Pacific Northwest
NATIONAL LABORATORY

Regulatory and Permitting Processes for Energy Storage Siting

Devyn Powell

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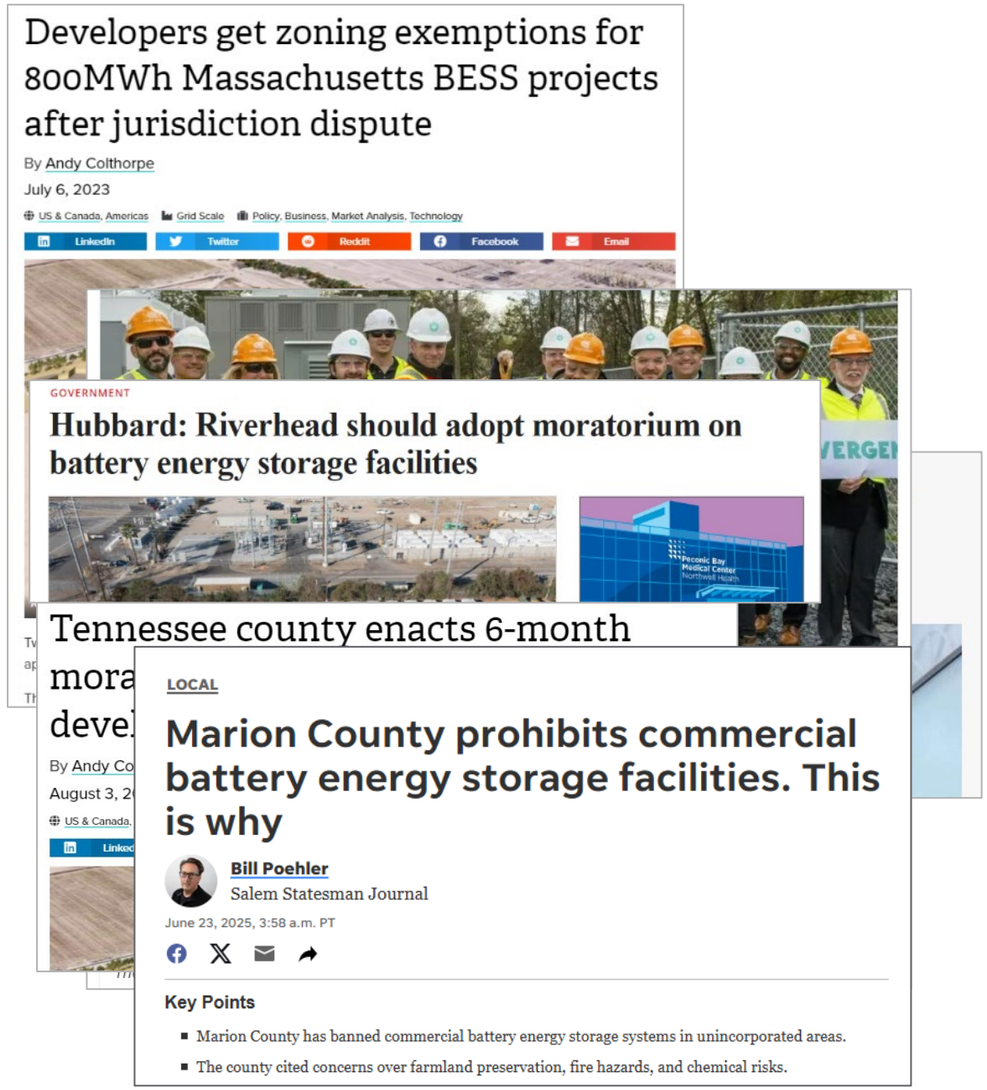
Agenda

- Introduction and context
- Siting and permitting landscape
- Trends and challenges
- Local zoning principles for energy storage
- Planning considerations
- Q&A

Permitting for Energy Storage Projects: Context and Challenges

- The modular nature of battery energy storage systems (BESS) means projects may be built near other existing land uses, unlike other energy infrastructure.
- Planning officials may face uncertainty about reasonable zoning decisions about emerging technologies that balance safety, local impacts, and other goals.
- In some states, unclear jurisdictional authority between state and local bodies can create uncertainty.
- Permitting challenges have led to project delays or withdrawals in some areas.
- Local concerns have spurred moratoria or bans on energy storage projects.

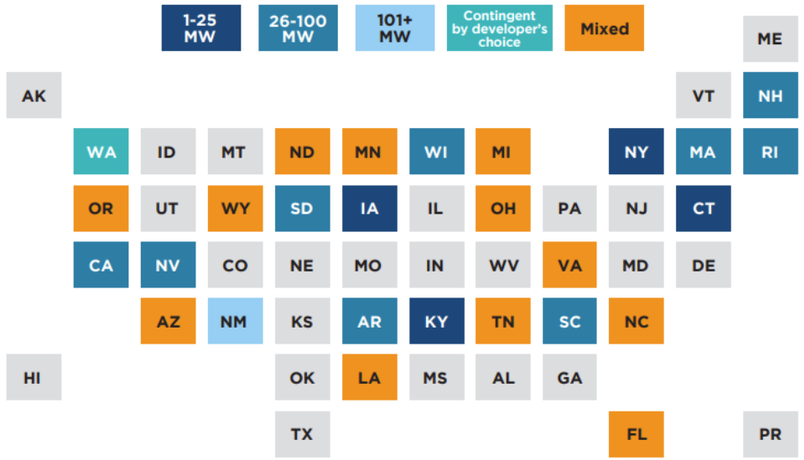


Permitting Pathways for Energy Storage

- Securing permits and ensuring compliance with all zoning codes and regulations is a necessary step for any energy project.
- Permits may be required at the state or local level, or both, depending on the location, project type, and project size.
- State authority may be held by public utility commissions, a dedicated siting commission, or other agencies.
- Washington is the only state that allows developers to choose a state or local permitting pathway regardless of project size.

Principal Authority for Energy Project Permitting

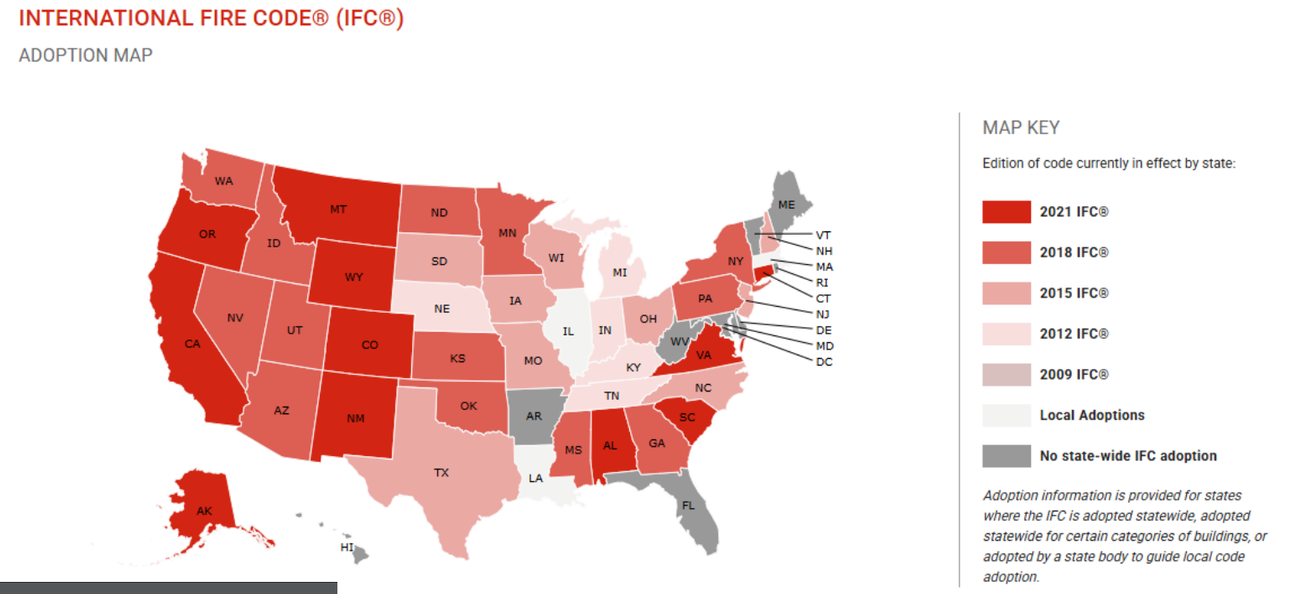
Project Threshold for States With Contingent Authority



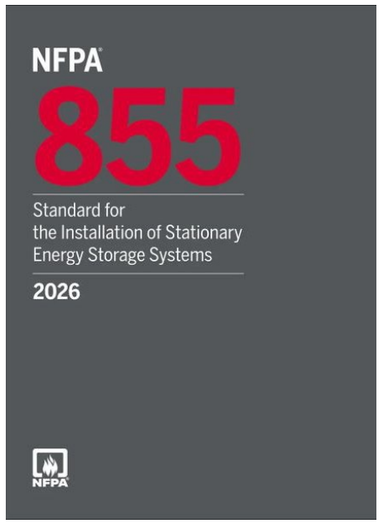
Graphics source: Laws in Order, Lawrence Berkeley National Laboratory and Regulatory Assistance Project, 2024

Role of Codes and Standards Adoption

- Adoption of current codes and standards relevant to energy storage (including NFPA 855 and current International Fire Code) can codify best practices for safe planning, construction, operations, and maintenance into permitting requirements.
- Challenges can include delays in adopting current versions and variations in state vs. local adoption authority.



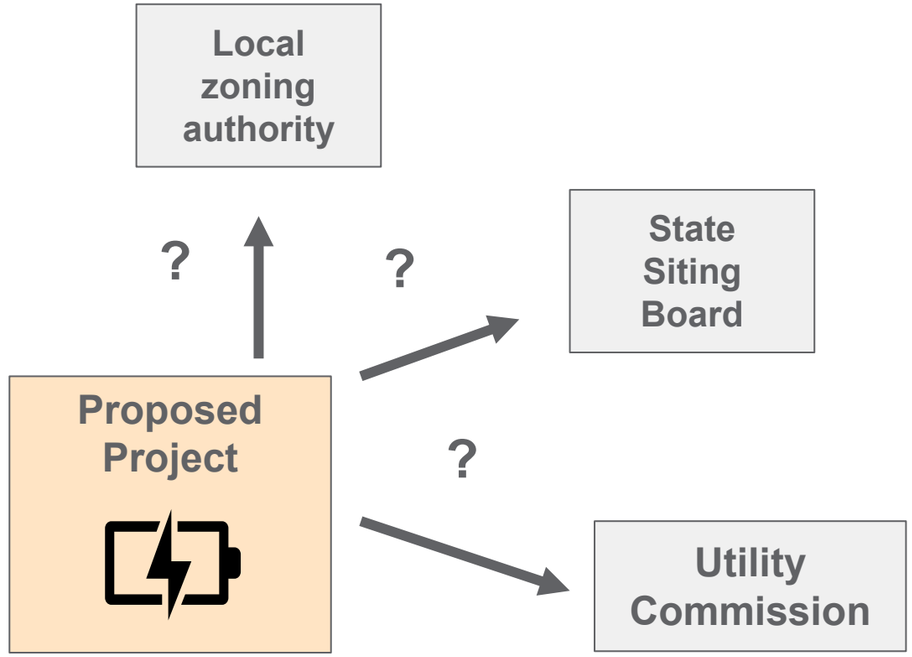
Source: IFC https://www.iccsafe.org/adoptions/code-adoption-map/IFC



IFC Chapter 12 on Energy Systems, including energy storage, was added in 2018 and updated in 2021, but some states use 2015 or earlier editions.

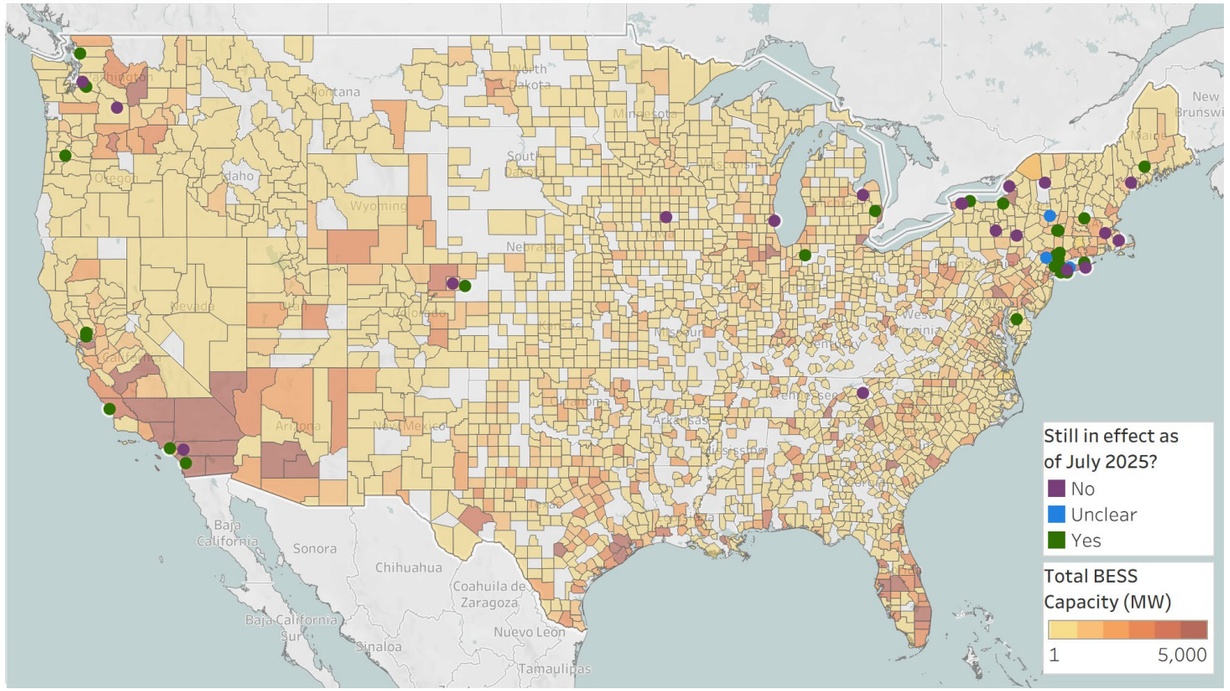
Permitting Jurisdictional Gaps: Examples

- **Rhode Island:** Lack of clarity on “major energy facility” in state statute has led to uncertainty for both developers and planners about whether energy storage projects fall under state or local authority, which led to a large project cancellation.
- **Maryland:** Shared code authority between state and local authorities has been cited as driver of uncertainty and project delays.
- **Washington:** some projects that have pursued state instead of county permitting pathways have encountered heightened local opposition.

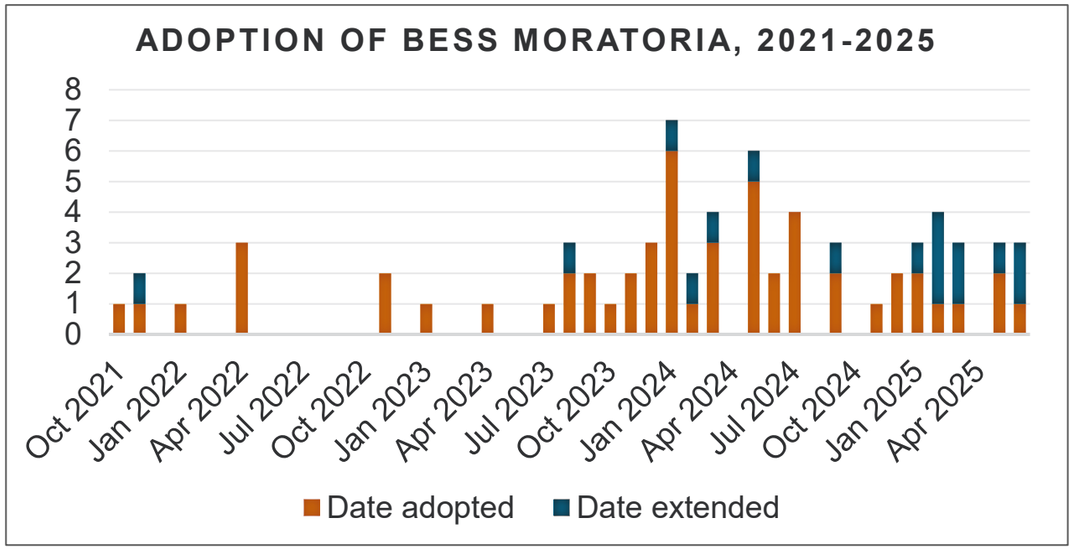


Local BESS Moratoria

Jurisdictions With Local BESS Moratoria and Installed Energy Storage Capacity in the U.S.



Source for BESS data: EIA 860M, September 2025. Total installed nameplate capacity aggregated at county level. Moratoria still in effect are as of July 2025.

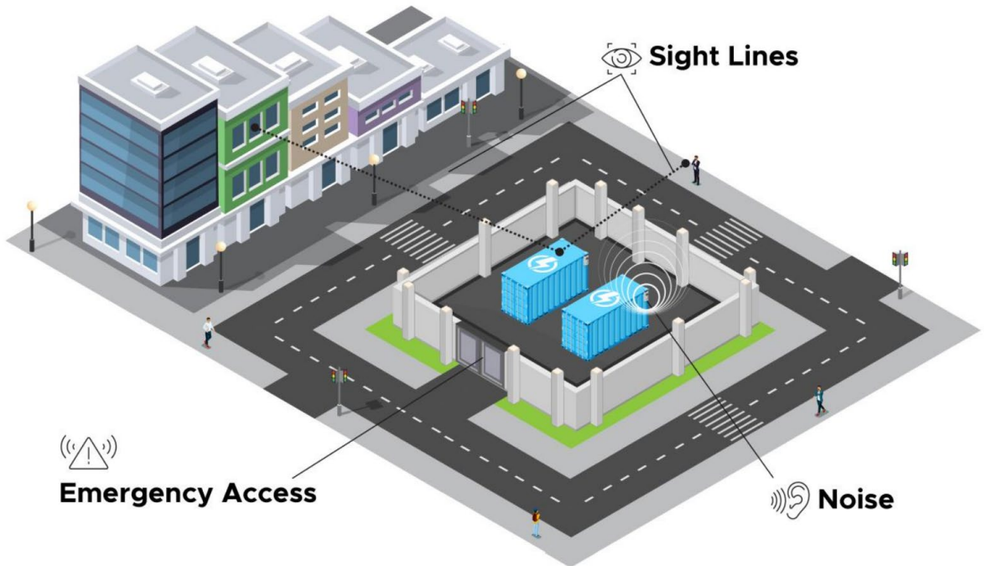


- Moratoria are commonly adopted to allow local planners the time to develop an informed zoning ordinance for BESS.
- Some are extended or adapted into bans.
- Drivers include fire safety concerns, lack of familiarity with BESS technologies, land use conflicts, and local impacts (e.g. noise, visual, natural resources).

Role of Local Zoning for Energy Storage Siting

Local zoning is key to streamlined, balanced deployment of battery energy storage systems:

- Zoning ordinances “automate” land use decisions by enabling efficient, consistent review of proposals, as opposed to requiring an extensive conditional use permit process for each project.
- Ordinances reflect local needs and preferences, helping ensure BESS are deployed in ways that align with an area’s values and maximize benefits.
- Ordinances offer an opportunity to incorporate best practices into local regulations, ensuring that energy storage deployment minimizes any risks to public health and safety.

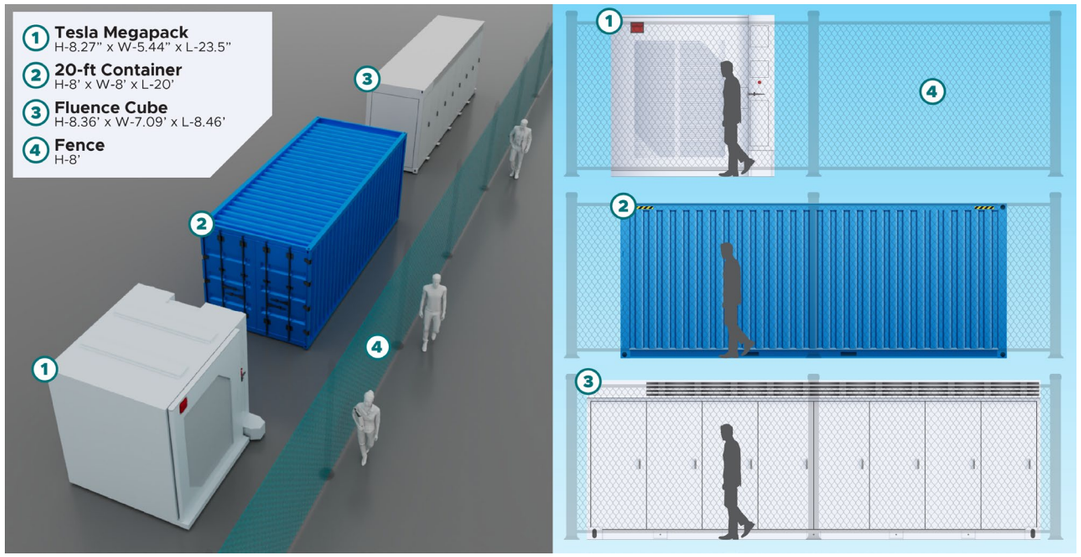


Illustrating potential local energy storage impacts and considerations for siting a utility-scale energy storage system, including visual impacts, noise, and first responder access.

Graphic source: Energy Storage in Local Zoning Ordinances, PNNL 2023

Siting Standards for Energy Storage in Local Zoning Ordinances

- **Definitions and general requirements:**
  - Definitions of BESS and other key terms
  - Size tiers or cutoffs (e.g. systems with a capacity greater than 600 kWh may only be permitted in certain zones)
  - Permitted zones for BESS (including zones permitted by right and zones that require special use permits)
- **Visual, noise, and aesthetic requirements:**
  - Property line setbacks (generally 25-100 ft)
  - Fencing and visual screening (commonly 6-8 ft)
  - Lighting (e.g. must be shielded from neighbors)
  - Noise (often set at a dBA maximum)
- **Safety and planning requirements:**
  - Decommissioning plans
  - Decommissioning funds
  - Site plan requirements
  - Other safety requirements



Visual screening requirements are common in local zoning ordinances for BESS systems. Illustrated here is an example of a standard 8-foot screening fence against common commercial BESS installations.

Graphic source: Principles and Options for Designing Battery Energy Storage Zoning Ordinances, PNNL 2026

Size Tiers or Cutoffs

- **Many ordinances set size "tiers" or cutoffs, where certain regulations or zoning restrictions apply only to larger systems.**
- New York model law defines "**Tier 1**" systems as **≤ 600 kWh**, and "**Tier 2**" systems as **> 600 kWh** (or any system using multiple battery technologies)
  - *Why 600 kWh?* Maximum allowable stored energy per space (with exceptions) in the International Fire Code, also in NFPA 855.
- **Other examples:**
  - Islip, NY – adapted NY model law by creating 3 tiers instead of 2
  - Medway, MA – Tier 1 is ≤ 1 MWh and > 10-70 kWh depending on technology
  - Whatcom County, WA – additional regulations apply to systems > 5 MW
- **Tier 2 or large systems may be:**
  - Permitted in fewer zones than smaller systems
  - Subject to additional permitting or review requirements
  - Subject to visual screening or setback requirements
- *With no tiers or cutoffs, regulations apply to systems of all sizes.*

Codes / I-Codes / 2021 International Fire Code (IFC)

Chapter 12 Energy Systems

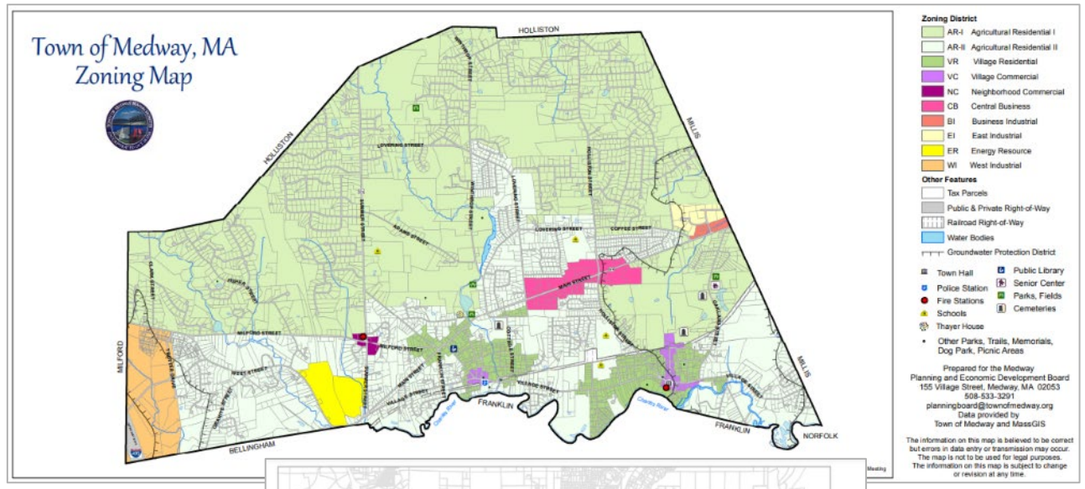
TABLE 1207.5 MAXIMUM ALLOWABLE QUANTITIES OF ELECTROCHEMICAL ESS

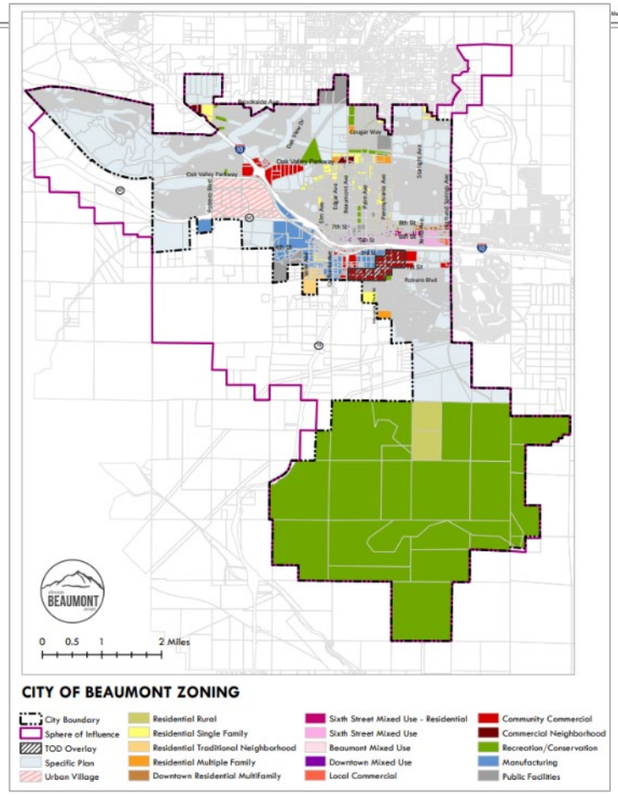
TECHNOLOGY	MAXIMUM ALLOWABLE QUANTITIES [a]
STORAGE BATTERIES	
Flow batteries[b]	600 kWh
Lead-acid, all types	Unlimited
Lithium-ion	600 kWh
Nickel metal hydride (Ni-MH)	Unlimited
Nickel-cadmium (Ni-Cd)	Unlimited
Other battery technologies	200 kWh
CAPACITORS	
All types	20 kWh
OTHER ELECTROCHEMICAL ESS	
All types	20 kWh

Graphic source: 2021 International Fire Code

Permitted Zones

- **Zones where BESS are permitted vary widely by location, as well as by system size.**
- Smaller or “Tier 1” systems may be permitted in all areas, including residential – *e.g. Johnson County, Iowa permits systems ≤ 300 kWh in all zones*
- Larger or “Tier 2” systems are generally more restricted, often to industrial, manufacturing, or energy/utility zones – *e.g. BESS in Medway, MA are permitted only in a designated “energy resource zone”*
- Areas with no tiering or cutoff language apply zoning restrictions to systems of all sizes – *e.g. Beaumont, CA allows BESS of any size in manufacturing zones only*
- Some (or all) BESS may require a special or conditional use permit to be allowed in some (or all) zones – *e.g. Virginia Beach, Virginia: BESS of any size permitted only in industrial zones, and must receive conditional use permit*





Graphics source: Town of Medway, City of Beaumont

Unique or Restrictive BESS Ordinances

- **Resource impact mitigation requirements:** Medway, MA and Amelia County, VA require impact studies and mitigation plans for any disruptions to natural, cultural, or historic resources as part of site plans.
- **Restrictive property line setbacks:** Amelia County, VA, requires 5,000-foot setbacks for all BESS. These may be reduced to no less than 1,000 feet via special permit.
- **Stringent enclosure wall or fencing requirements:** Some ordinances require very specific characteristics for fences or visual screening. For example, Beaumont, CA requires fences to made from concrete or decorative masonry and to be treated with graffiti-resistant coating.

Looking Ahead: Planning Considerations

- **Support adoption of best practice-informed zoning ordinances:** Many local officials use (or plan to use) a defined temporary moratorium period to develop a zoning ordinance for BESS. General and state-specific resources, including model ordinances, exist to support development.
- **Support adoption of current codes and standards:** Adoption of current codes and standards relevant to energy into state or local law can more efficiently ensure projects comply with best practices for safety.
- **Provide education on fire and safety:** Ongoing education and support for communities and first responders around fire risks will continue to be critical in addressing fire safety concerns that drive some jurisdictions to adopt BESS moratoria.
- **Prioritize local engagement:** Proactive and thoughtful local engagement, especially from project developers, is essential.
- **Consider state authority and roles:** In some cases, state siting bodies may have the authority to step in to supersede local restrictions or moratoria. Tradeoffs should be considered with this approach.

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Thank you

Devyn Powell
devyn.powell@pnnl.gov
(509) 375-6543