

Municipal Zoning Codes & Energy Storage Technology

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As interest in renewable energy and natural disaster resiliency increases, the need for energy storage increases as well. However, some municipalities lack the zoning guidelines necessary for any kind of energy storage infrastructure larger than a single-family home. While zoning codes vary from town to town, all municipalities would benefit from a better understanding of the technology and its siting needs. This is especially true for places like Suffolk County's North Shore, where upgrading transmission infrastructure and installing fossil fuel-burning "peaker" plants are more traditional solutions to power demand. Phil Schade, P.E., Energy Market Director at H2M architects + engineers, offers his expertise on the state of energy storage, what municipalities should keep in mind, and the concerns that residents may raise.

Some renewable energy sources, like solar and wind, are not constant. The purpose of energy storage is to store excess energy when demand is low so that energy is available either when demand is high or when intermittent sources are not producing.

According to Schade, energy storage can come in many different

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forms: "Batteries are a common form of energy storage and have been around for a long time. It's only recently that they've been applied on a utility scale. Additional energy storage technologies include pumped hydro and the application of hydrogen gas."

Pumped storage hydropower uses two water reservoirs at different heights to pass water back and forth through a turbine. When the sun stops shining or the wind stops blowing, the moving water

generates electricity instead. Pumped hydro is the best choice for areas with significant changes in elevation.

Hydrogen gas can be another way to store energy. Electrolysis can convert water into hydrogen, which is easy to store and can be used in fuel cells to generate electricity. The conversion of water to hydrogen to electricity is less efficient than pumped hydropower, but it is more versatile. The electrification step can also be skipped entirely and the



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gas can be used directly as a fuel source or as a greener supplement to natural gas.

Battery storage systems typically use metal-ion technology to store electricity. These systems can stack individual storage cells to meet the needed capacity. There are currently plans in the region to build battery capacities exceeding 100 megawatts. Battery storage systems are attractive for a number of reasons: the technology is readily available; batteries can complement renewable energy systems; they can be cost-effective and more easily sited than fossil fuel plants; and, lastly, they have little to no impacts on traffic or carbon emissions because most facilities are unmanned and monitored remotely.

The application of utility-scale energy storage is still relatively new.

“It’s not something that most municipalities had contemplated in their current [building and zoning] codes,” Schade said. “Most municipalities, if we were to do a poll [on current storage regulations], would likely be silent on the subject. It becomes difficult to site and properly evaluate an application for development if

your town or village code has no wording that addresses that particular topic.”

Schade advises municipalities to consider how much sound energy storage facilities produce when approving energy storage siting applications. Electrical equipment and cooling fans can contribute to the background noise level of a community. Municipalities should mandate that developers check existing background noise levels and determine if a new storage system would significantly increase noise impacts. If so, sound mitigation measures may be required.

Patricia DelCol, assistant vice president and municipal market director at H2M, added that energy storage projects can face additional siting challenges due to the codes’ often outdated language.

“Certain types of renewable energy, and utility-scale energy storage is one of them, should be designated as a ‘public utility’ in municipal zoning codes,” she said. “The phrase ‘public utility’ itself typically isn’t defined within the codes, and siting flexibility cannot be achieved without that designation. Case law supports relaxed zoning requirements when a facility is

designated as a “public utility” in a municipal zoning code. Without this designation, developers can be limited in where they are permitted to build.”

Municipal zoning codes also need to understand the location needs of energy storage systems, i.e., proximity to a substation or other utility connection infrastructure, in order to draft rules that make sense for both the technology and the community the technology will benefit.

Many tools are available to support municipalities as they learn about energy storage technology and prepare for installations within their jurisdiction. Entities like NYSERDA have published guidance on both the technology and on much-needed municipal code revisions. Professional support from experienced consultants is also available. Whatever the approach, municipal officials need to be well-versed and informed of the somewhat unique siting requirements and technology needs of energy storage, as they look to embrace alternative technology and its inherent benefits to the residents and businesses within their borders. □

