



ADDENDUM # 2

Wednesday, September 30, 2026

TO: ALL BIDDERS

Reference: SEALED BID NUMBER BTB3010: SOLAR PANELS AND BATTERIES
BID OPENING: OCTOBER 12, 2026 @ 2pm

The following information becomes a part of the specifications of the above referenced Invitation to Bid.
The following forms must be returned in a sealed envelope:

The bid date is extended to Monday, October 12, 2026 @2pm.

Bidders can bid on one item or both items.
We will award to the lowest bidder for each item.

See attached specifications documents that were left off Addendum 1.

All bidders must acknowledge receipt of this addendum in submitting their Bid. Failure to do so will be cause for rejection of Bid without further consideration.

Troy A Bacino
Assistant Director

ACKNOWLEDGMENT OF ADDENDUM

_____	_____
(bidder)	(authorized signature)
_____	_____
(address)	(printed or typed)

TECHNICAL SPECIFICATION
SECTION 26 31 13
PHOTOVOLTAIC MODULES

Half-Cell N-Type Bifacial Monocrystalline Silicon Modules
Basis of Design: SEG Solar Yukon N Series (620–640 Wp) or Approved Equal

PART 1 – GENERAL

1.1 SUMMARY

- A. Furnish crystalline silicon photovoltaic (PV) modules as specified herein for a grid-tied or hybrid solar PV system in order to support a 650kW solar array farm. The solar farm will be installed under a separate contract.
- B. Modules shall be half-cell, N-type, bifacial, monocrystalline silicon technology suitable for commercial, industrial, or utility-scale installations.

1.2 REFERENCES

- IEC 61215 / IEC 61730 – Design qualification and type approval / Safety qualification
- UL 61730 / UL 61215 – Safety and performance standards for PV modules
- IEC 62804 – Potential Induced Degradation (PID) resistance
- IEC 61701 – Salt mist corrosion testing
- IEC 62716 – Ammonia resistance
- IEC 60068 – Dust and sand resistance
- IEC 61215 – Hailstone impact resistance
- Fire Type (UL 61730) Type 29
- ISO 14001:2015, ISO 9001:2015, ISO 45001:2018
- Applicable national, state, and local electrical codes (including NEC Article 690) and utility interconnection requirements

1.3 SUBMITTALS

- Complete product data sheets and technical specifications for the proposed module
- IEC / UL test certificates and current listing reports
- Factory flash test reports for production modules (or representative samples)
- Product and linear power output warranty documents
- Manufacturer installation manual and mechanical load ratings
- Dimensional drawings showing overall size and mounting hole locations
- Evidence of USA-based liability insurance and domestic support presence (preferred)

1.4 QUALITY ASSURANCE

- Manufacturer shall be an established, vertically integrated PV module producer with demonstrated production capacity and shipping history.
- Modules shall be factory-assembled, tested, and labeled.
- Installer shall be experienced in bifacial module installation and shall follow the manufacturer's written installation instructions.

1.5 WARRANTY

- Product material and workmanship warranty: Minimum 15 years.
- Linear power output warranty: Minimum 30 years.
 - Year 1 degradation $\leq 1.0\%$ (or better as published by manufacturer).
 - Subsequent annual degradation consistent with the manufacturer's published linear warranty curve (typical residual power at end of warranty $\geq 87\text{--}88\%$ of nameplate).
- Warranty shall be transferable and backed by the manufacturer or equivalent insurance-backed coverage.

PART 2 – PRODUCTS

2.1 MANUFACTURERS

- **Basis-of-Design Product:** SEG Solar Yukon N Series (SEG-620/625/630/635/640-BTZ-BG or current equivalent model), 156-cell half-cell N-type bifacial module.
- **Acceptable Alternates:** Equal or better N-type half-cell bifacial modules that meet or exceed all performance, mechanical, electrical, and certification requirements of this Section. Substitutions require prior written approval by the Owner/Engineer.

2.2 MODULE PERFORMANCE REQUIREMENTS

- A. Cell Technology: N-type mono-crystalline, half-cut cells, multi-busbar (super multi-busbar preferred).
- B. Bifaciality: Minimum $80\% \pm 10\%$.
- C. Power Classes (select as required by design): 620 W, 625 W, 630 W, 635 W, or 640 W STC.
- D. Module Efficiency: Minimum 22.18 % (620 W class) up to 22.90 % (640 W class) at STC.
- E. Power Tolerance: 0 to +4.99 W (positive-only tolerance).
- F. Temperature Coefficients (maximum absolute values):
 - Pmax: $-0.30\%/^{\circ}\text{C}$
 - Voc: $-0.25\%/^{\circ}\text{C}$
 - Isc: $+0.046\%/^{\circ}\text{C}$
- G. Operating Temperature Range: -40°C to $+85^{\circ}\text{C}$.
- H. Nominal Operating Cell Temperature (NOCT): $45 \pm 2^{\circ}\text{C}$.
- I. Maximum System Voltage: 1500 V DC.
- J. Maximum Series Fuse Rating: 30 A.

2.3 ELECTRICAL CHARACTERISTICS (STC)

Standard Test Conditions: 1000 W/m², 25 °C, AM1.5 spectrum. Measuring tolerance $\pm 3\%$.

Typical values for the 640 W class (adjust proportionally for lower power classes per manufacturer published data):

- Maximum Power (Pmax): 640 W
- Open Circuit Voltage (Voc): $\approx 57.3 - 57.4\text{ V}$
- Short Circuit Current (Isc): $\approx 13.9 - 14.0\text{ A}$
- Maximum Power Voltage (Vmp): $\approx 48.0 - 48.1\text{ V}$
- Maximum Power Current (Imp): $\approx 13.3 - 13.4\text{ A}$

NOCT and BNPI (bifacial) values shall match the manufacturer's published data sheets.

2.4 MECHANICAL SPECIFICATIONS

SECTION 26 31 13 – PHOTOVOLTAIC MODULES

- A. External Dimensions: Approximately 2465 × 1134 × 30 mm (96.7"x44.65"x1.18" or current published equivalent).
- B. Weight: Approximately 34.0 kg.
- C. Front Glass: 2.0 mm AR-coated heat-strengthened glass.
- D. Back Glass: 2.0 mm heat-strengthened glass (bifacial construction).
- E. Frame: Anodized aluminum alloy.
- F. Junction Box: IP68 rated, with 3 bypass diodes.
- G. Connectors: MC4 or compatible equivalent; 12 AWG PV wire (UL listed).
- H. Cable Length: 400 mm (+) / 200 mm (-) standard, or custom lengths as required by design.
- I. Mechanical Load Ratings:
 - Front: 5400 Pa / 113 psf
 - Rear: 2400 Pa / 50 psf
- J. Cells: 156 pcs (78 × 2) N-type mono-crystalline.

2.5 CERTIFICATIONS & ENVIRONMENTAL RESISTANCE

Modules shall be certified and listed to the following standards (or current equivalent):

- IEC 61215 / IEC 61730 / UL 61730
- IEC 62804 (PID resistance)
- IEC 61701 (Salt Mist)
- IEC 62716 (Ammonia Resistance)
- IEC 60068 (Dust and Sand)
- Hail resistance per IEC 61215
- Fire Type 29 (UL 61730)
- Additional listings (ETL, California Energy Commission, etc.) preferred.

2.6 PACKING & SHIPPING

Modules shall be shipped in protective packaging suitable for container or truck transport. Typical packing configuration: 36 pieces per pallet (20' GP container); Containers will be the property of the University once product is delivered. Price for shipping shall include containers sale quantities for 40' HQ and 53' trailers per manufacturer documentation. A total of approximately 1000 panels will be required. Modules shall be delivered between Jan 1, 2027 and Feb 1, 2027

End of Section 26 31 13

STANDARD SPECIFICATIONS BOOK

BATTERY ENERGY STORAGE SYSTEM (BESS) AND MICROGRID CONTROLS

RATED POWER	USABLE ENERGY	NOMINAL VOLTAGE
250 kW AC continuous	1,500 kWh usable (BOL) (MAX)	208 V, 3-Phase, 60 Hz

For Competitive Bidding — MATERIALS / FURNISH ONLY

For Competitive Bidding

Project Location: Gulf South Region (Louisiana / Texas Gulf Coast)

Document Date: September 25, August 17, 2026 | ISSUED FOR COMPETITIVE BIDDING

This document defines the minimum technical, performance, safety, and commercial requirements for a complete, fully functional Battery Energy Storage System. Bidders shall provide a turnkey solution meeting or exceeding all requirements herein.

All proposals shall be based on the ratings, codes, standards, and performance criteria stated. Deviations must be clearly identified in a separate deviations list.

PART 1 — GENERAL

1.1 SUMMARY / SCOPE OF WORK

- A. This Section includes the design, engineering, manufacture, factory testing, supply, delivery, field testing, commissioning, training, and warranty of a complete turnkey Battery Energy Storage System (BESS) as specified herein.
- B. The BESS shall be a factory-integrated, UL 9540 listed system consisting of lithium-ion battery modules (preferably Lithium Iron Phosphate — LFP), Power Conversion System (PCS), Battery Management System (BMS), Energy Management System (EMS), thermal management, fire detection/suppression, enclosures, AC and DC protection, communications, and all necessary auxiliaries.
- C. System Ratings (minimum, measured at the Point of Interconnection — POI):
 - Continuous AC Power: 250 kW (charge and discharge)
 - Usable Energy Capacity (beginning of life, AC at POI): 1440 kWh
 - Nominal AC Voltage: 208-V/120V, 3-phase, 60 Hz, 3-wire or 4-wire as required by site
 - Duration at rated power: approximately 5.5 hours
- D. Intended Applications: peak shaving / demand charge management, time-of-use energy shifting, backup power / islanding capability (grid-forming preferred), solar self-consumption (if co-located), and grid support services as required by the interconnecting utility.
- E. ~~The Contractor shall be responsible for a complete, code-compliant installation ready for commercial operation, including all civil pads, grounding, conduits, cabling, transformers (if required for 208 V interface), disconnects, metering interfaces, and coordination with the Owner's existing electrical system and utility interconnection requirements.~~
- F. The Battery Energy Storage System and Microgrid Controller shall be provided either from the same manufacturer or be documented of proven coordination between the equipment being provided including existing successful past performance of deployed systems.
- F. All microgrid controls shall be provided to include the following:
 - Microgrid Controller: mounted within a compact, light-weight, polycarbonate NEMA 4X enclosure, it shall contain 8-port network switch and no touchscreen.
 - Protective Relay Cabinet: SEL-751 Protective Relay with redundant power supply, pre-programmed and pre-wired UL508A control panel to operate a 208v, 3ph, 2000A electrically controllable switch.
- G. Installation is not included in this project.

— 1.2 RELATED SECTIONS

SECTION 26.33.73 – BATTERY ENERGY STORAGE SYSTEM (BESS)

- * ~~Division 03 – Concrete (equipment pads)~~
- * ~~Division 26 – Electrical (general power, grounding, raceways, switchboards)~~
- * ~~Section 26.05.00 – Common Work Results for Electrical~~
- * ~~Section 26.05.26 – Grounding and Bonding~~
- * ~~Section 26.24.43 – Switchboards~~
- * ~~Section 26.28.46 – Enclosed Switches and Circuit Breakers~~

1.3 REFERENCES (CODES & STANDARDS)

The BESS and its installation shall comply with the latest editions of the following (or superseding) standards and codes as applicable at the time of bid:

Standard	Title / Application
UL 9540	Energy Storage Systems and Equipment (system listing required)
UL 9540A	Test Method for Evaluating Thermal Runaway Fire Propagation
UL 1973	Batteries for Use in Stationary and Motive Auxiliary Power Applications
UL 1741 SB	Inverters, Converters, Controllers and Interconnection System Equipment
IEEE 1547-2018	Interconnection and Interoperability of Distributed Energy Resources
IEEE 1547.1	Conformance Test Procedures for Equipment Interconnecting DERs
NFPA 855	Standard for the Installation of Stationary Energy Storage Systems
NFPA 70	National Electrical Code (NEC), Article 706 — Energy Storage Systems
NFPA 70E	Standard for Electrical Safety in the Workplace
NFPA 72	National Fire Alarm and Signaling Code
IEC 62619	Secondary cells and batteries — Safety requirements
UN 38.3	Transportation Testing for Lithium Batteries
IEEE 519	Recommended Practice for Harmonic Control
Local AHJ	Authority Having Jurisdiction requirements (fire marshal, building dept, utility)

Note: Where conflicts exist between codes/standards and this specification, the more stringent requirement shall govern. Contractor shall identify all conflicts in the bid.

1.4 DEFINITIONS

BESS: Battery Energy Storage System — complete integrated system including batteries, PCS, BMS, EMS, thermal management, enclosures, and protection.

PCS: Power Conversion System (bidirectional inverter/rectifier).

BMS: Battery Management System — monitors and protects individual cells/modules/racks.

EMS: Energy Management System — higher-level control, scheduling, and grid interface.

MGC: Microgrid Controller

PRC: Protective Relay Cabinet

POI: Point of Interconnection — the electrical point at which the BESS connects to the facility or utility system; all power and energy ratings are referenced to the POI.

Usable Energy: AC energy delivered at the POI from 100 % SOC to the manufacturer-defined minimum SOC (typically 80–90 % of nameplate depending on chemistry and warranty).

RTE: Round-Trip Efficiency (AC–AC) including all auxiliary loads.

SOH: State of Health — remaining capacity relative to beginning-of-life.

DoD: Depth of Discharge.

C-rate: Charge or discharge current relative to rated capacity (1C = full capacity in one hour).

Grid-Forming: PCS capability to establish voltage and frequency independently (islanded operation).

Grid-Following: PCS that synchronizes to an existing grid voltage/frequency reference.

1.5 SUBMITTALS

A. Bid Submittals (with Proposal):

- Completed Appendix A — Minimum Performance Data Sheet
- Preliminary single-line diagram showing proposed interconnection
- Product data sheets for batteries, PCS, BMS, EMS, fire system, MGC, PRC.
- UL 9540 listing certificate and UL 9540A test summary (or commitment to provide prior to shipment)
- Proposed warranty terms and cycle/calendar life guarantees
- Preliminary layout / footprint drawing and weight schedule
- Deviations list (if any)
- Proposed project schedule (engineering, manufacturing, delivery, installation, COD)

B. Post-Award / Shop Drawing Submittals:

- Detailed single-line, three-line, and control diagrams
- Equipment layout plans, elevations, and foundation/pad requirements
- Bill of materials with manufacturer part numbers
- Protection coordination study and arc-flash study (as applicable)
- Interconnection application support documentation for utility
- Factory Acceptance Test (FAT) procedure
- Commissioning and Site Acceptance Test (SAT) procedures
- Operation & Maintenance manuals (electronic + hard copies)
- As-built drawings and final settings

1.6 QUALITY ASSURANCE

- A. **Manufacturer Qualifications:** BESS system integrator shall have a minimum of five (5) years experience supplying UL 9540 listed commercial/industrial BESS of similar power and energy rating, with at least three (3) successfully commissioned projects in the United States.
- B. **Installer Qualifications:** Licensed electrical contractor experienced in energy storage installations, with documented training from the BESS manufacturer or system integrator.
- C. The complete BESS shall be listed to UL 9540. Individual major components shall carry appropriate UL or equivalent listings (UL 1973 for batteries, UL 1741 SB for PCS).
- D. Factory Acceptance Testing (FAT) shall be performed and witnessed (or documented with video/report) prior to shipment.

1.7 DELIVERY, STORAGE & HANDLING

- A. Equipment shall be delivered in manufacturer's original packaging, protected against weather, shock, and vibration. Batteries shall be shipped in accordance with UN 38.3 and applicable hazardous materials regulations.
- B. ~~On-site storage shall maintain batteries within manufacturer recommended temperature and SOC limits. Contractor is responsible for any degradation occurring due to improper storage prior to commercial operation.~~

1.8 WARRANTY

- A. **Product Warranty:** Minimum ten (10) years from Commercial Operation Date (COD) covering defects in materials and workmanship for the complete BESS (batteries, PCS, BMS, EMS, thermal system, enclosures, and auxiliaries).
- B. **Performance (Capacity) Warranty:** The system shall retain a minimum of seventy percent (70 %) of the original usable energy capacity (1,376 kWh) at the end of year 10, or after the equivalent of 4,000 full equivalent cycles, whichever occurs first, under the defined duty cycle and operating conditions. Annual capacity tests shall be permitted to verify compliance.
- C. **Availability Guarantee (optional but preferred):** Minimum 95 % annual availability (excluding scheduled maintenance and force majeure) during the warranty period.
- D. Warranty shall include parts, labor, and travel for remediation of warranted failures. Extended warranty options beyond 10 years shall be offered as alternates.

1.9 PROJECT CONDITIONS / SITE REQUIREMENTS

- A. **Ambient Conditions:** System shall operate at full rated power and energy without derating between -20 °C to +45 °C (-4 °F to +113 °F) ambient, with derating allowed above 45 °C up to 50 °C maximum. Relative humidity 5–95 % non-condensing. Altitude ≤ 1,000 m (3,280 ft) without derating.
- B. **Installation Environment:** Outdoor, NEMA 3R / IP54 minimum enclosures. System shall be suitable for Gulf South climate (high humidity, occasional extreme heat, potential salt air if near coast).
- C. **Seismic:** Equipment and anchoring shall meet applicable IBC seismic design category for the project site.
- D. **Noise:** Maximum 70 dBA at 1 meter from any enclosure under full load operation.

PART 2 — PRODUCTS

2.1 MANUFACTURERS / ACCEPTABLE PRODUCTS

- A. The BESS shall be a complete, factory-integrated system from a single responsible system integrator or manufacturer that holds the UL 9540 listing for the offered configuration.

SECTION 26 33 73 – BATTERY ENERGY STORAGE SYSTEM (BESS)

- B. Acceptable manufacturers/integrators include (but are not limited to) those with proven commercial installations meeting the ratings and standards herein, such as: Generac, Cummins, Eaton, or Approved Equal that meets the entire requirements and intent of this specification. The Owner reserves the right to approve or reject proposed manufacturers based on experience, safety record, and financial stability.
- C. All major components (battery cells/modules, PCS, BMS, MGC and PRC) shall be from established Tier-1 suppliers with documented quality systems (ISO 9001 or equivalent).

2.2 SYSTEM PERFORMANCE REQUIREMENTS

All ratings shall be guaranteed at the Point of Interconnection under the ambient conditions stated in Section 1.9. Nameplate energy shall be clearly distinguished from usable energy. Bidder shall state both values.

Parameter	Requirement
Continuous AC Power (charge & discharge)	250 kW minimum at POI, 208 V, 3Ø, 60 Hz
Usable Energy Capacity (BOL, AC at POI)	1,376 kWh minimum
Round-Trip Efficiency (AC-AC, Incl. auxiliaries)	≥ 88 % at rated power, 25 °C
Power Factor Range	Unity to ±0.8 (full four-quadrant preferred)
Total Harmonic Distortion (current)	< 3 % at rated power (IEEE 519 compliant)
Overload Capability	110 % for 10 minutes; ≥ 120 % for 10 seconds
Response Time (0 to rated power)	≤ 100 ms (preferred ≤ 50 ms for grid services)
Voltage Range (AC)	208 V ±10 % continuous
Frequency Range	57–63 Hz continuous (IEEE 1547 ride-through)
Cycle Life (to 70 % SOH)	4,000 full equivalent cycles or 10 years calendar
Calendar Life	10 years to 70 % SOH under defined conditions
Depth of Discharge (usable)	≥ 80 % of nameplate preferred; state clearly
C-rate (continuous)	Approximately 0.18 C (based on 1,376 kWh / 250 kW)

2.3 BATTERY MODULES & RACKS

- A. Chemistry: Lithium Iron Phosphate (LFP / LiFePO_4) is strongly preferred for superior thermal stability, cycle life, and safety. Nickel-Manganese-Cobalt (NMC) may be offered as an alternate with documented UL 9540A results and enhanced thermal management; LFP will receive preference in evaluation.
- B. Cells shall be prismatic or pouch, industrial grade, with individual cell voltage and temperature monitoring.
- C. Modules and racks shall be UL 1973 listed. Complete system shall be UL 9540 listed.
- D. Battery racks shall include integrated DC disconnects, fusing or circuit breakers, and clear labeling of voltage, capacity, and polarity. Front-access is preferred for serviceability.
- E. State of Charge (SOC) operating window shall be clearly defined (e.g., 5–95 % or 10–90 %). Usable energy shall be the energy delivered within this window at the POI.

2.4 POWER CONVERSION SYSTEM (PCS)

- A. The PCS shall be a bidirectional, three-phase inverter/rectifier rated for continuous 250 kW AC at 208-V. If the native PCS voltage is 480 V, a dedicated isolation or autotransformer suitable for continuous bidirectional operation shall be provided and included in the system efficiency and losses.
- B. PCS shall be UL 1741 SB certified and IEEE 1547-2018 compliant, including required voltage and frequency ride-through, anti-islanding, and interoperability functions.
- C. Preferred: Grid-forming capability for seamless island / backup operation. Grid-following is acceptable if clearly stated; islanding capability is a desirable feature for this project.
- D. Efficiency: Peak PCS efficiency ≥ 97.5 %; CEC weighted efficiency ≥ 96.5 %.
- E. Cooling: Forced air or liquid cooling acceptable provided acoustic and reliability requirements are met. Liquid cooling is preferred for higher power density and quieter operation.
- F. The PCS shall support full four-quadrant operation (active and reactive power) within the power factor range specified.

2.5 BATTERY MANAGEMENT SYSTEM (BMS)

- A. Multi-level BMS architecture (cell → module → rack → system) with continuous monitoring of voltage, current, temperature, and SOC/SOH for every cell or minimum every module.
- B. Protective functions shall include over/under voltage, over current, over/under temperature, short-circuit, and isolation fault detection. Automatic disconnect of affected strings/racks on fault.
- C. Cell balancing (active or passive) shall maintain cell voltage deviation within manufacturer limits throughout life.
- D. BMS shall communicate with the EMS via standard industrial protocols (CAN, Modbus, or equivalent) and provide detailed diagnostic data for remote monitoring.

2.6 ENERGY MANAGEMENT SYSTEM (EMS) / CONTROLS

- A. The EMS shall provide local and remote control of charge/discharge power, SOC limits, operating modes, and scheduling. Minimum operating modes: peak shaving, time-of-use shifting, self-consumption, backup/island, and manual set-point control.
- B. Local HMI (touchscreen or equivalent) for status, alarms, and basic control. Remote access via secure web portal or VPN with role-based permissions.
- C. Data logging of power, energy, SOC, temperatures, alarms, and events at 1-second resolution (or better) with minimum 90 days local storage and cloud/remote archival capability.
- D. Integration capability with facility Building Management System or existing SCADA via Modbus TCP, DNP3, or OPC-UA. APT documentation shall be provided.
- E. Automatic black-start and seamless transition to islanded mode (if grid-forming PCS is provided) upon loss of utility voltage.

2.7 THERMAL MANAGEMENT

- A. Active thermal management (forced air or liquid cooling) is required to maintain battery cell temperatures within the manufacturer's recommended range under all operating and ambient conditions specified.
- B. Liquid cooling is preferred for uniform temperature distribution and lower acoustic noise. Air cooling is acceptable if cell-to-cell temperature delta is maintained within limits and noise criteria are met.
- C. Thermal system shall include redundant fans/pumps as appropriate and automatic shutdown or power limiting on thermal faults.

2.8 FIRE DETECTION, SUPPRESSION & SAFETY

- A. The system shall comply with NFPA 855 installation requirements. UL 9540A test results shall determine required separation distances, deflagration venting, and suppression strategy.
- B. Minimum fire safety features:
 - Early detection of off-gassing / thermal runaway precursors (gas sensors / Li-ion Tamer or equivalent)
 - Smoke and heat detection per NFPA 72
 - Automatic fire suppression system (aerosol, clean agent, or water-based as appropriate to UL 9540A results and AHJ)
 - Deflagration vents sized and oriented per NFPA 68 / 855 guidance
 - Emergency stop (E-stop) pushbuttons and remote trip capability
 - Clear labeling of hazards, emergency procedures, and disconnect locations
- C. A formal Hazard Mitigation Analysis (HMA) prepared by a licensed Professional Engineer shall be provided if required by the AHJ or NFPA 855 edition in force.

2.9 ENCLOSURES & OUTDOOR RATING

- A. All outdoor equipment shall be housed in NEMA 3R / IP54 (minimum) enclosures suitable for the Gulf South environment. Higher ratings (NEMA 4 / IP65) preferred for coastal or high-humidity sites.
- B. Enclosures shall be corrosion-resistant (powder-coated steel, aluminum, or stainless as appropriate). C5 or equivalent corrosion protection preferred near salt air.
- C. Cabinets shall provide front or side access for maintenance. Lifting points and forklift pockets shall be provided.
- D. Overall system footprint and weight shall be minimized while meeting access, ventilation, and fire separation requirements.

2.10 ELECTRICAL PROTECTION & INTERCONNECTION

- A. AC and DC disconnecting means shall be provided in accordance with NEC Article 706 and local utility requirements. Disconnects shall be lockable in the open position and clearly labeled.

- B. Overcurrent protection, surge protection, and grounding shall comply with NEC and IEEE recommendations. Ground fault detection and interruption shall be provided on both AC and DC sides as applicable.
- C. The Contractor shall coordinate protective device settings with the facility's existing protection scheme and the utility interconnection requirements. A coordination study shall be submitted for review.
- D. If a step-up or step-down transformer is required to interface the PCS with the 208 V facility system, the transformer shall be included in the scope, sized for continuous bidirectional full power, and its losses included in the guaranteed round-trip efficiency.
- E. Metering: Revenue-grade or facility-grade metering at the POI for energy import/export and power quality as required by Owner or utility.

2.11 COMMUNICATIONS & SCADA INTERFACE

- A. Standard industrial protocols: Modbus TCP (minimum), DNP3, and/or OPC-UA. Ethernet (copper and optional fiber) interface.
- B. Secure remote access for monitoring and (with proper authorization) control. Cybersecurity features consistent with current best practices (password protection, role-based access, encrypted communications).
- C. Local alarm contacts (dry contacts) for critical faults, fire, and emergency stop for interface to facility fire alarm and building management systems.

2.12 AUXILIARY POWER & UPS

- A. Auxiliary loads (thermal management, controls, BMS, EMS, fire system, lighting, receptacles) shall be powered from a dedicated auxiliary circuit. Preferred source is the facility 208 V or 120/208 V system; alternatively the BESS may supply its own auxiliaries from the DC bus or AC output via internal UPS/inverter.
- B. Critical controls and BMS shall be backed by a UPS sized for orderly shutdown (minimum 15–30 minutes) in the event of loss of all AC sources.

2.12 MICROGRID CONTROLLER

- A. The microgrid controller and cabinet shall be a wall mountable UL508 listed, NEMA 4X, polycarbonate enclosure.
- B. Input Voltage: 100-240VAC @ 60Hz
- C. Current: 2A @ 120V AC
- D. Wire Size: 14 Ga.
- E. Environmental Limits: -10 - +40 degrees C @ 5-80% relative humidity non-condensing
- F. Remote Communications: Ethernet Cellular
- G. External Communications: Modbus RS485, Modbus TCP, DNP3, API
- H. Touchscreen: No touchscreen

2.12 PROTECTIVE RELAY CABINET

- A. The Protective Relay Cabinet (PRC) is a UL508 listed, SEL-751 relay, microgrid islanding device providing grid failure detection, sub-cycle grid isolation, and protected grid resynchronization for three-phase services mounted in a polycarbonate enclosure.
- B. Mounting: Wall Mounted
- C. Input Voltage: 24 VDC
- D. Current: 2A
- E. Wire Size: 14 Ga.
- F. Environmental Limits: -20 - +50 degrees C @ 20-90% relative humidity non-condensing
- G. External Communications: Modbus TCP
- H. Input/Output Rating: 0-480VAC 3ph, 0-5 A Sensing
- I. Digital Inputs: 6 A, 24-250 VAC/VDC Qty (6)
- J. Relay Outputs: 6 A, 0-250 VAC (Form A), Qty (6); 6A, 0-250 VAC (Form C), Qty (1)

B. _____

PART 3 — EXECUTION

3.1 EXAMINATION & PREPARATION

- A. Contractor shall verify site conditions, available space, foundation requirements, existing electrical infrastructure, utility interconnection point, and access routes prior to final design and equipment release.

~~B. Concrete equipment pads shall be designed for the static and dynamic loads of the BESS, including seismic and wind loads. Pads shall be level, properly drained, and provide required clearances for maintenance and fire separation per NFPA 855 and manufacturer instructions.~~

~~A. Contractor shall deliver the unit no earlier than April 1, 2027, and no later than May 1, 2027~~

~~B. Installation is not included in this project.~~

3.2 INSTALLATION

~~A. Installation shall be performed by qualified personnel in accordance with manufacturer instructions, NEC, NFPA 855, and all applicable codes. All work shall be supervised by the system integrator or authorized representative.~~

~~B. Grounding and bonding shall comply with NEC Article 250 and manufacturer recommendations. Equipment grounding conductors and grounding electrode system shall be installed as required.~~

~~C. All power and control cabling shall be installed in appropriate raceways, properly supported, and terminated with listed connectors. Cable entries shall maintain enclosure integrity (glands, seals).~~

~~D. Fire detection and suppression systems shall be installed and interfaced with the facility fire alarm system as required by the AHJ.~~

~~E. Clear working space and egress paths shall be maintained per NEC and NFPA 855.~~

3.3 FIELD QUALITY CONTROL / TESTING & COMMISSIONING

A. Factory Acceptance Test (FAT): Prior to shipment, the complete system (or representative string) shall undergo functional testing including charge/discharge, protection trips, communications, and thermal system operation. Test report shall be submitted.

B. Site Acceptance Test (SAT) / Commissioning: After installation, a comprehensive commissioning plan shall be executed, including but not limited to (This testing shall be completed after installation by the contractor is completed through a separate contract).

- Visual inspection and mechanical completion checklist
- Insulation resistance and continuity tests
- Protection device functional tests and settings verification
- BMS cell/module voltage and temperature verification
- Full power charge and discharge tests at rated power
- Energy capacity verification (usable kWh at POI)
- Round-trip efficiency measurement
- Grid interconnection and anti-islanding tests per IEEE 1547.1
- Islanded / backup mode tests (if applicable)
- Communications and SCADA point-to-point checks
- Fire system functional test
- Acoustic measurements

C. All test results shall be documented and submitted. Owner or Owner's representative may witness any or all tests. System shall not be declared commercially operational until SAT is successfully completed and accepted in writing.

3.4 TRAINING

A. Contractor shall provide on-site training for Owner's operations and maintenance personnel covering:

- System overview and architecture
- Normal start-up, shutdown, and operating modes
- HMI / EMS navigation and alarm response
- Routine maintenance tasks and recommended intervals
- Emergency procedures and fire response coordination
- Basic troubleshooting and when to call for manufacturer support

B. Training duration: minimum one (1) full day. Training materials and videos shall be provided for future reference. Additional training sessions may be requested as an option.

3.5 DOCUMENTATION & CLOSEOUT

A. Prior to final acceptance, Contractor shall deliver:

- Complete as-built drawings (single-line, layout, wiring, controls)
- Final settings files for PCS, BMS, EMS, and protective relays

SECTION 26 33 73 – BATTERY ENERGY STORAGE SYSTEM (BESS)

- Operation & Maintenance manuals (hard copy + searchable PDF)
 - Recommended spare parts list with pricing and lead times
 - Warranty certificates and claim procedures
 - Training attendance records and materials
 - All test reports (FAT, SAT, commissioning)
 - UL listing certificates and UL 9540A summary
 - Interconnection approval documentation from utility
- B. Electronic files shall be provided in native (CAD) and PDF formats. All documentation shall be organized and indexed for easy retrieval.

END OF SECTION 26 33 73

APPENDIX A — MINIMUM PERFORMANCE DATA SHEET

Bidder shall complete all fields below and submit with the proposal. Incomplete data sheets may result in disqualification or clarification requests.

Item	Bidder Response
Bidder / System Integrator Name	
Proposed System Model / Designation	
UL 9540 Listing Number / Status	
UL 9540A Test Report Available? (Yes/No + summary)	
Battery Chemistry (LFP / NMC / Other)	
Cell Manufacturer & Model	
Nameplate DC Energy (kWh)	
Usable AC Energy at POI (kWh) — BOL	
Rated Continuous AC Power (kW) — charge & discharge	
Round-Trip Efficiency AC-AC (incl. aux) at rated power	
PCS Manufacturer & Model	
PCS Nominal Voltage / Transformer Required?	

SECTION 26 33 73 – BATTERY ENERGY STORAGE SYSTEM (BESS)

Grid-Forming Capability? (Yes/No)

Peak / CEC Efficiency of PCS

Thermal Management Type (Air / Liquid)

Fire Detection Method

Fire Suppression Method

Enclosure Rating (NEMA / IP)

Overall Footprint (L x W x H) and Weight

Auxiliary Power Consumption (rated / idle)

Noise Level at 1 m (dBA)

Product Warranty (years)

Capacity Warranty (years / cycles to 70 % SOH)

Expected Calendar Life / Cycle Life

Communications Protocols Supported

Proposed Delivery Lead Time (weeks after NTP)

Proposed Installation Duration (weeks)

O&M / Service Presence in Gulf South Region

List of Reference Projects (similar size, last 5 years)

Deviations from this Specification (attach list)

Authorized Signature: _____ Date: _____

Printed Name / Title: _____

This Specifications Book is issued for competitive bidding. All questions shall be submitted in writing during the bid period. Addenda, if any, will form part of the Contract Documents.

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