

*Kitsap Non-Wires Alternatives RFP:*

# Exhibit C. BESS Requirements

## *Key BESS Requirements*

Battery Energy Storage System submittals for the Kitsap Non-Wires Alternatives RFP must adhere to the requirements listed below and if certain standards cannot be met, the Respondent will need to address them to PSE. If the project is selected to proceed, further information in regard to study reports, calculations, inverter behavior, battery characteristics, etc., shall be requested for analysis as PSE moves forward with its study process.

### **Requirements**

PSE's key requirements for BESS projects are bulleted below, with details provided in the following paragraphs.

- Seismic
- Physical Characteristics
- Fire Protection
- Site Controller
- Remote Operations

### **Seismic**

- The structural and nonstructural components of all enclosures, free standing structures, and structural equipment supports shall be designed and constructed to withstand the effects of earthquake motions and seismic loading in accordance with the requirements of the State of Washington Building Code and ASCE 7-16 with supplements No. 1 & 2, and adhering to the site-specific geotechnical report provided by PSE with the following parameters:
  - Risk Category IV
  - Seismic Design Category D
  - Site Soil Class D, unless otherwise determined by the Geotechnical Engineer
  - Importance Factor is 1.5
- All material, methods and equipment shall be designed to the 'High Seismic Qualification Level' in accordance with IEEE 693 Standard.
- Supplier shall provide typical anchorage drawings and indicate if anchorage is included in their scope of supply

**EXHIBIT C: BESS Requirements*****Physical Characteristics***

The BESS shall meet all applicable Occupational Safety and Health Administration (OSHA), National Electric Code (NEC), National Electrical Safety Code (NESC), IEEE, ANSI, and National Fire Protection Association (NFPA) requirements for electrical and fire safety.

The BESS shall be designed to minimize footprint and volume. The BESS may also be designed to include subsurface components or modules, provided relevant operating and environmental factors normally addressed for submersible equipment are considered to assure full life-cycle performance requirements are met.

The BESS components located outdoors shall be contained within weatherproof, tamper resistant, metal enclosures suitable for mounting outdoors on concrete foundations with a minimum NEMA 3R rating.

The enclosures shall be rust-resistant.

Any enclosures shall be dust tight to at least the NEMA 3R rating, except as designed to allow forced air exchange with the atmosphere. Screen vents with metal screens to prevent ingress of insects and rodents. Plug conduits with duct seal for same as well as water ingress.

The BESS shall be designed to operate with minimal maintenance for the specified life of the Project. A nameplate shall be provided including:

- Manufacturer Name
- Connection diagram
- BESS ratings; Power, energy, voltage, BIL
- Specimen data; serial number, date of manufacture
- The nameplate shall meet the requirements of IEEE C57.12.00

All necessary safety signs and warnings as described in ANSI Z535-2002 (entire series from Z535.1 through Z535.6) shall be included on the building, shelter or each enclosure. All necessary signs and warnings for identification of hazardous materials as described in NFPA 704 shall be included on the building, shelter or each enclosure. All necessary signs and warnings as required by CFC 608, as applicable, shall be included.

## EXHIBIT C: BESS Requirements

**Fire Protection**

The Supplier shall provide fire protection system for the complete BESS system in accordance with NFPA 855 “Standard for the Installation of Stationary Energy Storage Systems” and the latest approved revision of the applicable local fire protection codes. All designs shall include a Hazard Mitigation Analysis, (HMA). All HMA’s shall consist of equipment-specific Failure Mode and Effects Analysis (FMEA) and site-specific Fire Risk Assessment (FRA). All designs shall have the approval of the AHJ. State and local laws, codes, and/or regulations specific to BESS shall apply.

The Supplier shall comply with NFPA coordination, design, installation, commissioning, testing, training and startup requirements. This shall include all other requirements as outlined in this specification. Fire Protection system design shall include, but not be limited to, the following:

- The Supplier shall possess a completed Large Scale Fire Testing of the proposed BESS in accordance with UL 9540A as required by the NFPA 855 Code. The supplier shall provide the approved test results, along with the required separation distances, per the testing completed.
- The Supplier shall provide the completed Hazard Mitigation Analysis for the proposed BESS as required by Section 4.14 of the NFPA 855 Code.
- The battery container design shall be in accordance with NFPA requirements for location, separation, materials of construction, ventilation, smoke or flammable conditions detection, fire suppression, communications/alarms, training, commissioning, permitting, and documentation.
- The Supplier shall perform an explosion study based on data from UL9540A testing to develop the Explosion Control mitigation design. The Supplier shall provide all design data used in the design.
- The Supplier will provide the potential combustion products and quantities for the batteries selected to be used with the BESS system.
- The Supplier shall provide a price for a lithium-ion battery fault detector utilizing an off-gas sensing system that will detect off-gassing at the cell level. This system shall be integrated into the Supplier’s control system and/or site controller.

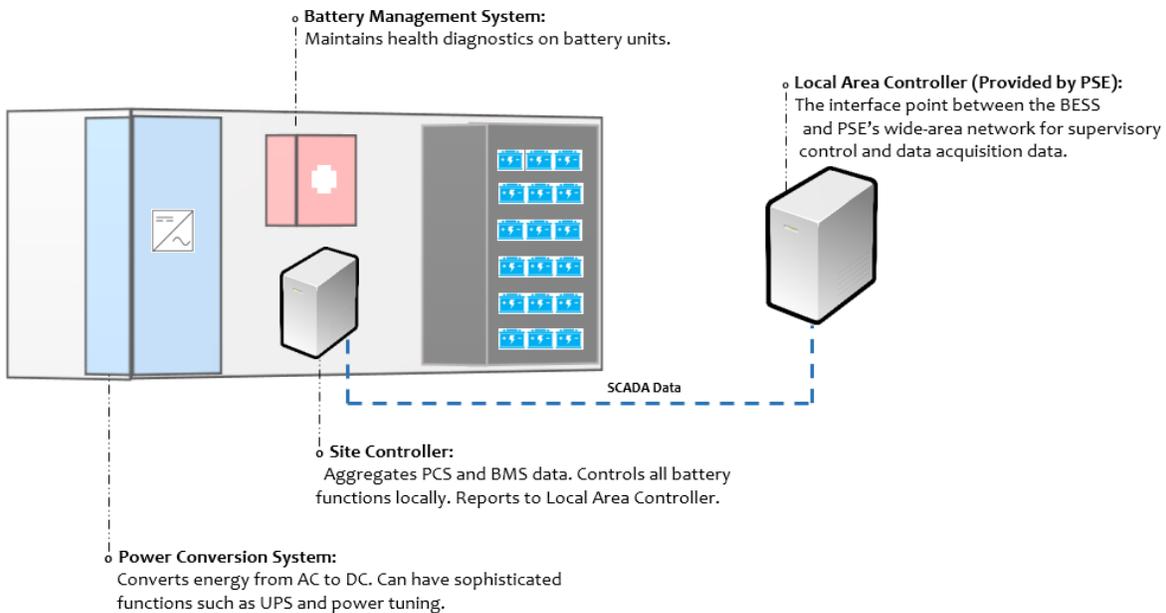
EXHIBIT C: BESS Requirements

**Site Controller (SC)**

The BESS shall include all necessary software applications and supporting hardware required to meet the specified functional requirements. Software algorithms, external data input capabilities, and user interfaces shall provide for specified variable input or set point values, as well as external data value streams required from the Owner’s Local Area Controller directing the BESS operations.

The BESS shall include the necessary communication and telemetry hardware, and support communications protocols, to effectively provide the required services. No single mode of failure shall result in loss of power to the control and data acquisition module. The control shall include provisions for an orderly and safe shutdown in the absence of utility power.

The SC shall use DNP/IP, NGVL, IEC 61850 MMS/Goose protocol to interface with Owner's Local Area Controller. All passwords and settings shall be turned over to the Owner after completion of the project, The Owner’s preference of a Site Controller is a SEL-3555 RTAC platform on an SEL Axion chassis.



**EXHIBIT C: BESS Requirements*****Remote Operations***

The BESS shall provide a single interface with which the Owner can communicate. All commands, feedbacks, information, statuses, and alarms from all system components or subsystems (fire suppression and/or HVAC included) shall be conveyed via DNP/IP, NGVL, or IEC 61850 MMS/GOOSE connection from the SC to the Owner's Local Area Controller. Single interface must have a minimum of four fiber ports and four copper ports or a network switch (Cisco IE4XXXX family) which provides the specified number of ports. Refer to the diagram below to illustrate the control concept.

The SC shall be able to respond to manual commands that are issued remotely by an external supervisory controller using DNP/IP, NGVL, or IEC 61850 MMS/GOOSE protocol. Commands sent to the SC may come from other applications within a larger Distributed Energy Resource hierarchy.

The BESS shall remain functional in the absence or loss of communication from the remote controller. The BESS shall continue its current mode of operation and follow commands for the last available set points for a user definable time period (15-minute default). On expiration of the time, the BESS shall maintain current state of charge.

During an interruption to communications, the remote controller will make repeated attempts to re-establish communications at a set time interval (default of 5 minutes). When communications have been re-established, the BESS and remote controller shall make any necessary updates to resume performance.

A "Local/Remote" control function shall be provided as a manual switch so that the operator may allow or inhibit remote commands. The SC shall log the source of each command (i.e., HMI/Operator Name, Remote). The source of the current active command shall also be displayed in the HMI.

## EXHIBIT C: BESS Requirements

## Applicable Codes &amp; Standards

<b>ANSI/IEEE C2</b>	National Electric Safety Code
<b>IEEE 519</b>	IEEE Recommended Practices and Requirements for harmonic Control in Electrical Power Systems
<b>IEEE 1547-2018</b>	IEEE Standard for Interconnecting Distributed Resources with Electric Power Systems
<b>IEEE 1547.1</b>	Standard Conformance Test Procedure for Equipment Interconnecting Distributed Resources with Electric Power Systems
<b>IEEE 1547.2</b>	Interconnecting Distributed Resources with Electric Power Systems
<b>IEEE 1547.3</b>	Guide for Monitoring, Information Exchange, and Control of Distributed Resources Interconnected with Electric Power Systems
<b>ANSI Z535</b>	Product Safety Signs and Labels
<b>ANSI C57/IEEE</b>	Transformer Standards, whenever applicable
<b>ANSI C37/IEEE</b>	Surge withstand capabilities, whenever applicable
<b>UL 1642/IEC 62133</b>	Applicable sections related to battery cell safety, where applicable
<b>UL 1741</b>	Standard for Inverters, Converters, Controllers and Interconnection System Equipment for Use with Distributed Energy Resources. Also, Supplemental A is to be included.
<b>NFPA 704</b>	Standard System for the Identification of the Hazards of Materials for Emergency Response
<b>UL 1778</b>	Underwriters Laboratory's Standard for Uninterruptible Power Systems (UPS) for up to 600V A.C.
<b>UL 1973</b>	Standards for Batteries for Use in Light Electric Rail Applications and Stationary Applications
<b>UL 9540/9540A</b>	Standard for Energy Storage Systems and Equipment
<b>NISTIR 7628</b>	Guidelines for Smart Grid Cyber Security
<b>NEC</b>	National Electric Code
<b>NESC</b>	National Electric Safety Code
<b>CAA</b>	Clean Air Act and Amendments
<b>CERCLA</b>	Comprehensive Environmental Response, Compensation, and Liability Act of 1980
<b>EPA</b>	Environmental Protection Agency regulations
<b>FAA</b>	Federal Aviation Administration regulations
<b>FERC</b>	Federal Energy Regulatory Commission regulations
<b>FPA</b>	Federal Power Act

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	Noise Control Act of 1972
<b>RCRA</b>	Resource Conservation and Recovery Act
<b>SDWA</b>	Safe Drinking Water Act
<b>SWDA</b>	Solid Waste Disposal Act
<b>TSCA</b>	Toxic Substances Control Act
<b>ADA</b>	Americans with Disabilities Act
<b>MBTA</b>	Migratory Bird Treaty Act
<b>CWA</b>	Clean Water Act
<b>ANSI</b>	American National Standards Institute
<b>IEEE</b>	Institute of Electrical and Electronics Engineers
<b>NEMA</b>	National Electrical Manufacturers Association
<b>ASTM</b>	American Society for Testing and Materials
<b>ASME</b>	American Society of Mechanical Engineers
<b>IEEE 1881</b>	Standard Glossary of Stationary Battery Terminology
<b>IEEE 519</b>	Recommended Practice and Requirements for Harmonic Control in Electric Power Systems
<b>IEEE 142</b>	Recommended Practice for Grounding of Industrial and Commercial Power Systems
<b>IEEE 242</b>	Recommended Practice for Protection and Coordination of Industrial and Commercial Power Systems
<b>IEEE 2030.3</b>	Standard Test Procedures for Electric Energy Storage Equipment and Systems for Electric Power Systems Applications
<b>IEEE 2800-2022</b>	Standard for Interconnection and Interoperability of Inverter-Based Resources (IBRs) Interconnecting with Associated Transmission Electric Power Systems
<b>EPRI 3002009313</b>	Energy Storage Integration Council Energy Storage Test Manual 2016
<b>IEEE 1881</b>	Standard Glossary of Stationary Battery Terminology
<b>IFC 2018</b>	International Fire Code 2018
<b>MESA</b>	Open Standards for Energy Storage
<b>NFPA 13</b>	Fire Sprinkler Systems 2019
<b>NFPA 14</b>	Standard for the Installation of Standpipe and Hose 2019