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TO: Kathleen Schmid, Julia Casagrande and Lydia Wiener
NYC Mayor's Office of Climate and Environmental Justice (MOCEJ)

CC: Mark Page, Julie Lubin and Alyssa Preston
NYC Department of Environmental Protection (DEP)

Alan Price and Steven Hong
NYC Department of Buildings, Office of Alternative Energy

RE: NYC Noise Code and Battery Energy Storage Systems (BESS)

Dear colleagues:

NY-BEST thanks you for your efforts to support the deployment of energy storage in New York City. We appreciate the opportunity to provide feedback on opportunities to improve NYC Noise Code policies in support of energy storage.

As both New York City and State have recognized, energy storage is critical to achieving climate, equity, and health targets. By charging from the grid when electricity is cleanest and discharging when demand spikes, battery energy storage systems (BESS) help to reduce reliance on dirty power plants, thereby improving local air quality and contributing to public health. Energy storage also provides important grid stabilization services that support integration of renewable technologies like wind and solar, and help keep the lights on when the grid is stressed. Given the urgency of the climate crisis, rapid deployment of energy storage is essential.

The New York energy storage industry recognizes the link between noise and public health, and is absolutely committed to best practices when it comes to minimizing audial impacts of energy storage installations. **However, recent City agency policies relating to the Noise Code are stalling energy storage development and directly conflicting with progress toward clean energy targets.**

Specifically, the Department of Buildings (DOB) Office of Technical Certification and Research (OTCR) has recently begun to require energy storage developers to provide a certification by an Engineer of Record (EOR) that project designs comply with the NYC Noise Code, prior to being issued a Conditional Letter of Approval to move forward with project construction. **This presents a major challenge for project development and is currently impacting at least 340 MW of energy storage projects that would otherwise be moving forward.**

NY-BEST presents the following feedback for the City's consideration, as discussed further below:

About NY-BEST

The New York Battery and Energy Storage Technology Consortium (NY-BEST) is a not-for-profit industry trade association with a mission to grow the energy storage industry in New York. We act as a voice of the energy storage industry for more than 180 member organizations on matters related to advanced batteries and energy storage technologies. Our membership includes global corporations, start-ups, project developers, leading research institutions and universities, and numerous companies involved in the electricity and transportation sectors.[1]

[1] NY-BEST comments represent the interests of the organization as a whole and not the views of any single member. Our members have diverse interests and the organization's views are intended to be reflective of the energy storage industry collectively.

I. The City should eliminate the EOR certification requirement.

In June 2024, OTCR began requiring energy storage developers to provide a certification by an Engineer of Record (EOR) that project designs comply with the NYC Noise Code. This certification is required before a project can be issued a Conditional Letter of Approval to move forward with project construction. Because it was introduced as a requirement effective immediately, projects which had already obtained nearly all necessary permits were halted until the developer could obtain the EOR certification. Largely due to lack of clear accompanying guidance, this requirement is creating significant confusion in the industry and presenting a major challenge for project development, particularly for the most advanced projects, for the following reasons:

- **Because of substantial uncertainty around key Noise Code considerations, obtaining the certification from an EOR is extremely challenging.** First, DEP has not issued any guidance regarding how the Noise Code will be applied to BESS, as described further in Section II below. Noise consultants and EORs therefore have little to no basis for determining compliance. Second, modeled noise levels do not always reflect operational data; certifying in advance that a project will comply with the Noise Code requires the development of complex acoustic modeling that considers how a system will interact with site-specific conditions. This modeling will never be as accurate as measuring noise conditions once the system is constructed, introducing a level of uncertainty that makes it difficult to pre-emptively certify compliance.

- **Providing certification presents a liability for the EOR, resulting in a refusal to sign or highly conservative recommendations.** For the reasons described above, EORs who are being asked to put their license on the line tend to use the most conservative measuring standards, if they are willing to sign at all. These conservative standards are often inappropriate given the operating profile of batteries, and result in highly conservative recommendations, such as constructing 23-foot high concrete walls to act as sound barriers. While these recommendations are intended to eliminate any uncertainty around Noise Code compliance prior to EOR certification, they are unreasonable and not in the best interests of the neighbors of the proposed project.

- **Unique burden on the energy storage industry.** Other than the instance of a noise-based e-designation, to our knowledge, battery energy storage installations are the only type of development required to provide a specific certification of Noise Code compliance before receiving building permits from DOB. This appears contradictory to the City's climate policies, including the City of Yes for Carbon Neutrality, and also means there is a limited availability of consultants able or willing to conduct this type of modeling and certification.

Instead of requiring pre-emptive certification of Noise Code compliance, NY-BEST recommends enforcement once the project is constructed and if complaints are received or violations issued by the Department of Environmental Protection (DEP). If the system is not in

compliance with the Noise Code once operational, the onus would remain on the developer to consider modifications to the system and face penalties under the standard DEP process. This would allow compliance to be measured with operational data, rather than be based on imperfect modeling in advance of construction. From a technical perspective, BESS can be shut down or de-rated in an instance where Noise Code enforcement requires.

The urgency of removing the EOR certification requirement cannot be understated. Notably, many energy storage developers are contending with strict financing deadlines to capture State and Federal funding. The EOR certification, compounded with uncertainty about how the Noise Code applies to BESS, is resulting in significant permitting delays that directly impact projects' financial viability and, by extension, the City's ability to meet its climate targets.

II. The City should clarify Noise Code compliance requirements for energy storage systems.

The treatment of BESS under the Noise Code is not currently clear, leading to different noise consultants providing different recommendations on what compliance means. Unsurprisingly, this has resulted in confusion and permitting delays. NY-BEST recommends DEP and/or DOB release a Bulletin or other guidance document specifying how BESS installations will be measured to be in compliance with current Noise Code. We recommend that the document:

1. Clarify when and how BESS installations demonstrate compliance with § 24-218.
    a. When does Section 218 apply to BESS?
    b. How should ambient sound levels be measured for the purposes of BESS compliance? NY-BEST recommends measuring average ambient noise during the seasons and hours that BESS installations will be in operation, rather than using the lowest recorded ambient noise level at a given point in time.
    c. Do BESS noise levels need to be measured from both within a receiving property and from 15 feet away on public right of way to demonstrate compliance? NY-BEST recommends that, particularly as they do not produce impulsive sound, BESS should be able to demonstrate compliance via measurement from within a receiving property alone, rather than via measurement from a public right of way.

2. Clarify when and how BESS would be subject to § 24-227: "Circulation Devices."
    a. When does Section 227 apply to BESS?
        i. Does this only apply to BESS whose noisiest component is a fan, not an inverter?
        ii. Does this apply if ambient noise levels exceed 42 dBA?
        iii. Does this apply if there are no receiving dwelling units nearby, such as in a Manufacturing district?
    b. To ensure consistent treatment, and since no BESS are Circulation Devices, NY-BEST recommends that all BESS solely be subject to Section 218, not Section 227.

NY-BEST members would appreciate the opportunity to work collaboratively with policymakers and agency regulators to provide feedback on any draft guidance document.

III. The City and industry must work together to identify long-term solutions.

In the long-term, to achieve the considerable amount of BESS deployment required to meet clean energy targets, NY-BEST recommends the City establish a working group to bring together industry and City agency representatives to (A) establish best practices for industry mitigation of noise, and (B) develop an evidence-based proposal for a potential Noise Code amendment in the future.

A. Establish best practices for industry mitigation of noise.

While battery manufacturers generally do not provide guidance for noise attenuation for their products, NY-BEST members have extensively explored strategies to mitigate the noise generated by BESS installations. These include:

1. **Site design**
   By locating the noisiest components of the BESS away from sensitive receptors, developers can sometimes reduce perceived sound. This includes moving the battery units away from receptors and using the Balance of Plant (e.g. other components of the system like transformers and switchgear) as a barrier between the noisiest components and the receptors. However, given the high density of both neighboring buildings and receptors in NYC, feedback from acousticians indicates modifying the site design is not always able to make a significant difference in the dBA levels perceived at the receptors.

2. **System design**
   Blade hush kits, also known as dampeners, may be an option to mitigate noise levels generated by the fans integrated into many BESS systems. However, hush kits are generally unable to be added to BESS products that have already achieved UL certification without the kits. Notably, every BESS product undergoes extensive safety testing, including system burn tests, to achieve UL certification; changes to the design of any component post-manufacturing would violate the UL certification and/or require an amendment of the FDNY permit.

   Instead, policymakers, developers, and manufacturers should work together to identify opportunities to integrate noise-attenuating technologies into future product models in advance of UL certification. Notably, many newer product models have already incorporated quieter technology; using these models going forward would be a solution for future projects, but as they have not yet received FDNY Certificate of Approvals through the TM-2 process, would not offer a solution for projects currently under development.

3. **System operation**
   Given that the fans are the noisiest components of many BESS products, being able to run the fans at lower speeds would help reduce sound output. NY-BEST members have explored this possibility with the battery manufacturer Tesla in other jurisdictions. For example, one NY-BEST member worked with Tesla to permit a reduction in fan speeds on their BESS

installation in Scotland to 30% during the day and 20% during the night, significantly reducing the noise output of the system. This was largely feasible given the colder climate of Scotland, reducing the need for high fan speeds to dissipate heat from the battery. More locally, a second NY-BEST member with projects in Massachusetts has successfully worked with Tesla to determine allowable de-rating to fans based on the planned operating profile of the system along with local weather projections. Conversations with Tesla and other manufacturers about lowering fan speeds for projects in NYC are ongoing. However, the outcome of these conversations will depend on the UL certification and product warranty restrictions, as well as potential amendments to the FDNY model-specific permit.

4. **Sound barriers**

Constructing sound barriers is likely to be an effective option to mitigate noise from BESS installations in NYC, though NY-BEST encourages policymakers to consider how to best balance noise concerns with potential aesthetic implications for the host neighborhood. Industry has explored a range of sound barrier materials, including:

- **Concrete Masonry Unit (CMU) block wall:** Sound barrier walls constructed from CMU blocks are a preferred option for BESS installations in industrial zones. The walls are typically constructed to 15-25 feet in height, depending on the location of nearby receptors and zoning.

    - Pros: CMU walls are generally the most effective noise mitigators.
    - Cons: CMU walls require significant planning and are expensive and time-consuming to install. They need to be incorporated early in the design process as they require the most substantial foundation work, which requires additional permits. Further, in lower rise zoning districts, where many batteries must be installed to meet climate targets, walls of 15-20 feet are not compatible with zoning height restrictions. They may also be impractical due to construction complexity (wind bracing), security, ventilation and lighting concerns. Finally, in many neighborhoods, the aesthetic concerns of tall CMU block walls surrounding a BESS installation are considerable.

- **Pre-cast noise barrier:** Sound barrier walls made from pre-cast absorptive materials, such as the Durisol Noise Barrier, are designed to absorb noise and prevent reverberation. They are typically made of softwood shavings that are specially processed to an acoustically engineered size and bonded together with cement.

    - Pros: Pre-cast noise barriers are effective noise mitigators and can be more aesthetically pleasing than CMU walls.

- Cons: Pre-cast noise barriers face similar challenges as for the CMU walls, described above. They are, however, significantly more expensive.

- **Sound attenuating fences**: Sound attenuating fences, such as the Shakespeare SafeFence or other acoustic fencing, are designed to block out noise from heavy traffic, substations, and commercial activities. They are typically made of fiberglass and/or mass-loaded vinyl (MLV) and can be 15-20 feet high.

  - Pros: Sound attenuating fencing can reduce sound considerably, though are generally less effective than CMU walls or pre-cast noise barriers. While these require some foundation work as part of the installation, the requirements are less onerous than that required for CMU walls or pre-cast noise barriers. Further, they can be more aesthetically pleasing than the block wall.
  - Cons: Similar to CMU block walls, fencing is also subject to height limitations based on the zoning district.

- **Curtains on a chain link fence:** Outdoor sound curtains, such as eNoise Control curtains, generally consist of a quilt-like material made from vinyl and fiberglass, which can be hung from a chain-link fence or other structure.

  - Pros: Sound curtains are more economic and versatile than CMU walls or sound attenuating fencing.
  - Cons: They are not as effective at sound mitigation as sound walls or fences. Further, they are better suited for temporary uses, and are prone to deterioration in inclement weather. Thus, these are not the preferred method for sound mitigation at BESS projects.

- **Natural barriers**: In some scenarios, trees and vegetation can help reduce perceived noise levels by dispersing sound. However, BESS developers are required by FDNY to clear trees within a specified radius from the project site for safety purposes. As a result, this is not a viable noise mitigation option for NYC purposes. For systems on lots with significant space, bunding (or building natural earth bunds/hills around the site) is an effective way of minimizing noise. However, given the high density of NYC, this is almost never an option for BESS projects within the city. Further, NFPA requirements prohibit siting BESS installations below grade.

NY-BEST members are committed to continuing to explore innovative ways to bring down BESS noise levels and to working collaboratively with policymakers in support of both noise-related and climate-related goals and mandates.

B. Develop an evidence-based proposal for a potential Noise Code amendment in the future.

Even after noise mitigation best practices, including incorporating sound barriers into site design, many BESS developers in NYC have found that they are still above current Noise Code requirements. (See Appendix for sample Noise Analysis Report).

Notably, the current Noise Code thresholds may not be aligned with the realities of modern urban life. For example, under the Noise Code, Circulation Devices are currently limited to 42-45 dBA when measured within a receiving dwelling unit, three feet from an open window. However, most air conditioners and heat pumps on the market are rated significantly higher than this, and even when measured from within a receiving dwelling unit are likely to exceed this threshold. For example, the three most common heat pumps in the market, Carrier, Trane, Lenox, often located in low rise residential neighborhoods across the city, typically have dBA ratings that exceed 70 dBA, as can be seen in the table below, and given the density of neighborhoods, are likely to exceed 42-45 dBA from receiving dwelling units. System sizes of 1.5 to 5.0 tons are typically appropriate for units that range in size from 900 to 2,500 SF.

Supplier	**Model**	**A-Weighted Sound Level Power Standard Rating**
Carrier	Comfort Series 24SCA5 (1.5-5.0 tons)	73-76 dB(A)
Trane	Split System XR15 (1.5-5.0 tons)	74-75 dB(A)
Lenox	Merit Series 13ACX (1.5-5.0 tons)	76-79 dB

Window air conditioners also typically have dBA ratings well in excess of 42 dB(A), with a typical range of 50 -75 dB(A).

(For context, according to the Handbook of Environmental Acoustics (Cowan 1993), 40 dBA is equivalent to the noise at a public library, 50 dBA is equivalent to the background noise in an office, and 60 dBA is equivalent to light car traffic at 15 meters in city or commercial areas.)

By establishing a working group process to identify reasonable thresholds for noise levels for modern technologies including BESS, the City can ensure that the Noise Code is not unduly burdensome, and that the adopted thresholds reflect the reality of the best available technology and noise mitigation practices. NY-BEST members would be eager to participate in such a process.

CONCLUSION

NY-BEST greatly appreciates the opportunity to provide the above feedback on opportunities to improve the NYC Noise Code in support of energy storage. We are eager to collaborate with MOCEJ, DEP, and DOB to achieve noise-related public health goals while minimizing the climate and public health risks of delayed energy storage deployment. Please do not hesitate to reach out with any questions or concerns; we would be happy to discuss further at your convenience.

Sincerely,

William Acker
Executive Director

Claudia Villar-Leeman
Sr. Director, Policy & Regulatory Affairs

APPENDIX: BESS components and noise

A Front-of-the-Meter (FTM) BESS installation consists of a number of components that have varying impacts on the installation's overall noise output. Component specifications and design vary widely by product, but in general, fans, inverters, and transformers contribute the most to the sound generated by the system. Given the limited number of BESS products currently approved by the FDNY (see products with a Certificate of Approval here), the Tesla Megapack 2XL and Sungrow PowerTitan are the two products currently used in FTM BESS development in NYC, and are therefore referenced in the below descriptions. However, future products may incorporate different components resulting in different sound levels.

Note: To date, BESS in NYC have generally been built or proposed outdoors, at-grade. However, there are some exceptions. One system has been proposed on a rooftop of a residential building in Brooklyn formerly used for industrial purposes. Another system is under development at the Javitz Center that will install up to 3.5 MW of BESS indoors. However, to date applications have been limited for FTM systems installed indoors or above-grade.

1. **Fans**
   Most BESS products include fans, which tend to be the noisiest component of the installation. Fans are part of heat exchanger systems that are used to cool the internal machinery and ensure the battery continues to run at a safe operating temperature. Fans typically run the most when the batteries are charging and discharging, which is when batteries generate the most heat.

   The Tesla Megapack 2XL is a single self-contained unit that includes the batteries, integrated electrical inverters, and the HVAC system. A 5MVA installation would include five or six units, depending on the configuration. Each Megapack 2XL unit contains up to 9 fans located on the roof of the cabinet pointing in the upward direction, with fan blades rotating around a vertical axis. The fans are the primary noise source in the product. In a 2-hour product configuration, the Megapack 2XL contains all 9 fans, while in a 4-hour product configuration, it contains 5 fans. The sound pressure levels, and therefore perceived dBA, differ from each side of the unit because the fans are arranged asymmetrically. Tesla provides the overall dBA rating for the Megapack 2XL as 75 dBA at 10m, or 32ft away.

2. **Inverter**
   Electrical inverters convert the direct current (DC) stored in the battery to alternating current (AC) for export to the grid, and vice versa.

   The Tesla Megapack 2 XL includes string inverters (also known as individual inverters) within each self-enclosed unit, which make negligible amounts of noise. A Tesla Megapack 2 XL installation with 1MVA of capacity would include 24 units, each equipped with a string inverter. Since the inverters and batteries are housed in the same cabinet, any noise from the

inverters would be included in the dBA rating for the cabinet overall, including noise from the fans.

In contrast to the Megapack 2XL, the Sungrow PowerTitan uses a single central hub inverter, which is typically larger and louder than string inverters, rated around 75dBA. The central inverter is housed separately from the battery cabinet, resulting in a second noise source that is generally the loudest component of the system. However, the Sungrow PowerTitan 2, which is expected to receive an FDNY Certificate of Approval in December 2024, leverages quieter string inverters similar to the Tesla Megapack 2XL.

3. **Transformer**
   Most BESS systems include transformers, which step the voltage of electricity up or down to accommodate import and export from the battery to the grid. Transformers can be the noisiest component of the system when the battery is charging or discharging (generally rated between 60-80 dBa), but for most systems the fans still tends to be louder. Power transformers installed alongside the Tesla Megapack 2XL produce approximately 60dBA measured from 10m, or 32ft away.