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# STAFF REPORT

Date: June 9, 2026  
To: City Council  
From: Dana Bowers, Associate Planner



## Battery Energy Storage Systems

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### 1. Request

Staff requests that the City Council review and direct staff on considerations for battery energy storage systems to inform potential amendments to Tumwater Municipal Code (TMC) Title 18 *Buildings and Construction* and TMC Title 18 *Zoning*.

### 2. Background

Battery energy storage systems store electricity for later use, helping manage peak demand and maintain power during outages. These systems are increasingly used by utilities to stabilize and support the reliability of the electrical grid. They vary widely in scale, from small residential systems to larger facilities that support regional grid infrastructure.

The battery energy storage system industry is experiencing rapid growth due to decreasing battery costs and increasing electricity demand. As a result, regional utilities have asked local jurisdictions, including Tumwater, to amend their development regulations to allow these systems where appropriate. TMC Title 18 *Zoning* does not allow battery energy storage systems.

The intent of this scoping effort is to establish clear parameters for developing regulations that could allow systems of varying sizes in appropriate zone districts, while ensuring compatibility with surrounding uses and protecting public health and safety.

In addition to potential private utility projects, Tumwater is also exploring the use of battery energy storage systems to support critical public facilities. The Tumwater Police Station, Tumwater Fire Hall and Tumwater Library have been identified as facilities where maintaining power during emergencies would be essential for providing safe shelter and ensuring continuity of operations during power disruptions.

### **3. Federal, State and Local Guidance**

Development and regulation of battery energy storage systems are addressed through a combination of international standards, federal regulations, state codes, and local land use regulations. Projects in Washington state must comply with requirements across all applicable levels.

#### **Federal Regulations and Standards**

Federal standards govern the safety, installation, and operation of battery energy storage systems:

- National Fire Protection Association Guidance 855 establishes safety standards and is recognized as an approved standard in Washington state. The current edition is from 2023 with an update expected in 2026.
- Environmental Protection Agency regulations address hazardous materials management, spill prevention and cleanups, and environmental protection, especially for lithium-ion batteries. The Environmental Protection Agency provides guidance on installation and incident response ([Sustainable Management of Electronics and Batteries](#)), along with additional resources on its website.
- The National Electrical Code regulates wiring, grounding, and safe connections to the electrical grid.
- Occupational Safety and Health Administration regulations address worker safety during installation, operation, and maintenance.
- American National Standards Institute Z535 establishes standards for safety signage and labeling, supporting Occupational Safety and Health Administration and fire code requirements.

#### **Washington State Regulations**

Washington State regulations apply additional safety and operational standards to battery energy storage systems:

- The Washington State Fire Code, which adopts the International Fire Code, includes provisions for lithium-ion battery storage.
- The Washington State Building Code contains additional provisions governing lithium-ion battery storage.

- The Washington State Energy Code is currently under review by the State Building Code Council to include updated standards for solar and battery energy storage systems.
- The Washington State Department of Ecology establishes maximum environmental noise levels through WAC 173-60-040. These standards apply to all uses and are codified in TMC 8.08 *Noise Control*.
- The Washington State Labor & Industries regulates worker safety and electrical work associated with high-hazard energy systems.
- The Washington State Energy Facility Site Evaluation Council reviews new applications and oversees construction, operation, decommissioning and site restoration for approved energy facilities.

## Other Jurisdictions

Thurston County has been working with building and fire officials' jurisdictions in the county to develop a model ordinance addressing battery energy storage systems. That model ordinance is still under development with some considerations, such as sizing tiers, yet to be determined. Further regional discussions are not currently planned, as jurisdictions may adapt the model code to fit their local context. This approach provides a regional framework while allowing discretion for local land use considerations, such as setbacks, siting, noise, and compatibility with surrounding uses.

The current status of code updates in other jurisdictions in Washington is as follows:

- Olympia is planning to update its regulations, although the timeline is unclear.
- Lacey has not included this work in its current work plan but may revisit this issue in 2027.
- Thurston County may defer additional code development until late 2026 or 2027 as it currently has a permitting pathway in place.
- Sumner and Arlington, which are similar sized cities in Washington State, have adopted battery energy storage system standards that were reviewed to inform potential alternatives.

## City of Tumwater Policies and Regulations

### Comprehensive Plan

Several goals and policies in Tumwater's Comprehensive Plan provide the framework for developing regulations addressing battery energy storage systems:

- Land Use Element, which directs compatible land uses.

- Goal LU-2:

*Ensure development occurs in an orderly, effective, and cost-efficient manner to best utilize available land and public services, conserve natural resources, protect and enhance critical areas and open space, address equity and climate change, and reduce sprawl.*
- Policy LU-6.1:

*Ensure development conforms with environmental standards and requirements.*
- Policy LU-7.2:

*Explore and implement methods to protect residential uses from excessive noise, odors, dirt, glare, traffic, pollution, and other nuisances emanating from regional transportation facilities and commercial and industrial uses.*
- Climate Element, which promotes energy resilience and expansion of renewable energy systems.
  - Goal CL-5:

*Expand the use of on-site renewable energy technology (e.g., solar photovoltaics, battery storage, etc.) across all building types through providing funds, code changes, and educational programs.*
  - Policy CL-5.1:

*Increase the production and storage of local renewable energy.*
  - Policy CL-9.2:

*Plan energy infrastructure to be able to integrate with an increase in renewable energy sources, including increasing energy storage capacity to improve energy grid resilience.*
- Utilities Element, which encourages coordination with private utilities and supports adoption of clean energy technology.
  - Goal U-1:

*Promote efficiency when planning for and siting private utilities.*
  - Policy U-1.1:

*Coordinate with private utility providers to allow utilities to meet anticipated demand.*
  - Policy U-1.3:

*Locate private utility facilities near compatible adjacent land uses.*

- Goal U-2:

*Support enhancement of electricity generation, distribution, monitoring, and storage infrastructure serving Tumwater that uses clean technologies and practices.*

- Policy U-2.1:

*Monitor system or grid-scale energy storage innovations and use the experiences of communities that begin to deploy them to inform updates to Tumwater codes and permitting.*

### **TMC Title 8 Health and Safety**

TMC Chapter 8.08 *Noise Control* establishes maximum environmental noise levels within designated areas of the City to minimize exposure to the harmful physiological and psychological effects of excessive noise. TMC 8.08.040 sets limits on public disturbance noise consistent with the maximum environmental noise levels established in WAC 173-60-040, as noted above.

### **TMC Title 15 Buildings and Construction**

TMC Chapter 15.04 *International Building Code* and TMC Chapter 15.16 *International Fire Code* adopt these codes as amended by the State with limited local amendments.

### **TMC Title 18 Zoning**

TMC Title 18 *Zoning* defines “energy systems” and “solar energy system” as follows:

*TMC 18.04.050 E Definitions*

*“Energy systems” means those systems which serve to produce energy from nondepletable energy sources.*

*A. These sources of energy (excluding minerals) are derived from:*

- 1. Incoming solar radiation, including, but not limited to, natural daylighting and photosynthetic and photovoltaic processes;*
- 2. Energy sources resulting from wind, waves and tides, lake or pond thermal differences; and*
- 3. Energy derived from the internal heat of the earth, including nocturnal thermal exchanges.*

*B. Neither natural gas, oil, coal, liquefied petroleum gas, nor any utility-supplied electricity shall be considered a nondepletable energy source. (See “solar energy system,” TMC 18.04.180.)*

TMC 18.04.180 *S Definitions:*

*Solar Energy System.*

*A. “Solar energy system” means any device or combination of devices or elements which rely upon direct sunlight as an energy source, including, but not limited to, any substance or device which collects sunlight for use in:*

- 1. The heating or cooling of a structure or building;*
- 2. The heating or pumping of water;*
- 3. Industrial, commercial, or agricultural processes; or*
- 4. The generation of electricity.*

*B. A solar energy system may be used for purposes in addition to the collection of solar energy. These uses include, but are not limited to, serving as a structural member or part of a roof of a building or structure and serving as a window or wall. (See TMC 18.04.050.)*

Currently, battery energy storage systems are not allowed in TMC Title 18 *Zoning*. “Energy systems” that produce energy from nondepletable sources are permitted outright and as an accessory use in the ARI Airport Related Industry zone district and as an accessory use in the ARI Airport Related Industry, BD Brewery District, CS Community Services, GC General Commercial, LI Light Industrial, and RSR Residential/Sensitive Resource zone districts.

Height limitations in TMC Title 18 *Zoning*, except those related to imaginary airspaces, do not apply to energy systems.

TMC Title 18 *Zoning* incentivizes the use of energy systems in planned unit developments (TMC 18.36.010(B)(5)).

## **4. Analysis**

As noted above, TMC Title 18 *Zoning* does not currently allow battery energy storage systems. With the adoption of the 2025 Comprehensive Plan, Tumwater has several goals and policies which support and encourage battery storage facilities to expand opportunities for energy storage at all scales and improve the resilience of the electrical network.

To align development regulations with Comprehensive Plan goals, staff recommend reviewing the considerations below.

## Considerations

Regulate battery energy storage systems based on the following:

- Energy storage capacity and use;
- Physical scale of the facility; and
- Whether is an accessory use to a primary use or is the primary use on a property.

### Energy Storage Capacity and Use

At the national, state, and local levels, battery energy storage systems are regulated based on their energy storage capacity, measured in kilowatt hours (kWh) or megawatt hours (MWh). These systems consist of smaller components that can be combined to achieve a wide range of capacities. The most common systems currently use lithium-ion technology. Code recommendations for Tumwater should be based on standards applicable to lithium-ion batteries, while recognizing that updates may be needed as technologies evolve.

Accessory systems serving homes are limited in capacity. Federal and state fire codes limit individual units to 20 kWh, with spacing requirements and specific standards for placement within a residence. These codes also limit installations to 40 kWh inside a home and 80 kWh when installed in a garage, detached structure, or mounted on an external wall. These systems are commonly used for demand response, backup power during outages, and electric vehicle charging. They are inspected by Washington State Labor & Industries for compliance with state fire, building, and electrical codes.

Battery energy storage systems serving businesses or community facilities, such as libraries or community centers, have different capacity needs. For non-residential buildings, federal and state fire codes allow systems up to 600 kWh per site without additional fire testing or hazard and decommissioning plans. These systems can support community functions, including emergency shelter, heating and cooling centers, and emergency response services. While larger in scale, allowing them as accessory to non-residential development can align with the scale and character of other permitted uses.

Primary-use, utility scale systems typically exceed 600 kWh. These systems support the electrical grid and provide demand management. As electricity demand increases, battery energy storage systems at this scale are expected to play a role in reducing greenhouse gas emissions.

### Physical Scale of the Facility

#### *Small Residential Scale Systems (0 – 80 kWh)*

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Battery energy storage systems associated with residential use (0 – 80 kWh) can range from the size of a gym bag to a refrigerator. At this scale, they typically do not change the look or feel of a site, are often located within a structure, and may be mounted on an external wall similar to an electrical panel. These systems are reviewed under existing electrical, building, and fire codes.

### ***Medium Scale Systems (0 – 600 kWh)***

For systems associated with non-residential uses (0 – 600 kWh), larger systems are expected, ranging from the size of a refrigerator to the size of a shipping container approximately eight to twelve feet tall. These systems are typically enclosed in metal housing to protect them from weather and to allow for proper ventilation and may resemble utility transformers. Large metal enclosures may not be compatible with community goals for urban design in some areas and may require screening.

### ***Utility Scale Systems (over 600 kWh)***

Primary use battery energy storage systems (over 600 kWh) have a larger footprint and may characteristics that affect nearby land uses. These facilities are often located near substations or transmission lines and require additional site analysis, fire suppression equipment, and testing in accordance with National Fire Protection Association 855. They also require buffering from adjacent uses, screening, emergency response fire safety planning, and decommissioning plans, and a greater consideration of visual and noise impacts.

## **Zone Districts**

Energy storage capacity and physical scale determine the appropriateness of battery energy storage systems within zone districts. Small residential and medium scale battery energy storage systems can be installed as accessory uses in most zone districts with minimal impacts to neighboring properties.

Utility scale systems require additional electrical infrastructure, such as substations and major transmission lines. At this scale, systems are more likely to impact neighboring properties and are subject to more stringent safety requirements under federal and state fire codes.

Identifying appropriate zone districts for utility scale systems requires balancing the need for essential infrastructure with the need to preserve land planned for residential, commercial, or sensitive resource uses. Environmental justice is also important to avoid siting facilities with potential hazards near areas designated for low income or affordable housing. This approach helps manage impacts while maintaining appropriate uses within each zone district.

Staff recommends conditionally allowing primary-use battery energy storage systems in zone districts where they:

- Align with the intent of the zone district in TMC;
- Are located near existing utility infrastructure;
- Do not constrain land planned for housing or employment uses; and
- Can be separated from high density, affordable housing types like apartment complexes and manufactured home parks and environmentally constrained areas.

### **Screening and Setbacks**

Battery energy storage systems vary widely in size from a gym bag to multiple shipping containers. Smaller systems approved as accessory uses in residential areas are consistent with neighborhood scale and typically require minimal screening or setbacks. These systems are often installed within a home, garage, or accessory structure. When mounted on an exterior wall or placed on the ground, they are similar in appearance to other utility equipment and are subject to Citywide Design Guidelines in the Service Areas and Mechanical Equipment sections of each chapter.

Medium scale systems have larger energy capacities and greater potential impacts on neighboring properties. Setbacks for these systems would follow International Fire Code Sections 1207.5.7 and 12.07.8.3. Flammable vegetation must be cleared within ten feet and units must be set back at least ten feet from property lines, buildings, stored combustibles, and other hazards. Screening provisions in the Citywide Design Guidelines (Service Areas, Utilities, and Mechanical Equipment) should be used to mitigate visual impacts and may include shelters or additional screening.

Utility-scale systems may consist of one or more containerized units resembling 8 to 12 foot tall shipping containers on concrete pads. National Fire Prevention Association Guidance 855 requires systems over 600 kWh to be enclosed with a minimum seven-foot tall, self-locking security fence to prevent unauthorized access. Setbacks beyond those required by the International Fire Code are determined by the jurisdiction and range from ten to 1,000 feet. One approach is to apply setbacks like those for compatible uses, such as substations, with increased setbacks, potentially double, along property lines adjacent to incompatible uses, such as residences.

For all energy storage systems, fire risk is a key consideration. Fire-wise landscaping and screening materials should be used to reduce risk and improve compatibility with surrounding uses.

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## Fire/Thermal Runaway

Thermal runaway is a condition in which increasing temperature within a battery cell triggers a chain reaction, releasing more energy and causing further temperature spikes that can lead to fires or explosions. While these incidents receive significant public attention, they are rare relative to the number of installations.

The National Fire Prevention Association establishes safety standards for battery energy storage systems. For systems exceeding 600 kWh, the standard requires:

- Hazard mitigation analysis;
- Fire suppression systems;
- Fire and explosion testing;
- Emergency response planning; and
- Annual training for maintenance staff.

Small residential scale battery energy storage systems are limited to 20 kWh per installation location under the International Fire Code. A single residence can have up to four installation locations, not to exceed 80 kWh per home.

The Tumwater Fire Chief has expressed concerns regarding the safety and emergency response preparedness for all battery energy storage systems. For systems under 80 kWh, a notification system is recommended, as lithium-ion battery fires are not typically extinguishable with water. To ensure the Fire Department is aware of system locations, staff have requested historic and ongoing data sharing between the Washington Department of Labor & Industries and the City.

For systems over 600 kWh, the Fire Department would be involved in project review and would evaluate whether appropriate training, equipment, and pre-incident planning are in place. If training gaps exist, project approvals could require third party review until fire and planning staff are trained.

For utility-scale primary use systems, dedicated-use buildings may be part of the site plan. To support on-site personnel and to ensure safety during emergencies, standards could allow up to ten percent of a dedicated-use building for accessory functions, provided egress is available without passing through hazard areas near storage units.

Another safety consideration relates to fire fighter access. While National Fire Protection Agency Standard 855 provides standards for spacing to facilitate emergency responder access, there are concerns about fires emanating from sources in basements. Locating battery energy storage systems in basements increases risk to emergency responders. Removing this risk still allows applicants to place units in their home, but limits placement to include the potential for structural

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failure during a fire. Limiting placement to more accessible areas would reduce this risk while still allowing installation within residential structures. Requiring signage that identifies structures with battery energy storage systems would also help emergency responders prepare for the incident.

## **Safety**

Battery energy storage system failures for utility-and medium-scale systems are monitored and tracked in the Electric Power Research Institute's Battery Energy Storage System Failure Incident Database. EPRI defines a failure incident as an occurrence which results in increased safety risk, caused by a BESS system or component failure. Publicly available global data has been collected and analyzed for this system since 2011.

As of May 2024, a total of 108 incidents globally has been reported in the database. The failure rate was approximately 1.5 incidents per deployed GWh in 2018 and declined to less than 0.1 incidents per GWh in 2024. The majority of system failures in the United States were attributed to system over 5MWh in capacity.

In 2019, a fire in Surprise, Arizona, injured four firefighters and prompted increased investigation into public safety risks associated with battery energy storage systems. To date, no deaths in the United States have been attributed to battery energy storage systems.

US Environmental Protection Agency monitoring of incidents reported in the United States found that contaminants remained below acceptable thresholds. Additional concerns regarding post-incident clean-up, include re-ignition risks and structural damage that can complicate site remediation.

## **Noise**

Medium and utility-scale battery energy storage systems may generate noise from inverters, transformers, and heating, ventilation, and air conditioning systems. Studies of existing primary-use systems indicate noise levels ranging from 38 to 59.8 dB(A) at the property line. For comparison, sustained exposure above 80-100 dB(A) may cause hearing damage according to the Yale Environmental Health & Safety and the U.S. Center for Disease Control.

Based on available information, noise levels from battery energy storage systems are generally below levels associated with hearing risk and within the limits set by TMC Chapter 8.08. Staff do not recommend additional noise regulations. However, staff recommend buffering and vegetative screening as described below to reduce sound transmission between medium and utility use battery energy storage systems and adjacent residential uses.

## Decommissioning

The Washington State Fire Code (WAC 51-54A-1207.2.1(12)) requires a decommissioning plan for medium and utility scale battery energy storage systems. The decommissioning plan must describe procedures for safely shutting down and removing equipment, with notification provided to code officials prior to decommissioning. Additional options could include requiring recycling of electronic materials. Requiring a bond would retain funds to carry out the decommissioning plan, regardless of the financial condition of the operator.

Ownership may change during the life of the system. Staff recommend requiring new owners to assume obligations established in the approved plans. Compliance can be verified through existing annual fire inspections.

## 5. Options

To allow battery energy storage systems in Tumwater, there are two broad policy choices for the City Council to consider:

- A. **Amend TMC Title 15 *Building and Construction* and Title 18 *Zoning* to allow battery energy storage systems** subject to safeguards addressing identified safety, siting, and compatibility considerations, or
- B. **Do not amend municipal codes.** Permitting would continue under applicable Washington State Labor and Industries standards and through the WA State Energy Facility Site Evaluation Council process. This option would not prohibit battery energy storage systems, but would rely on state permitting requirements rather than additional local standards.

### Option A

Model codes for battery energy storage systems are available and could be adapted to address Tumwater’s local requirements and development standards. Below is a summary of preliminary changes to the Tumwater Municipal Code that could guide the development of these systems.

Table 1. Option 1 Policy Recommendations.

Name	Residential Scale BESS	Medium Scale BESS	Utility Scale BESS
Capacity	0 - 80 kWh	0 - 600 kWh	>600 kWh
Allowed Uses	Accessory to residence	Accessory to non-residence	Accessory to non-residence or primary use

Name	Residential Scale BESS	Medium Scale BESS	Utility Scale BESS
<b>Land Use Approval</b>	NFPA 70 and L&I inspections. No land use approval required – exempt from site plan review. No units allowed in basements.	NFPA 70 and L&I inspections. Required land use approval for site plan review. No units allowed in basements.	NFPA 70 and L&I inspections. Conditional Use Permit. No units allowed in basements.
<b>Zoning</b>	Allowed in all zone districts only as an accessory to residential uses.	Allow in all zone districts only as an accessory to non-residential uses.	Not allowed in MHP Manufactured Home Park, HDR High Density Residential, GB Green Belt, OS Open Space, GC General Commercial, and RSR Residential/Sensitive Resource zone districts.
<b>Setbacks</b>	Detached or external facilities will meet current setbacks and NFPA 70 installation requirements.	International Fire Code-1207.5.7 vegetation removal within 10 feet. International Fire Code 1207.8.3 10-foot setbacks from property line.	Modify current utility substations code TMC 18.42.060 to address battery storage facilities: 30 feet front, 20 feet side, 20 feet back. Require double the setback on property lines with adjacent residential.
<b>Screening</b>	Follow Citywide Design Guidelines and TMC Title 18 <i>Zoning</i> . No vegetation buffer required.	Follow Citywide Design Guidelines and TMC Title 18 <i>Zoning</i> . Fire-wise vegetated buffer. Visual screening complies with pedestrian scale design in subarea plans or Citywide Design Guidelines.	Follow Citywide Design Guidelines and TMC Title 18 <i>Zoning</i> . Firewise vegetated buffer. Visual screening complies with zone district requirements for impervious surfaces and open space.
<b>Fencing</b>	No fence required.	No fence required.	National Fire Protection Association Standards.
<b>Decommissioning</b>	No requirements.	Electronics waste recycling required.	Require decommissioning plan, bonding, and electronics waste recycling.
<b>Fire Safety</b>	National Fire Protection Association requirements, Labor & Industries permits and inspects.	National Fire Protection Association requirements. Labor & Industries permits and inspects. Fire Marshal or designee to review and approve.	National Fire Protection Association requirements. Labor & Industries permits and inspects. Fire Marshal or designee to review and approve. Develop emergency management plan with the Fire Department.

Name	Residential Scale BESS	Medium Scale BESS	Utility Scale BESS
Noise	May not exceed limitations in TMC <b>8.08.040</b> .	May not exceed limitations in TMC <b>8.08.040</b> .	May not exceed limitations in TMC <b>8.08.040</b> .
Lighting	As in Citywide Design Guidelines.	As in Citywide Design Guidelines.	As in Citywide Design Guidelines.
Building Use	Not applicable.	Not applicable.	Allow 10% of buildings for administrative and Operations & Maintenance, provided egress is available without traversing battery energy storage system units.
Ownership Changes	Not applicable.	Not applicable.	Ownership changes require written agreement to assume obligations. Reported with annual fire inspections.

Option A would allow Tumwater to review and approve all three tiers (residential, medium and utility scale) of battery energy storage system applications. Municipal regulations may also be equal to or more stringent than state regulations. For example, the Tumwater Fire Chief has requested that battery energy storage systems be prohibited in basements and that signage be placed on electrical meters indicating the presence of a battery energy storage system to assist emergency responders.

**Option B**

If City Council chooses Option B and does not update the Tumwater Municipal Code, residential battery energy storage systems would continue to have a permitting pathway under the Washington State Department of Labor and Industries. Permit review and approval would not be at the discretion of local authorities.

Under Option B, residential, and medium- and utility battery energy storage systems would also have a second permitting pathway through the Energy Facility Site Evaluation Council. This process includes local representation, but final approval is not at the discretion of local authorities.

In sum, Option A would allow Tumwater to establish and enforce local permitting, safety, and development standards for battery energy storage systems that are equal to or more restrictive than state regulations, while Option B would rely on existing state permitting pathways where final approval is not at the discretion of local authorities.