR review is not always required. Con Edison will inform applicants if CESIR review is required.

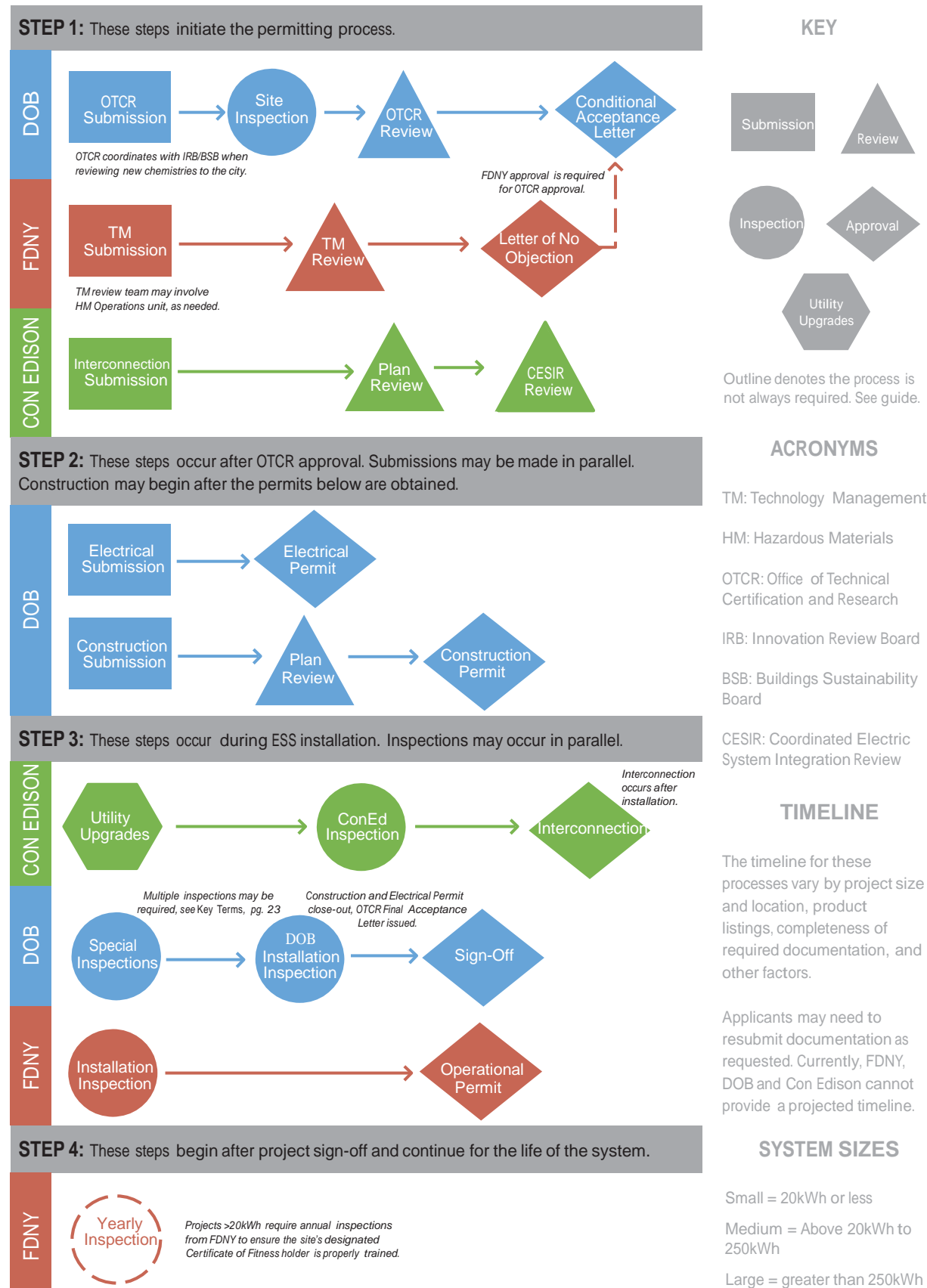
## ESS PERMITTING AND INTERCONNECTION FLOW CHARTS

### NYC Permitting & Interconnection Process for Small Systems (≤20kWh)



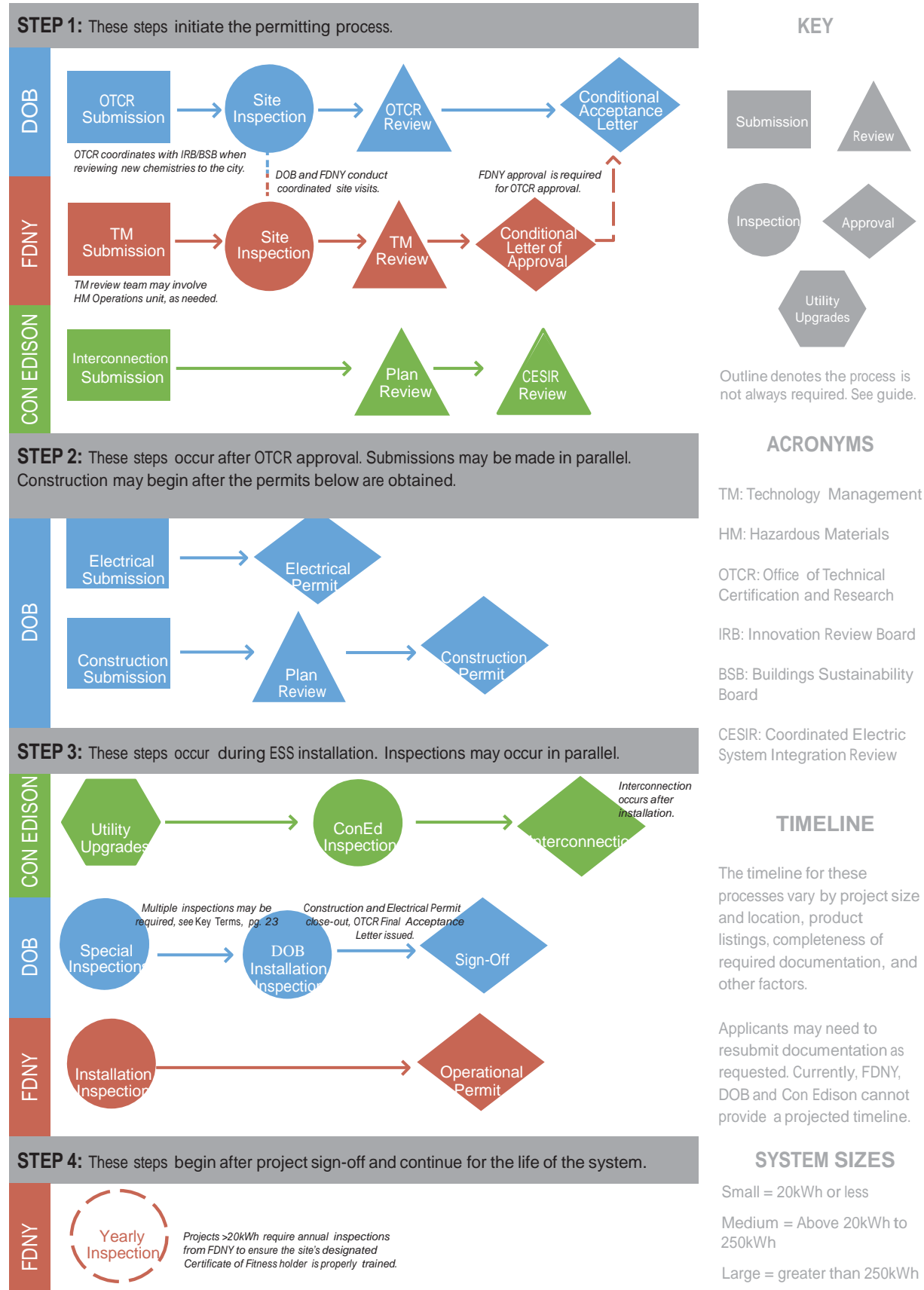
# Permitting and Interconnection Process Guide For New York City Lithium-Ion Outdoor Systems

## NYC Permitting & Interconnection Process for Medium Systems (>20kWh – ≤250kWh)



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

## NYC Permitting & Interconnection Process for Large Systems (>250kWh)



## PERMITTING PROCESSES BY AUTHORITY

### 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 via a Conditional Acceptance Letter
- (2) An Electrical Permit
- (3) A Construction Permit

The OTCR ESS process for material acceptance involves site-specific approval for equipment. The OTCR will need to review all stationary ESS that do not function as either an emergency power supply or an uninterruptible power supply (UPS). These two uses are outlined in the [2014 NYC Construction Codes](#).

Lithium-ion batteries are exempted from BSB/IRB review. However, it should be noted that new chemistries that were not previously evaluated by OTCR require this review. Both the BSB and IRB will evaluate the new chemistry and installation, and provide recommendations to the Commissioner. OTCR coordinates BSB and IRB review.

DOB OTCR PROCESS FOR MATERIAL ACCEPTANCE OF BATTERY STORAGE TECHNOLOGIES	
OTCR Approval	<p>OTCR site-specific material acceptance is required for all stationary ESS installations*. An OTCR Final Acceptance letter is a requirement for sign-off.</p> <p>Relevant codes: See <a href="#">1 RCNY §101-12</a> and the <a href="#">NYC Construction Codes Article 113</a>.</p> <p>*ESS evaluated by OTCR do not include batteries used for emergency power supply or uninterruptible power supply (UPS).</p>
Required Submission Documents	<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 OTCR Battery Documentation Form (Appendix A)</li> </ul> <p>Note: The applicant can be anyone associated with the project, including the owner, PE/RA, and manufacturer, among others.</p>
How to Submit	<ul style="list-style-type: none"> <li>• <b>In-person or via mail:</b> Office of Technical Certification and Research, 280 Broadway, 7<sup>th</sup> Floor, New York, NY 10007</li> </ul>
Fee	\$600 per OTCR2 application (non-refundable)



Timeline	The timeline varies depending on siting, site visits, and additional information requested.
Summary of key steps	<ol style="list-style-type: none"> <li>1. Applicant submits the completed OTCR-2 site-specific application form along with \$600 processing fee.</li> <li>2. For batteries with capacity over 20 kWh, OTCR will coordinate a site visit with the applicant and FDNY.</li> <li>3. Applicant will submit the following: <ol style="list-style-type: none"> <li>i. All required items listed in the battery documentation form (Appendix A).</li> <li>ii. For new battery chemistries requiring BSB and IRB review, a 10-minute Powerpoint presentation addressing the battery technology and installation details.</li> </ol> </li> <li>4. OTCR reviews project submission documents, as well as recommendations from BSB/IRB if applicable. OTCR may request clarifications from the applicant.</li> <li>5. OTCR makes its final decision after review of application documents and FDNY Letter of No Objection. OTCR issues Conditional Acceptance or rejection letter. The Conditional Acceptance letter establishes conditions for the Final Acceptance letter which may include <a href="#">special inspection</a> requirements. OTCR also posts its determination on <a href="#">BIS</a> (Building Information System).</li> <li>6. Once construction and electrical permits and OTCR Conditional Acceptance letter 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. (See <a href="#">BC Chapter 17</a>)</li> <li>8. Installation must comply with the NYC Construction Codes, NYC Electrical Code, the conditions of the required listing, FDNY Letter of No Objection, and the OTCR Conditional Acceptance Letter.</li> <li>9. OTCR issues the Final Acceptance letter after applicant satisfies all conditions.</li> </ol>
Contact	<a href="mailto:OTCR@Buildings.nyc.gov">OTCR@Buildings.nyc.gov</a> , 212.393.2626

ELECTRICAL PERMIT FOR BATTERY STORAGE TECHNOLOGIES	
Electrical Permit	Electrical permits are required for all ESS installations. See the note below and the Electrical Code Rules ( <a href="#">§34-05</a> ) for more information.
Required Submission Documents	<ul style="list-style-type: none"> <li>• Form <a href="#">ED16a</a></li> <li>• Equipment specification sheets</li> <li>• A single or three-line electrical diagram (diagram required on-site during inspections).</li> </ul> <p>Note: 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>
How to Submit	May be submitted <a href="#">online</a> .
Fees	<p>Fees vary. There is an initial \$40 application fee for each electrical permit plus an additional range of fees, not to exceed \$5,000, depending on the equipment installed and other proposed work. See NYC Electrical Code (<a href="#">§27-3018</a>) page 18 for fee details.</p> <p>Note: Fees are non-refundable. Checks and money orders accepted; make payable to “Department of Buildings.”</p>
Timeline	Issued immediately upon submission. Applicants should wait to submit the Electrical Permit until after OTCR Conditional Acceptance letter is issued.
Summary of key steps	<ol style="list-style-type: none"> <li>1. Apply for and obtain electrical permit before construction begins.</li> <li>2. Installation must comply with the NYC Construction Codes, NYC Electrical Code, the conditions of the required listing, and the OTCR Conditional Acceptance Letter.</li> <li>3. Applicant requests an electrical inspection <a href="#">online</a>.</li> <li>4. Inspector inspects the system.</li> </ol>
Contact	Electrical permit: 212.393.2441

<h2 style="text-align: center;">CONSTRUCTION PERMIT FOR BATTERY STORAGE TECHNOLOGIES</h2>	
Construction Permit	<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 OTCR Conditional Acceptance Letter has been issued and electrical permit have been approved.</p>
Required Submission Documents	<p>Forms to submit after receiving OTCR Conditional Acceptance Letter:</p> <ul style="list-style-type: none"> <li>• <a href="#">PW1 – Plan/Work Approval (PW1 User Guide)</a></li> <li>• <a href="#">PW2 – Work Permit Application</a></li> <li>• <a href="#">PW3 – Cost Estimate</a></li> <li>• <a href="#">TR1 – Technical Report: Statement of Responsibility (construction progress/special inspections)</a></li> <li>• <a href="#">TR8 – Technical Report: Statement of Responsibility (energy code progress inspections)</a></li> <li>• <a href="#">ACP5 or ACP7 – Asbestos Abatement Form</a> (if there is risk of asbestos contamination)</li> <li>• 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).</li> <li>• <a href="#">C408 – Commissioning and completion requirements</a></li> </ul> <p>Sign-off forms and letters 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 (certification of complete inspections)</a></li> <li>• <a href="#">Final TR8 – Technical Report (certification of complete inspections)</a></li> <li>• <a href="#">C408 – Commissioning reports</a></li> <li>• OTCR Final Acceptance letter</li> </ul> <p>Notes:</p> <p>(1) PW1 may be submitted in parallel with OTCR Conditional Acceptance process</p> <p>(2) Paperwork must be filed by registered design professional, expeditor, contractor, registered special inspection agency, etc.</p> <p>(3) Commissioning is a requirement for every energy storage project, regardless of size. The requirements for the commissioning report are defined in Section <a href="#">C408</a> of the Energy Code. (The Rule to further define acceptable commissioning procedures is still in development).</p>
How to submit	<ul style="list-style-type: none"> <li>• <a href="#">Online</a> (through Hub Full Service)</li> <li>• <b>In-person:</b> See list of <a href="#">Borough Offices</a></li> </ul>

Fee	Varies, see 2014 NYC Construction Code ( <a href="#">§1-112</a> ) for more detail. Use <a href="#">PW3</a> to complete a cost estimate.
Timeline	Plan examiners aim to issue construction document approval within 2-3 weeks of submission.
Summary of key steps	<ol style="list-style-type: none"> <li>1. Applicant determines if building requires an asbestos investigation. <i>Associated forms: ACP5 or ACP7</i></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. <i>Associated forms: PW1, PW2, PW3, TR1, and TR8</i></li> <li>4. DOB reviews the application. It may request clarifications from the applicant.</li> <li>5. If requirements are met, then DOB issues construction document approval.</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>. <i>Associated forms: PW7, final PW3, final TR1, and final TR8</i></li> <li>11. If inspections and paperwork are approved, then DOB issues Construction Sign-off in BIS.</li> </ol>

DOB RESOURCES FOR PERMITTING ESS	
General DOB	<ul style="list-style-type: none"> <li>• DOB website: <a href="http://www1.nyc.gov/site/buildings/index.page">http://www1.nyc.gov/site/buildings/index.page</a></li> <li>• Building Information System (BIS): <a href="http://a810-bisweb.nyc.gov/bisweb/bsqpm01.jsp">http://a810-bisweb.nyc.gov/bisweb/bsqpm01.jsp</a></li> <li>• NYC Development Hub: <a href="http://www1.nyc.gov/site/buildings/industry/the-hub.page">http://www1.nyc.gov/site/buildings/industry/the-hub.page</a></li> <li>• Codes and Reference: <a href="https://www1.nyc.gov/site/buildings/codes/nyc-code.page">https://www1.nyc.gov/site/buildings/codes/nyc-code.page</a></li> </ul>
OTCR/IRB/BSB	<ul style="list-style-type: none"> <li>• OTCR page: <a href="http://www1.nyc.gov/site/buildings/codes/otcr.page">http://www1.nyc.gov/site/buildings/codes/otcr.page</a></li> <li>• OTCR Rule: <a href="http://www1.nyc.gov/assets/buildings/rules/1_RCNY_101-12.pdf">http://www1.nyc.gov/assets/buildings/rules/1_RCNY_101-12.pdf</a></li> <li>• OTCR Forms: <a href="http://www1.nyc.gov/site/buildings/codes/otcr-forms.page">http://www1.nyc.gov/site/buildings/codes/otcr-forms.page</a></li> </ul>
Electrical Permit	<ul style="list-style-type: none"> <li>• E-filing website: <a href="https://a810-efiling.nyc.gov/eRenewal/loginER.jsp">https://a810-efiling.nyc.gov/eRenewal/loginER.jsp</a></li> <li>• Electrical Forms: <a href="https://www1.nyc.gov/site/buildings/about/forms-electrical.page">https://www1.nyc.gov/site/buildings/about/forms-electrical.page</a></li> <li>• NYC Electrical Code page on DOB website: <a href="https://www1.nyc.gov/site/buildings/codes/electrical-code.page">https://www1.nyc.gov/site/buildings/codes/electrical-code.page</a></li> <li>• Administrative Sections of the 2011 NYC Electrical Code: <a href="http://www.nyc.gov/html/dob/downloads/bldgs_code/electrical_code_local_law_39of2011.pdf">http://www.nyc.gov/html/dob/downloads/bldgs_code/electrical_code_local_law_39of2011.pdf</a></li> </ul>
Construction Permit	<ul style="list-style-type: none"> <li>• E-filing website: <a href="https://a810-efiling.nyc.gov/eRenewal/loginER.jsp">https://a810-efiling.nyc.gov/eRenewal/loginER.jsp</a></li> <li>• Construction Forms: <a href="http://www1.nyc.gov/site/buildings/about/forms.page">http://www1.nyc.gov/site/buildings/about/forms.page</a></li> <li>• NYC 2014 Construction Codes page: <a href="http://www1.nyc.gov/site/buildings/codes/2014-construction-codes-updates.page">http://www1.nyc.gov/site/buildings/codes/2014-construction-codes-updates.page</a></li> <li>• Administrative Sections of the 2014 NYC Building Code: <a href="http://www.nyc.gov/html/dob/apps/pdf_viewer/viewer.html?file=2014C C BC Chapter 1 Administration.pdf&amp;section=conscode_2014">http://www.nyc.gov/html/dob/apps/pdf_viewer/viewer.html?file=2014C C BC Chapter 1 Administration.pdf&amp;section=conscode_2014</a></li> <li>• Section ECC C408: System Commissioning: <a href="https://www1.nyc.gov/assets/buildings/apps/pdf_viewer/viewer.html?file=2016ECC_CHC4.pdf&amp;section=energy_code_2016">https://www1.nyc.gov/assets/buildings/apps/pdf_viewer/viewer.html?file=2016ECC_CHC4.pdf&amp;section=energy_code_2016</a></li> </ul>
Can't find what you're looking for?	<p>Contact the CUNY DG Hub:</p> <ul style="list-style-type: none"> <li>• <a href="mailto:dghub@cuny.edu">dghub@cuny.edu</a></li> <li>• (812) 302-2735</li> </ul>

## FIRE DEPARTMENT OF THE CITY OF NEW YORK (FDNY) PROCESS

The FDNY evaluates all projects on a site by site basis, based on the information supplied as listed below. Adhering to these requirements does not guarantee approval, and applicants should always consult with FDNY.

FDNY APPLICATION PROCESS FOR ESS	
Required Submission Documents	<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 (Listing to UL 9540, UL 1973, UL 1741 and other pertinent UL certifications)</li> <li>○ Testing conducted to UL 9540A testing standards by an independent NYC-approved testing agency (see note). The complete test report and data shall be provided.</li> </ul> </li> </ul> <p>Note: UL 9540A is a testing protocol that was released in November 2017 and is required. Batteries without this testing may still be considered while manufacturers perform UL 9540A testing. Testing must be conducted by a NYC approved testing agency – see <a href="#">1 RCNY 101-07, Section (c)(2)</a> for approved qualifications.</p>
Who can submit the application	The TM-1 application shall be prepared by a registered design professional or an expert in the subject field.
When to submit	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.
How to submit	<ul style="list-style-type: none"> <li>• <b>In-person:</b> Window #8, 1<sup>st</sup> Floor, 9 Metrotech Center Hours: Mon-Fri, 8am – 3pm</li> <li>• <b>Mail:</b> Fire Department of the City of New York Bureau of Fire Protection Technology Management 9 MetroTech Center, Third Floor, Room 3W-2 Brooklyn, NY 11201-3857</li> </ul>
Fee	\$420 per TM-1 application (non-refundable). Credit cards, checks, and money orders are accepted.

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Timeline	Applications are typically reviewed within 40 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.
Steps	<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 to 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>
Contact	718.999.2405

## APPLICANT CHECKLIST FOR OUTDOOR LITHIUM-ION BATTERY SYSTEMS

The following checklist is a comprehensive list of documentation, certifications, and other NYC requirements for permitting applications, including applicability based on system size. Reference the documentation and details below when preparing the application packages for DOB and FDNY, along with further details as outlined in Appendix A, the DOB Required Supporting Documentation list.

Documentation		Details	Aggregate System capacity (kWh)		
			≤ 20	>20 - ≤250	> 250
FDNY	TM-1	Application for plan examination	N/A		
	TM-2	Certificate of Approval for <i>new*</i> equipment to city			
DOB	OTCR-2	Site specific approval application			
	ED16-A	Electrical permit			
	PW1	Application for Plan/Work Approval for DOB			
	PW3	Project cost estimate			
	TR1	Technical Report: Statement of Responsibility (Construction code)			
	TR8	Technical Report: Statement of Responsibility (Energy code)			
Site plans		Indicating placement of ESS container(s) and auxiliary equipment, to scale, demonstrating compliance with siting requirements <sup>1</sup>			
Other structures on site	If planned adjacent-to-building placement, state if the building is of non-combustible construction or has a 1-hour rated fire assembly, in compliance with adjacent placement requirements <sup>2</sup>			Evaluated on a case by case basis <sup>3</sup>	Evaluated on a case by case basis <sup>3</sup>
	If another energy storage system is already on site, this must be indicated with storage capacity of other system noted.				
Site use		Industrial, commercial, residential, multi-use, etc.			
Site characteristics		Flood, seismic, environmental, and vehicle protections specified in NYC Construction Codes and NY Fire Code Section 312.			
System description		A system specification or similar including at least narrative description of system, total system capacity (kWh and kW), and total system weight and dimensions.			
Single line drawing		Demonstrating compliance with NYC Electrical Code, as applicable to energy storage and balance of system devices, indicating placement and interconnection of equipment, including electrical disconnects or emergency stops.			
UL 1973		Certification required			
UL 1741		Certification required			
UL 9540	Generic system certification required				N/A
	Project-specific certification required (or plan in place to procure)		N/A	N/A	
UL 9540A		UL 9540A testing and test data. Where these tests have not yet been conducted, AHJs will determine a reasonable period within which testing shall be completed. Each system must undergo this testing once.			
Explosion analysis		Based on UL 9540A-compliant test data, conducted by an approved test laboratory.			



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Fire analysis	Based on UL 9540A-compliant test data, conducted by an approved test laboratory.			
FMEA	Generic FMEA required, in accordance with IEC 60812 and DOB stipulated requirements as outlined in Appendix A, including sign-off by NYS PE.			N/A
	Site specific FMEA required, if not already produced as part of UL 9540 certification, in accordance with IEC 60812 and DOB stipulated requirements as outlined in Appendix A, including sign-off by NYS PE.	N/A	N/A	
Battery specification	If not included in system specification, a specification sheet or similar including total number of batteries, battery chemistry, and voltage.			
Inverter specification	If not included in system specification, a specification sheet or similar including make, model, and rating.			
System encasement specification	If not included in system specification, a specification sheet or similar including confirmation that container is of non-combustible material, is approved or appropriate for planned use (with ratings as applicable), and is secured against unauthorized personnel.			
	Drawing of cabinets or racks within container, indicating number and type of each.	N/A		
Communication and controls specification	If not included in system specification, a specification sheet or similar including: 1) description of 24/7 remote monitoring at inverter, string, and battery level of at least current, voltage and temperature; 2) approved energy management system capable of balancing current, voltage, and temperature, as well as remote shut-down in case of emergency conditions; 3) description of on-system status indicator (screen or indicator light), noting system status (e.g., idle, active, faulted); 4) Delineation of manufacturer-assessed safe operation ranges; 5) communication methods (e.g., 4G cell)			
Monitoring and alarms specification	If not included in system specification, a specification sheet or similar for smoke, gas, and temperature sensors, which produce audible and visual alarms in the area. If a detection system or automatic fire suppression system is required, a central station connection shall be required.	N/A		
Fire protection system description	Drawing of suppression system, if required based on UL 9540A test results <sup>4</sup> . Water pressure and flow rates determined by hydraulic calculations.	TBD <sup>4</sup>	TBD <sup>4</sup>	
	If system is installed on a rooftop and requires a water based fire suppression system, drawing of sprinkler system, with FDNY access to Fire Department Connection serving system at grade level shall be provided.	TBD <sup>4</sup>		
Non-water suppression system	If installed, specification sheets or similar providing manufacturer name, system details, and MSDS. Drawing of system to indicate position within container.			
Specification for ventilation and exhaust system	Specification sheet for HVAC or other system, describing method to maintain safe temperature ranges. System must be designed to maintain LFL below 25%.	N/A		

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Deflagration venting and exhaust	Based on explosion analysis conducted on UL 9540A test data, exhaust and deflagration venting should be described, such that exhaust, flame, or explosion is minimized and directed away from combustible materials and personnel.	TBD <sup>4</sup>		
Installation and commissioning plans	Plan should include coordination expectation with interconnection authority.			
Operations and maintenance plan	O&M manual provided, or similar, including a noted understanding that maintenance must be logged as required by NYC Fire Code 107.7, available for inspection on request. Brief instructions shall be provided at the required shut offs and with the building representative in a labeled box, readily accessible by Fire Department Personnel. Systems that are used as utility interactive systems shall be listed and identified as utility interactive systems.			
Decommissioning and disposal plan	Description of planned process for end of life, including SME contact information, recycling information, and DOT compliant transportation plan.			
Emergency management plan	Plan must be available on site or with the CoF holder, and include at least: 1) List of considered issues; 2) Process by which issues are detected and assessed; 3) On-site emergency response, including shut-down procedures and hazards which first responders should be aware of; 4) Emergency notification process and contact info, for SME, operators, owners, AHJ, and emergency responders, as applicable; 5) Response timeline (within 24 hours); 6) Area clean up (including spill control and neutralization requirements <sup>5</sup> ), system repair, and/or system removal.			
Signage	Signage must comply with Signage Requirements <sup>6</sup> , and be posted on the container and at entrance to the space. All equipment shall additionally be labeled as required by NYC Mechanical and Electrical code, or as required by certifications.			
Rooftop structural analysis	If installed on a rooftop, analysis demonstrating rooftop is structurally capable of handling all anticipated loads.			
Rooftop materials descriptions	Description of building as non-combustible, rooftop as non-combustible assembly, and rooftop material under system as non-combustible, extending at least 5 ft. from system perimeter.			
	If installed on dunnage, dunnage must have a fire rating of 1 hour.			N/A
	If installed on dunnage, dunnage must have a fire rating of 2 hours.	N/A	N/A	

<sup>1</sup>Siting requirements:

- Must demonstrate compliance with NYC zoning requirements per zoning area and equipment category.
- 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).
- Individual containers may not exceed 53' x 8.6' x 9.6'.
- Must indicate distance from other site features, regardless of proximity to energy storage system, covering at least:
  - 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;
  - OR can install a line of protection if approved by AHJ;
  - 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.
- Indicate location and distance from fire hydrants and standpipes, as applicable.
- 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.
- If installation on rooftop below 100 ft, description of how installation complies with NYC Fire Code 504.4.

<sup>2</sup> Adjacent to building requirements:

- Must be under 20 kWh.
- Building must be non-combustible;
  - 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.
- AND installed at least 5 ft. from any openings in walls (windows, doors, vents, etc.) and 10 ft. from required exit;
  - OR where insufficient space, a non-combustible or 1-hour fire rated assembly barrier may be put in place, if approved by AHJ.
- UL 9540A test results may be submitted to OTCR for evaluation. OTCR may omit the above requirements based on their evaluation.

<sup>3</sup> Over 20kW system site requirements are to be evaluated on a case by case.

<sup>4</sup> Applicability pending UL 9540A testing results.

<sup>5</sup> Spill Control and Neutralization Requirements:

- 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.
- 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.

<sup>6</sup> Signage Requirements:

- Dimensions at least 8.5" x 11".
- Made of durable material.
- Must have non-glare finish, and characters must contrast with background.
- If sign fades, a new one must replace it.
- Characters must be a minimum of 0.5" in height.
- Sign must be securely attached at approximately 5 ft.
- Sign will include following or equivalent:
  - Space/container contains energized battery systems.

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- The container contains energized electrical circuits.
  - Subject Matter Expert and reach-back phone number linked to monitoring system to relay information to First Responders in case of emergency.
  - Markings identifying the type of system (e.g., Lithium-ion, Sodium, etc.) and any chemistry-specific hazard.
- If electrical disconnect is not within sight of energy storage equipment, sign indicating its location will be provided per NEC.
- If shut off is located separately from battery system, sign shall indicate it is connected to an energy storage device.

## CON EDISON PROCESS

CON EDISON INTERCONNECTION OF ESS	
Application requirements	<p>Applications must follow the <a href="#">New York State Standardized Interconnection Requirements</a> (SIR), Appendix F. Visit the <a href="#">Con Edison Applying for Private Generation Interconnection</a> page for a summary of required forms with accompanying links. Requirements will differ depending on project size.</p> <p>Note: From an interconnection perspective, ESS will be treated as a generator under the SIR process.</p>
How to initiate the process	<p>Applicant creates interconnection application via Power Clerk, Con Edison's online portal for distributed generation applications. There are two separate portal links, one for projects <a href="#">greater than 50 kW</a> and one for projects <a href="#">50kW or less</a>. For a tutorial on using Power Clerk, <a href="#">see this video</a>.</p>
When to submit	<p>Submissions to Con Edison 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>
How to submit	<p>Online through <a href="#">Power Clerk</a>.</p>
Fees	<p>Fees for 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> \$750 (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>
Forms and required documents	<p>The application package consists of the following:</p> <p>NOTE: All forms listed below are available via the <a href="#">Applying for Interconnection page</a> and can be uploaded to Power Clerk; also see the <a href="#">DG Documentation Checklist</a> for a full list of items that may be required.</p> <ol style="list-style-type: none"> <li>1. Customer Authorization Letter</li> <li>2. Signed Standardized Contract (Appendix A of SIR)</li> </ol>

	<ol style="list-style-type: none"> <li>Signed Standardized Application (Appendix B of SIR)</li> <li>\$750 application fee (see fee details above)</li> <li>Technical drawings (<a href="#">three line diagram</a>) &amp; equipment specifications as required (more details <a href="#">here</a>)</li> <li>Manufacturer data sheets</li> <li>Copy of the verification test procedure</li> <li>Completed Application Form G (required for net metering or standby service rate applications)</li> </ol>
Timeline	<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 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>Up to 15 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 study for projects up to 2MW, and 80 business days or less for projects between 2MW-5MW.</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>
Recommended Steps for systems 50 kW to 5MW	<p>The following steps are recommended to complete the interconnection process for ESS:</p> <ol style="list-style-type: none"> <li>Applicant submits paperwork on Power Clerk.</li> <li>Con Edison acknowledges the application has been received by emailing the applicant and assigning a Customer Project Manager (CPM).</li> <li>Con Edison starts application review.</li> <li>Con Edison notifies applicant if application is complete or missing documentation.</li> <li>Con Edison starts preliminary review of the system once the application is complete.</li> <li>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> </ol>

	<ol style="list-style-type: none"> <li>7. If a CESIR is required, applicant then commits to a CESIR via Power Clerk and by paying for any CESIR review costs that Con Edison identifies.</li> <li>8. 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>9. Applicant commits to pay for the utility construction of Utility System Modification, if required.</li> <li>10. If a modification is required, Con Edison will provide a general timeframe for the project, and complete the required work.*</li> <li>11. Con Edison issues an “Approval to Build” Letter.</li> <li>12. The system is installed.*</li> <li>13. Applicant emails the CPM to request an inspection.</li> <li>14. Applicant's facility is tested in accordance with the SIR.</li> <li>15. Cost Reconciliation and Final Acceptance Letter emailed to applicant.</li> </ol> <p>*Steps 10 and 12 may occur in parallel once the contractor agrees to pay for the upgrade.</p>
Inspections	<p>Provided free of charge by Con Edison as per above Process Steps.</p> <p>All ESS must complete an on-site verification test and inspection.</p>
Questions	<p>Questions should be directed to the Con Edison CPM. Additional information on general incentive programs and process guidelines is available at Con Edison’s <a href="#">DG Home Page</a>.</p>

## KEY TERMS

- **Building Information System (BIS):** The DOB's 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):** 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.
- **Energy Storage System (ESS):** 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 for which 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):** OTCR oversees technical certifications of approved agencies and entities performing inspections, tests, and material approvals. It also evaluates new technologies that enhance safety, sustainability and efficiency. Note: See RCNY [§101-12](#) for more information on OTCR.
- **Rules of the City of New York (RCNY):** The City's official compilation of approximately 6,000 rules, which prescribe standards that must be met regarding fees, licenses, permits, and other activities over which City agencies have jurisdiction.
- **Special Inspections:** An Energy Progress Inspection and Special Inspections will need to be completed prior to scheduling construction inspections. The Energy Progress Inspection is often completed by the NYS PE/RA and the Special Inspections are completed by third party Special Inspectors. At a minimum, construction projects require verification during construction of structural stability, fire-resistant penetrations and joints, air sealing and insulation, and energy code compliance. Additional inspections depending on a project's specifics may be required. <https://www1.nyc.gov/site/buildings/codes/special-inspections.page>



## APPENDIX A: DOB BATTERY SUPPORTING DOCUMENTATION FORM



NYC Buildings Department  
280 Broadway, New York, NY 10007  
Rick D. Chandler, PE, Commissioner



### **Required Supporting Documentation for OTCR Applications and Construction Permit Applications for Battery ESS**

The following information is required for all ESS submitted for evaluation by the Department of Buildings:

#### **1. Project Information**

- Location/Address.
- Building Owner (Name, address, contact info).
- Statement that project meets Con Ed/NYSERDA technical requirements for approved incentive program, if applicable.
- Construction Permit – Provide NYC DOB Job# if filed or when the job number is issued.
- Electrical Permit – Provide NYC DOB Job# if filed or when the job number is issued.
- Installation conditions. Indicate if indoor, exterior or rooftop conditions.
- Indicate if ESS is used for PV or Peak Shaving.

#### **2. Battery Properties and Characteristics**

- Make/model# for ESS and inverter.
- Provide product literature for ESS and inverter.
- Identify chemistry (ie. lithium-Ion, VRLA, etc.).
- Physical Dimensions for the cell, module and cabinet/rack. Physical dimension must include length, width, height and weight.
- Hazard classification and quantity per classification.
- Chemical classification and quantity per classification.
- ESS electrical capacity (kWh).
- Expected lifespan for the battery.
- Indicate if batteries are sealed.

#### **3. Specific risks/concerns**

- Corrosive spills/electrolyte leakage. Does the ESS have free electrolyte? If so provide the electrolyte volume and containment volume (cu. yd.).

#### **4. Plans and Statements**

- Architectural and site plans (location of batteries; obstructions; egress features; distances from ESS to adjacent construction and nearby equipment; FDNY access to site and battery).
- Flood Zone statement (signed by NYS PE) – Where an ESS 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. The certification must be signed by a NYS PE.

- Electrical interconnection. Provide a statement that the system will be installed with an electrical interconnection with the utility.

**5. Proposed Design Features (provide general requirements and project-specific information, show on plans where applicable)**

- Fire separation for ESSs in room enclosure (hourly rating).
- Fire suppression for room. Indicate if NFPA 13 compliant, commodity class.
- Fire suppression for enclosure. Indicate if NFPA 13 or 15 compliant, commodity class.
- Fire alarm. Indicate if automatic fire alarm will be provided. Indicate if central station monitoring will be provided.
- Venting requirements for room. Indicate if installation will comply with MC 504.2.
- Venting requirements for cabinet/enclosure. Indicate if installation complies with MC 504.2.
- Rooftop construction (if applicable). Specify roofing material. Roofing class (BC 1505).
- Special structural considerations. Dunnage (if applicable), indicate if dunnage will comply BC Chapter 16 and BC Chapter 22. Concrete pad (if applicable), indicate if concrete pad will comply with BC Chapter 16 and BC Chapter 19.
- Electrical. Indicate if installation will comply with 2011 NYC Electrical Code.

**6. Certification and Testing**

- Batteries: UL 1973 and UL 9540 – provide web link from certification database.
- Inverters: UL 1741 – 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**

- Provide 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**

- Zoning Analysis. For outdoor installations including rooftop, prepared by NYS PE/RA. Must submit for plan review. Submit DOB approved Zoning Analysis prior to permit.

- Maintenance /Service Plans – Include details for continuing support of existing product such as replacement parts (batteries), 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 analysis 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:
    - Electrical; External Short-Circuit, Internal Cell Fault, Abnormal Charge, Overcharge, Over-Discharge, Soft Short
    - Thermal; External and Internal Fire, Elevated Temperature, Energetic Failures (Thermal Runaway), Thermal Abuse
    - Mechanical; Crush, Nail Intrusion, Shock, Drop, Poor Cell Design, Vibration
    - 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):

- ISO 31010 “Risk management - Risk assessment techniques”
- The risk analysis is prepared on a site-specific basis.

## ABOUT

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. 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.

**CONTACT:** [DGHub@cuny.edu](mailto:DGHub@cuny.edu)



*Tria Case, Esq. - University Director of Sustainability  
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