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PLANNING GUIDE
FOR NYC ENERGY STORAGE SYSTEMS (ESS):
SITE CONSIDERATIONS

This document was developed with support from the NYC Interagency Solar & Storage Coordination Initiative.

The City of New York is committed to a renewable energy transition that includes a shift away from fossil fuel dependency; enhances grid reliability, modernization, and resilience; and is centered on equity. The expansion of energy storage deployments within the five boroughs is necessary for the City to meet these goals.

The NYC Interagency Solar & Storage Initiative, coordinated by Sustainable CUNY in partnership with the NYC Mayor's Office of Climate & Environmental Justice, convenes more than 30 New York City agencies on a bi-annual basis to align policy, permitting, and implementation efforts for solar and energy storage deployment.

This *Project Considerations Guide* provides an introductory level overview of key decision-making elements involved in ESS project planning, for stakeholders interested in exploring the potential for an ESS installation at a site/building/facility in NYC. It is intended to help users understand important physical site characteristics that may impact project feasibility and influence project design.[1]

This document aims primarily to support more informed communications between end users and service providers. It is not a comprehensive design or compliance guide. Design and compliance for ESS installations is highly variable and subject to New York City's code requirements as well as site specific factors. Always consult a qualified professional when evaluating, scoping, designing, and permitting an ESS project.

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[1] An accompanying decision-support tool, the *Planning Guide for NYC Energy Storage Systems: Project Considerations*, addresses other elements of ESS project planning beyond physical site considerations.

Site Needs: All Projects

ESS installations in New York City are regulated by a set of code-based requirements as well as by site-specific evaluation of the project which is required for obtaining approval and associated permits. These regulations vary to some extent based on the ESS size (in kWh) as well as the project's location (e.g., indoor, outdoor, rooftop, etc.). However, the following site-associated factors are applicable for all ESS projects, regardless of their size or location.

Table 1
Stationary Storage Battery System Size Thresholds

Battery Technology	Aggregate Rated Energy Capacity		
	Small	Medium	Large
Lead Acid Battery	>2 kWh and ≤70 kWh	>70 kWh and ≤ 500 kWh	> 500 kWh
Ni-Cd Battery	>2 kWh and ≤70 kWh	>70 kWh and ≤ 500 kWh	> 500 kWh
NiMH Battery	>2 kWh and ≤70 kWh	>70 kWh and ≤ 500 kWh	> 500 kWh
Li-ion Battery	>2 kWh and ≤20 kWh	>20 kWh and ≤ 250 kWh	> 250 kWh
Flow Battery	>2 kWh and <20 kWh	>20 kWh and < 500 kWh	> 500 kWh

Source: FDNY Rule 3 RCNY 608-01, "Outdoor Stationary Storage Battery Systems"

Water Source/Hydrant

"Small" or "Medium" ESS projects (as defined in NYC Rule 3RCNY 608-01 Outdoor Stationary Storage Battery Systems) require a fire hydrant to be located within 250 feet of the ESS location, while "Large" ESS projects (also defined in 3RCNY 608-01) require a hydrant within 100 feet of the fire department connection point (FDC) which links to the fire suppression sprinkler system. If there is no public hydrant available within the maximum radius, a private hydrant/water source would need to be installed as part of the project – and the project financials would need to evaluate whether the installation of a private hydrant would be economically feasible.

Physical space/location basics

Evaluating a site's physical space feasibility and availability for an ESS installation must consider not only the space needed for the ESS equipment itself, but also space that will be needed for any auxiliary fire protection, utility interconnection equipment, and code-required separation distances between the ESS and surrounding exposures such as buildings, sidewalks, parked vehicles, etc. These separation distances will vary depending on the product's FDNY-issued Certificate Of Approval (COA) and a project's site-specific approval for permitting.

For most outdoor ESS installations, the general baseline is a 10-foot separation distance to surrounding exposures, but large ESS may require greater separation distances, especially for accompanying fire protection system controls and access points. Rooftop installations must account for firefighter access space needs. Separation distances for indoor ESS are more variable and based on the product COA and zoning regulations.

Fire apparatus access

Fire truck/apparatus access via a public or private street is needed for all ESS installations. Most sites will typically already have this access via public streets, especially ESS that are being installed within or in close proximity to a building. However, this will be an additional project consideration for some large ESS installations on undeveloped lots if public street access is not available; see the section below specific to large ESS installations.

Site Needs: Indoor Projects

Siting ESS indoors requires a building to meet certain essential requirements. Newer buildings may be better suited for compliance with these requirements.

Building requirement – fully sprinklered

If a building is fully sprinklered throughout, any type of indoor ESS is allowed regardless of the ESS chemistry type or product type. If a building is not fully sprinklered throughout, it is not a candidate for indoor installation of lithium-ion, flow, and other ESS types regardless of the building's combustibility construction type. Non-sprinklered buildings, regardless of combustibility type, are limited solely to certain lead-acid and nickel-cadmium ESS equipment for either back-up of fire and life safety systems or UPS (uninterruptible power supply) systems.

Building requirements – non-combustible construction

Any building of non-combustible construction that is also fully sprinklered can allow the indoor installation of any type of ESS. A building that is of non-combustible construction but lacks a building-wide sprinkler system is limited to only the lead-acid and nickel-cadmium ESS types as described above.

Building requirements – combustible construction

For buildings of combustible construction, allowable ESS types vary. Lead-acid/nickel-cadmium can be installed indoors of any combustible building, regardless of whether the building is sprinklered. Lithium and other ESS types can be installed in combustible buildings if they are fully sprinklered, except for buildings of occupancy types R-1, R-2, Group A, and Group I, which must be of non-combustible construction only.

Building requirement – central fire alarm panel

The control area housing an indoor ESS must either have an existing connection to the building's central fire alarm system, or, if the building is not required to have a central fire alarm system, then the control area will need a dedicated smoke detection system to be installed as part of the ESS installation.

Room requirement – control area

All indoor ESS must be installed within "Control Areas" as specified in fire code (FC 608). For certain lead-acid/nickel-cadmium systems, the control area must meet a limited set of fire protection requirements. For lithium and other ESS types, the control area must be built to meet the full construction requirements of "high hazard" occupancies including explosion control, ventilation, and other protective elements. Any existing control area(s) within a building should be evaluated for its suitability for various ESS types.

Site Needs: Outdoor Ground Mount

Outdoor sites for ESS must be able to accommodate the below physical spacing and other requirements.

Zoning-based location and screening requirements

Zoning regulations generally allow ESS siting on ground level, with some limitations that may apply in areas with special zoning rules such as low-density growth management zones, Flood Hazard Areas, etc. ESS installations with a physical footprint area larger than 25 square feet will require the addition of screening and/or vegetative barriers as part of the installation in residential and most commercial-zoned districts.[2]

Zoning-based setback distances

NYC Zoning regulations set a five feet minimum setback to lot lines for outdoor systems and 10 feet setbacks from street wall for rooftop installations. These cannot be modified. However, FDNY separation distance to lot lines may supersede the zoning-prescribed minimum of five feet if the COA requires a larger lot-line separation distance.

General outdoor projects - separation distances

For outdoor ESS installations, separation distances as described in the section above will need to be factored into site design/layout, but additional details are provided below:

- ESS to surrounding exposures: as described previously, the ESS must typically be located at least 10 feet away from surrounding exposures. This includes lot lines of adjacent properties in addition to other exposures such as buildings, sidewalks, infrastructure, etc.
- ESS unit-to-unit spacing: this is applicable when there is more than one ESS unit being installed on a site. The spacing minimums are set by each product's COA and can vary significantly.
- ESS emergency e-stop: all ESS require an emergency e-stop/shutoff switch, which must be located a minimum of 10 feet from the ESS. The e-stop is typically installed near the FDC or the utility connection.
- ESS smoke purge controls: some ESS (typically but not exclusively large systems) may require a manually activated smoke purge system, as determined via the product's COA. If required, the activation/control switch must be located a minimum of 10 feet from the ESS and is typically located near the FDC or the utility connection.

Large ESS sprinkler systems – separation distance requirements

[2] For additional reference see the CUNY Smart DG Hub's *NYC ESS Zoning Guide*.

All large ESS require a code-compliant dry-pipe exterior sprinkler system as part of the ESS installation. These sprinkler systems require certain separation distances including:

- A maximum 100 feet distance between the hydrant(s) and the FDC that feeds the system.
- Up to 50 feet distance between the FDC and the ESS itself, depending on risks to first responders.

Any site for a proposed large ESS installation would need to accommodate these space requirements for the sprinkler system.

Site Needs: Additional Large ESS Considerations

Large ESS are defined as exceeding 250 kWh for lithium-ion systems and 500 kWh for lead-acid and other battery types in New York City's Outdoor Stationary Storage Battery Systems Rule (3RCNY 608-01).

Surrounding site exposure impact mitigation

During the project's site-specific review, potential impacts of an ESS failure on surrounding exposures will be used to identify any additional fire and life safety protections that may be needed. These can include elements such as fire/blast walls, additional separation distances, and other mitigation measures. A potential site for a large ESS should especially consider any sensitive exposures within a 100 feet radius of the proposed ESS installation (e.g., school, residential, hazardous/combustible) and whether the site might have physical limitations that could impede the ability to add these types of additional mitigations and protective features.

Fire apparatus access

Fire truck/apparatus access via a public or private street is needed for all ESS installations, but large standalone ESS installations would need to incorporate this into site design if regular access via public or private road is not already available, or if an existing access road does not meet certain code requirements (e.g., 34 foot minimum width and a maximum distance of 40 feet between the ESS and the access road).

Assessment of a site's feasibility would need to confirm access road availability and compliance, and especially if there is no existing access road, whether the site could accommodate the addition of one.

Stormwater management

Stormwater management and/or sewer connection infrastructure will be an additional project design and approval element for large ESS, and a site would need to be able to accommodate any build-out or installation of required stormwater/sewer infrastructure.

Site Needs: Rooftop Installations

Rooftop installations are designated by New York City Fire Code as “outdoor” systems, but rooftop locations must take additional site considerations into account. As with solar installations, the condition of a rooftop must be evaluated for its suitability for installation of an ESS, given a typical 10-year lifespan of an ESS installation. For a rooftop nearing its end of life or otherwise in need of repair or replacement, the project would need to evaluate whether the project economics can support the roof repair or replacement.

Rooftop combustibility

If the building roof covering or roofing system is of combustible construction, the ESS unit must be installed on a non-combustible mounting pad that extends five feet from all sides of the ESS.

Rooftop weight capacity

A rooftop will need to be assessed for its ability to support not only the weight of the ESS itself but any associated (e.g., utility or fire protection) equipment, as well as the weight of a non-combustible pad if needed. Steel structural supports known as dunnage may be needed to support and distribute the weight of the installation on the rooftop; the project’s financials would need to evaluate how this might impact the project’s financial viability.

Rooftop space needs and separation distances

Rooftop ESS installations must factor in multiple space-related considerations:

- There must be a clear and unobstructed access path for firefighting operations that is no less than six feet wide from the rooftop access point to the unit.
- Space needs include the ESS unit itself, along with any auxiliary fire protection or utility equipment, as well as space to accommodate a non-combustible pad if needed.
- A minimum of 10 feet distance is needed between the ESS and any rooftop egress points (e.g., rooftop bulkheads). Other separation distances to exposures that pertain to ground-mount systems will also apply to rooftops wherever pertinent. For example, public utility infrastructure, power lines, building HVAC intakes, etc. In addition, zoning regulations require a 10 feet setback from street-facing walls for all rooftop ESS.

Rooftop water supply

For any building that has a standpipe system (e.g., generally, buildings over four stories), ESS installations sited on rooftops will necessitate having at least two standpipe hose outlets within the stairway bulkhead if this is not already provided.

If you need assistance with your solar or energy storage project, contact a NYC DG ombudsman at

smartdghub@cuny.edu

Office of Facilities Planning, Construction and Management

Sustainability & Energy Conservation