APPENDIX A
SOUTHERN CALIFORNIA PUBLIC POWER AUTHORITY
STANDALONE ENERGY STORAGE SYSTEM SPECIFICATIONS
- FOR LADWP TRANSMISSION RELIABILITY PROJECTS

A. LADWP Objective

The requirements for proposals to this Request for Proposal (RFP) effort are as laid out in this Appendix and the ESS Specifications Datasheet (Exhibit 1). Proposals that do not meet the requirements will be deemed non-responsive and disqualified from further evaluation unless otherwise stated.

1. The Seller must possess site control of the project site in the form of ownership of the site, or a lease or license for the term of the Agreement
2. The Seller may propose one or more of the following types of contracts:
    a. Non-LADWP land: Energy Service Agreement (ESA) with a purchase option
        1. Expected Commercial Operations Date (COD): 2026-2033
        2. To be considered, the proposed project must be able to connect to LADWP's Power System grid. The Seller is responsible for submitting an interconnection request through the LADWP Large Generator Interconnection Process and provide proof of submission with the proposal. The cost of interconnection and any associated expenses are the sole responsibility of the Seller.
        3. Proposals with a buyout option must include Long-Term Service Agreements (LTSA) for the following services:
            1. Operation & maintenance
            2. Transmission service
            3. Operating agent agreement(s)
    b. LADWP-owned land: See Exhibit 3 for details.

B. Energy Storage System Requirements

1. The Energy Storage System (ESS) requirements provided in this Appendix shall apply to standalone energy storage projects. For the purposes of this Appendix, “standalone energy storage projects” refer to those not electrically paired with any specific source of generation. Proposals for ESS paired with a renewable energy resource are requested to be submitted to a separate RFP.

All energy for charging the ESS will be solely provided by the Buyer. The ownership to such charging energy shall remain with the Buyer at all times and the Buyer shall have control of such charging energy at all times. The Seller shall have custody of such energy while it is stored by the ESS.

2. The ESS requirements in this Appendix are technology agnostic, provided that the ESS:
    a. is standalone energy storage.
    b. meets all of the requirements and technological specifications of this Appendix.
        1. As such, any requirements or specifications that cannot be met shall be explicitly stated in the proposal.
    c. shall interconnect at transmission level only (greater than 100kV).
    d. shall interconnect to the LADWP grid with revenue grade metering.
3. The ESS must be integrated into LADWP as a network resource for serving load in the LADWP's balancing authority area.
4. The Agreement term for lithium-ion battery energy storage systems (BESS) shall be a minimum fifteen (15) years, unless otherwise specified. The Agreement term for other BESS and ESS shall be a minimum of twenty (20) years, unless otherwise specified.
5. The ESS shall consist of a commercially available technology.
6. The Seller shall be an experienced project developer with at least one member of the development team having (a) completed at least one project of similar technology, or (b) begun construction of at least one other project similar to the proposal being submitted.
7. The ESS shall be installed, delivered, repaired and maintained by the Seller; however, the Buyer shall have full operational control over the ESS. The Buyer will provide the Seller payments for services provided.
8. The Seller shall make good faith effort(s) to pursue any available Federal or State incentives and grants which shall be reflected in the project pricing proposal.
9. The ESS shall be developed and installed in accordance with all applicable laws, best industry practices, and pertinent standards for the applicable technology.
10. All proposals shall explicitly provide operational capabilities and operating restrictions of the proposed technology and include all Control Modes that the ESS is capable of performing (See Table 1 for details).
11. Proposed Projects shall have an energy density of at least approximately 1.5 kWh per square foot.

12. The proposal must identify the ESS rated discharge duration which must be capable of a minimum duration of four (4) hours of discharge capability at the full rating; however, proposals for projects with longer durations, such as ten (10) hours or more, are encouraged.

13. If the proposal includes a BESS, it shall include, at minimum, information on each of the following elements:

    a. Battery storage modules and racks

    b. Power conversion and transformation equipment

    c. Battery management systems

    d. Equipment for communication

    e. Thermal regulation

    f. Environmental conditioning and safety

    g. Control systems and related software

    h. Enclosures

    i. Incidental and related equipment

    j. A statement indicating that the BESS complies with the target response times set forth in the North American Electric Reliability Corporation (NERC) Inverter-Based Resource Performance Guideline, as published during the design period, based on the BESS' proposed COD.

14. The ESS shall maintain full rated power and energy rating for the entire term of the Agreement, pursuant to sections B.14.a to B.14.c, as applicable.

    a. The Seller shall ensure that the ESS charge capacity (MW), discharge capacity (MW), and Energy (MWh) matches the Guaranteed ESS Charge Capacity, Guaranteed ESS Discharge Capacity, and the Guaranteed ESS throughout the Agreement term. If the ESS charge or discharge capacity falls below the Guaranteed values at any time, the ESS will be considered unavailable.

        1. Contingent on an Agreement term of fifteen (15) years or more, Lithium-ion BESS shall maintain its energy to match the Guaranteed ESS Energy until five (5) years before the end of the Agreement; afterwards, the energy may degrade by up to three (3) percent of the Guaranteed ESS Energy per year. The Seller shall provide a degradation curve for the term of the Agreement.

        2. Non-Lithium-ion ESS energy shall match the Guaranteed ESS Energy for the entire term of the Agreement.

b. The Seller shall be subject to liquidated damages if the Guaranteed ESS parameters, pursuant to sections B.14.a.1, B.14.a.2, and E.2 are not maintained for the term of the Agreement.

c. Any expected degradation of the ESS shall be explicitly identified in the ESS proposal.

15. The ESS shall be capable of continuous discharge from 100% State of Charge (SOC) to 0% SOC and continuous charge from 0% to 100% SOC at the Guaranteed charge and discharge capacity. Pursuant to Section B.14, 100% SOC shall be equal to the Guaranteed ESS Energy during the entire term of the Agreement.

16. The Buyer shall have the following:

    a. The ability to set specific SOC and MWh values for the ESS to achieve by a set time.

    b. The ability to specify a new charge and discharge MW set point that shall supersede existing operations/schedules for immediate execution.

    c. The ability to connect, communicate, and control the ESS via LADWP Supervisory Control and Data Acquisition (SCADA) on Distributed Network Protocol 3 (DNP3).

17. All ESS metering shall comply with the applicable metering policies and requirements from the LADWP Bulk Electric System Meter Policy.

18. The Seller shall be responsible for the ESS complying with applicable policies and all requirements for the Energy Imbalance Market.

19. The ESS shall be registered with the California Independent System Operator following the New Resource Implementation Process. The Seller shall assume such resource will become a participating resource in the Buyer's portfolio.

20. The ESS system is subject to the following use limitations:

    a. Lithium-ion BESS shall provide a minimum of 365 equivalent cycles per calendar year or 366, as applicable for leap years. The number of cycles for other technologies shall be included in the proposal. Cycling during performance tests shall not be included in the minimum cycles per year. The Buyer will pay a fee to use additional cycles over the minimum requirement, if available.

    b. The ESS shall be capable of providing between ±0.8 power factor at the Point of Interconnection (POI).

21. The ESS must comply with the latest version of applicable codes and standards at the time of the detailed engineering phase, including, but not limited to the following:

    a. IEEE Standards 1547, 1547.1, 693, 519,

    b. UL Standards 9540, 9540A, 2054, 62133, 1741, 1741SA

c. NFPA Standards 855, 68, 69, 72, 70, 1

d. IFC 2018/2021

e. UN/DOT 38.3

f. NEC

g. ANSI C84.2006

h. IEC 62933-5-2

i. Requirements of law

j. The ESS shall be programmed in accordance to NERC Standard PRC – 024-2, in consultation with the Buyer.

k. The Seller shall be responsible for compliance with applicable environmental rules and regulations, including but not limited to, hazardous material removal and dust mitigation/control measures, as will be further defined and explained in the Agreement between the Buyer and Seller. Specific hazardous materials shall be defined separately in the Material Safety Datasheet (MSDS).

The Seller shall indicate any exceptions to this list and provide supporting explanations.

22. The ESS shall have Modular Energy System Architecture (MESA)-ESS communication standards capability as well as DNP3 communication protocol capability.

23. The ESS shall establish a connection to external communications in the form of at least: one console for the Buyer's Energy Management System (EMS) and one console for local control.

24. Seller shall provide LADWP with Back-up Automatic Generation Control for the ESS.

25. The Seller shall provide regular reporting of ESS status to the Buyer via SCADA including, but not limited to the following.

a. ESS cycles available in cycles and MWh

b. Specific grid charge percentage availability for the year

c. MW and MVAR available for charge and discharge

d. MWh available for charge and discharge

e. MWh discharged year to date

f. Estimated time needed to charge from current SOC to another Operator-specified SOC

g. Estimated round-trip efficiency, based on total MWh charged and discharged per month. For clarification, this does not establish the round-

trip efficiency of the ESS as described in the annual performance test or as part of declaring commissioning.

26. The Seller shall provide D-Curve for all 4 quadrants (MVAR output vs. MW output) at all power factors to the Buyer.
27. All ESS warranty terms and limitations shall be explicitly stated in the proposal.
28. The Seller shall describe any required environmental compliance, such as the California Environmental Quality Act, or permits for the project. Criteria pollutants and gas emissions must be disclosed in the ESS Specifications Datasheet. Examples of environmental permits are provided below:
    a. If the equipment generates emissions of criteria pollutants (VOC, NOx, SOx, CO, PM), a permit-to-operate may be required by the local Air Quality Management District.
    b. If an emergency generator is installed, a permit-to-operate is required if the engine driving the emergency generator is greater than fifty (50) horsepower.
    c. National Pollutant Discharge Elimination System Permit
29. The Seller shall be responsible for decommissioning, disposal, and end of life considerations. The Buyer reserves the right to obtain cost of recycling and/or disposal of all project equipment at the end of life from the Seller. The Seller shall provide project decommissioning plan to the Buyer.
    a. The project decommissioning plan shall include key system and installation information that helps inform the Buyer about system decommissioning, end-of-life disposal/recycling process with potential vendors.
    b. The Seller shall also provide guidelines and procedures for safe handling and disposal of damaged equipment or defective battery cells and modules, if applicable.

C. Timeline and Pricing

1. The proposal Timeline will consist of the following deadlines:
    a. Proposal Submittal Close Date: September 1, 2023
    b. Proposal Evaluations: After September 5, 2023
    c. Proposal Selection: After November 1, 2023
2. The Seller's price shall consist of the following:
    a. Fixed Price: A price for the availability of the ESS, subject to availability and performance guarantees in $/kW-month, i.e. capital cost, and debt service.

b. Fixed Operations and Management (O&M) Cost: A price for the fixed costs associated with the maintenance and repair of the ESS in $/kW-month, i.e. labor costs, rent/lease on property/land, insurance, overhead, etc.

c. Variable O&M and Variable Asset Replacement Cost: A price for the variable costs associated with the maintenance and repair of the ESS in $/MWh, i.e. component replacement, consumables, etc.

3. Buyout Price: A price for the sale of the ESS in annual increments for the term of the Agreement, if applicable.

Required Information

The Seller shall provide the following information (indicate N/A if not applicable to the proposal):

1. Legal Description of Site
2. Site Plan Drawing
3. General arrangement drawing or site map with balance of plant included, for reference purposes. The Seller may update as needed if their proposal is selected.
4. Electrical single-line diagram
5. Fire detection, notification, suppression, and protection systems
6. Project milestone schedule and material permits
7. Supply plan information (such as how and where to source materials and components)
8. Capacity and ancillary services operating restrictions
9. All information requested in Energy Storage System Requirements, Section B with any exceptions to ESS Project requirements indicated with “N/A”
10. Evidence of interconnection application and payment, if applicable
11. For projects on non-LADWP property, proposal must demonstrate site control in the form of ownership, lease or license, or irrevocable option for ownership, lease, or license.
12. Project emergency response plan that describes the associated hazards and risks, training, and emergency actions to be taken
13. Hazard and operability (HAZOP) Study or equivalent. HAZOP studies are used as part of a Quantitative Risk Assessment or as a standalone analysis.
14. The Seller may provide additional reports, such as an independent engineering reports, preliminary front-end engineering design (FEED)/FEED studies, etc. to assist LADWP’s evaluation of the proposal.

D. Availability Guarantee

The ESS shall maintain Monthly Guaranteed Availability as described in Exhibit 2 For the entire term of the Agreement, the applicable Monthly Guaranteed Availability values are:

- 98% if proposed technology is lithium-ion battery
- 90% for other technologies

If the ESS fails to achieve the Monthly Guaranteed Availability, then the Seller shall remedy such failure by paying liquidated damages, as described in Exhibit 2.

ESS Failure to Meet Guarantee

If BESS Monthly Guaranteed Availability remains below 90% beyond the agreed cure period, not including planned outage or curtailment at the Buyer's discretion, the BESS shall be considered in default.

For ESS technologies other than lithium-ion BESS, Monthly Guaranteed Availability Requirement for Default described above shall be modified on a case-by-case basis during negotiations. In no event shall the required availability be lower than seventy-five percent (75%).

Planned outage time required for maintenance and augmentation per calendar year shall be set forth in Exhibit 1.

The Seller shall provide outage notification at least thirty (30) days in advance via email with start and end dates of such outage, subject to the Buyer's approval.

If SCADA control for ESS is not available or ESS is not visible via SCADA to the Buyer's Energy Control Center, then the ESS shall be considered unavailable, unless otherwise specified by the Buyer. The Seller shall coordinate the timing of ESS augmentation with the Buyer to ensure optimal timing and minimal interference and disruption to the Buyer.

E. Performance Guarantee

1. The Seller shall guarantee the performance of the ESS in accordance with the Performance Test requirements and procedures for the selected parameters ("Guaranteed ESS Parameters") listed in the Section E.2 for the entire term of the Agreement. If the ESS fails the Annual Performance Test, the Buyer's payment to the Seller shall be subject to reduction by the liquidated damages until ESS passes a subsequent Performance Test which is separate from the Annual Performance Test.
2. The following Guaranteed ESS Parameters are to be tested by the Seller and provided to the Buyer for comparison against the appropriate expected values provided in Exhibit 1 at the COD and during the Annual Performance Test. All parameters measured at the POI.
    a. Round-Trip Efficiency (RTE)

b. Continuous Charge Capacity (MW)

c. Continuous Discharge Capacity (MW)

d. Guaranteed ESS Energy (MWh)

e. Active Power Response Time (Time required for the ESS to ramp up to full capacity from when the Buyer issues the signal).

f. Guaranteed up-ramp rate for full power charge and discharge operation (MW/time)

g. Guaranteed down-ramp rate for full power charge and discharge operation (MW/time)

3. The following ESS parameters must be tested through the Performance Test and match the appropriate expected values provided in Exhibit 1 to declare COD.

    a. Full-rated continuous Power Rate (Charge and discharge at full rated power capacity for sustained periods of time.)

    b. Half-rated Continuous Power Rate (Charge and discharge at ½ of full rated power capacity for sustained periods of time.)

    c. Minimum time required to charge from 0 to 100% SOC at full rated capacity

    d. Maximum time required to charge from 0 to 100% SOC at full rated capacity

    e. Energy Available for immediate discharge at 100% SOC (MWh)

    f. Charge Ramp Rate (MW/[time])

    g. Discharge Ramp Rate (MW/[time])

    h. Discharge Ramp Rate after synchronization (%/sec)

    i. Self-discharge (% SOC/day)

    j. Noise (dBA)

    k. Startup time (min)

    l. Shutdown time (min)

4. Payment for ESS shall be performance-based and made in full if all performance parameters are met. A monthly performance report shall be provided as a pre-requisite for payment. Invoices shall be paid after the Buyer approves the monthly performance report. Payment shall be reduced for underperformance.

F. Regulatory and Reporting Requirement

1. **NERC and LADWP CIP Requirement:** to the extent determined applicable, the Seller shall comply with NERC standards and Buyer's requirements, including Critical Infrastructure Protection (CIP) Standards for the ESS.
2. **LADWP Internal Cyber Security Standards:** The Seller shall comply with LADWP's Internal Cyber Security and Physical Security Standards.
3. **WECC/NERC Generator Testing and Model Validation Requirement:** The Seller shall comply with Western Electricity Coordinating Council (WECC) Generator Testing and Model Validation Requirements, and shall provide Buyer with the required documents for compliance, as applicable.
4. **EIA Requirement:** The Seller shall be responsible for the U.S. Energy Information Administration (EIA) data submittals. A copy of any submitted reports shall be provided to the Buyer upon submittal to EIA.

G. Energy Storage System Control Requirements

1. The ESS shall have all the functions listed and outlined in Table 1: Control Modes.
2. The Control Modes shall consist of settable functional parameters that trigger responses that the ESS can provide. The operation of any Control Mode or simultaneous Control Modes are subject to the ESS Limitations, Control Mode setpoints and priorities (as specified and scheduled by the Buyer), and the ESS conditions (i.e. SOC, temperature, etc.) at the time of operation of such Control Mode(s). The Buyer shall have the ability to provide Control Mode set points for charge and discharge of the ESS as well as the ability to set specific MW charge and discharge values and priorities, subject to those limitations and conditions. All functions should be operable from the Buyer's EMS via DNP3.
3. The Control Modes in Table 1 are from the MESA-ESS Specification, and reference shall be made to either the MESA-ESS Specification or IEC 61850-90-7, or standard mutually agreed upon by the Buyer and the Seller. Table 1 through Table 5 are centered on Lithium-ion BESS and not all sections may be applicable to all ESS technologies. The Seller shall indicate the portions not applicable in the proposal.

Table 1: CONTROL MODES

Control Mode Category	Control Mode
Emergency Modes	1. Voltage Ride-Through
	2. Frequency Ride-Through
	3. Dynamic Reactive Current
	4. Dynamic Volt-Watt
	5. Frequency-Watt (*Implement NERC Inverter- Based Performance Guideline)**
	6. Freqency Droop
Active Power Modes	7. Charge-Discharge Storage
	8. Coordinated Charge-Discharge
	9. Active Power Limit
	10. Active Power Response (configurable as Peak Power Limiting, Load Following, or Generation Following modes)
	11. Automatic Generation Control
	12. Active Power Smoothing
	13. Volt-Watt
	14. Frequency-Watt Curve
	15. Pricing Signal
Reactive Power Modes	16. Fixed Power Factor
	17. Volt-VAR Control
	18. Watt-VAR
	19. Power Factor Correction

* A frequency function/set point is needed to facilitate LADWP's compliance to NERC Reliability Standard BAL-003-2, requirement R1 or its successor.

The functionality set forth in Table 2 to Table 5 are covered in the various DNP 3.0 Control Modes in Table 1 above and will be implemented by such Control Modes. Setpoints to some Control Modes are included below to establish a common understanding of expected operations but the Buyer shall have the right to direct changes to these setpoints at any time during the Agreement term. In addition to the MESA Control Modes, the ESS shall implement the LADWP-specified "Frequency Rate of Change Response Control Mode" in Table 2. The functionality set forth in Table 2 to Table 5 shall be provided for BESS products; however, to the extent they are applicable to other ESS products, proposals shall provide applicable information and indicate why the following tables are not applicable.

Table 2: AUTONOMOUS FUNCTIONS

AUTONOMOUS FUNCTIONS

Multiple Control Modes shall be available to be simultaneously armed and operated as needed

Frequency Rate of Change Response Control Mode

Monitor grid frequency on the ESS side of the Point of Delivery. Continuously compute rate of frequency change.

The ESS plant controller shall alternately have setpoints for positive or negative rate of change of frequency below or above which the ESS will respond with "Frequency Response Power" for a "Response Period" setpoint.

The ESS shall ramp to the average power for "Rolling Average Period" before the frequency goes above or below frequency rate of change thresholds. The rate at which ESS ramps back to the average power prior crossing the thresholds shall be a "Recovery Ramp Rate" setpoint.

Set points required for Frequency Rate of Change Response:

Symbol	Value	Units
Δf_{trig}	Magnitude of frequency change to trigger response	mHz
Δt_{trig}	Maximum duration over which that change can accrue	sec
ΔP_{resp}	Magnitude of MW response per decihertz	MW/dHz
t_{resp}	Duration of MW response after triggered	sec

Initiate frequency response if the magnitude of frequency change $|\Delta f|$ is at least Δf_{trig} within or at time interval Δt_{trig}.

- The response is a MW step change of amount $P_{resp} = \Delta P_{resp} \times -\Delta f \times k$, where k is the unit conversion between dHz and the units used for Δf.
- The response is recalculated throughout the frequency response period. Its magnitude increases if the magnitude of the frequency deviation increases as determined by comparing the current frequency and the starting frequency for calculation of Δf_{trig}. The response magnitude is not permitted to decrease.
- Frequency response ends at the expiration of response period t_{resp}.
- Ramp-out is at the same ramp rate as is used for active power control. No special ramp rate is needed for this mode.

Response time to the event shall comply with Table 2.1 in the NERC Inverter-Based Resource Performance Guideline for BESS products.

Table 2.1: Dynamic Active Power-Frequency Performance

Parameter	Description	Performance Target
For a step change in frequency at the POM of the inverter-based resource…		
Reaction Time	Time between the step change in frequency and the time when the resource active power output begins responding to the change[31]	< 500 ms
Rise Time	Time in which the resource has reached 90 percent of the new steady-state (target) active power output command	< 4 seconds
Settling Time	Time in which the resource has entered into, and remains within, the settling band of the new steady-state active power output command	< 10 seconds
Overshoot	Percentage of rated active power output that the resource can exceed while reaching the settling band	< 5 percent**
Settling Band	Percentage of rated active power output that the resource should settle to within the settling time	< 2.5 percent**

** Percentage based on final (expected) settling value

Dynamic Reactive Current Support Mode Requirements

Monitor voltage at Point of Delivery

Default hold time (HoldTmms) for Dynamic Reactive Current Support Mode after voltage returns to inside the deadband is five (5) seconds.

Default to Frequency Response and Frequency Rate of Change Response are higher priority than Dynamic Reactive Current Support.

Ability to respond in a minimum of 1-3 Cycles from detecting and to provide reactive power in response to Point of Delivery voltage falling below 0.8 pu.

Reactive Power Control Modes Requirements

Monitor voltage on ESS side at Point of Delivery.

While voltage remains between 1.1 and 0.8 pu respond to deviations in voltage outside a defined deadband with proportional reactive power.

Ramp rate (MVAR / Sec) for adjustment of reactive power.

Scheduled (day/night) fixed power factor setting for reactive power support.

State of Charge Management (Coordinate Charge/Discharge Control Mode) Requirements
Monitor ESS SOC and provide a mechanism to regulate SOC, principally to recover SOC after discharge events (both manual and automatic).

Table 3: EXTERNAL OVERRIDE CONTROLS

Provide functionality to trigger manual discharge, using the following parameters:
Continuous discharge power
Operator set point discharge time
Operator set point “On” ramp rate (MW / min or immediate)
Operator set point “Off” ramp rate (MW / min or immediate)
Reactive power set point (MVAR)
Reactive power set point timer (Hours)
Power factor set point
In addition to the MESA-ESS specification of Charge/Discharge Storage Control Mode, provide the following functionality when the ESS is in Charge/Discharge Control Mode:
ESS shall respond to external command signals to execute manual discharge or apply reactive power within 10 seconds of receiving the signal.
If present conditions do not permit requested discharge (e.g., SOC is too low), BESS shall report the maximally conforming parameters which are available over DNP 3.0.
During manual discharge or manual reactive control, ESS shall indicate which, if any, autonomous functions are disabled or degraded.
After manual discharge cycle is complete, ESS shall resume autonomous functions including automatic SOC management.

Table 4: CONNECTION AND DISCONNECTION FROM LADWP GRID

CONNECTION AND DISCONNECTION FROM LADWP GRID
While voltage and frequency remain within the specified voltage and frequency windows, the ESS shall remain connected to the LADWP grid unless instructed otherwise by disconnection signal or otherwise unavailable. System will stay connected and operational pursuant of Monthly Guaranteed Availability of the Agreement.
Provide function for commanded disconnection from LADWP grid both remotely and via local HMI. This is to be used for routine disconnection when sufficient warning is available to permit normal standard disconnect procedures by the ESS.
Provide functionality to accept an emergency disconnect input in the form of a dry contact. If instructed to open the ESS must immediately cease operation.
Startup and connection time from an "Off" or "Disconnected" state to "Connected and Idle" shall be no more than 300 seconds if the BESS/inverter thermal management loads are energized and the inverters are not set to "Sleep Mode". If the BESS is "Disconnected" but the main breaker is still closed, the BESS shall provide Buyer a timeout setpoint that causes the BESS to transition to a "Disconnected" state with the breaker closed but the inverters set to "Sleep Mode" after a Buyer setpoint number of minutes. The time to return from "Disconnected" and "Sleep Mode" to "Connected and Idle" shall be no more than 600 seconds if the BESS main breaker is closed and thermal management loads are energized. If a "Disconnected" or "Off" state opens the BESS main breaker, which removes battery and inverter thermal management power, then startup and connection time will be dependent on local temperature conditions and may exceed 600 seconds. The BESS shall report estimated time to "Connected and Generating" at all times. Inverters in "Sleep Mode" represents state where inverters are not switching and not synchronized to the grid.
4 seconds maximum time for ESS Point of Delivery disconnection after receiving emergency stop signal.
Behavior of ESS while the control systems are powered by a UPS, or an alternative auxiliary power supply, when the mains power line is shorted or opened shall be to disconnect until normal operations are restored.
Behavior of ESS when the mains power returns while the control systems are still powered by the UPS or an alternative power source shall be to reconnect as directed by Buyer.
The ESS shall have a microprocessor-based relay protection system (such as SEL 351) with CTs and PTs to detect overcurrent and to disconnect the AC breaker.

Table 5: REMOTE MONITORING AND CONTROL

REMOTE MONITORING AND CONTROL Requirements
The ESS-LADWP communication mechanism for data transfer during faults/triggered actions shall have 1 second sampling time.
The ESS shall be connected to external communications systems via one console for LADWP EMS and one console for local control.
The ESS shall set heartbeat timer to ensure communication path is online and processor is functioning.
Minimum available metrics via both data transfer and operator control updated by event driven data or buffers.
The ESS shall also monitor and be capable of controlling the following: • Current operational status • Total real power (MW) • Total reactive power (MVAR) • Total complex power (MVA) • State-of-charge (SOC), expressed as a percent, defined as ESS Energy Available for discharge / Guaranteed ESS Energy • Current power capabilities in all quadrants • Voltage and frequency as measured at Point of Delivery • Operation mode • Fault codes / description The Seller shall supply the points list and sampling frequency. The ESS shall have 2 seconds maximum response time for implementing changes to set points.

Exhibit 1: ESS Specifications Datasheet

The Seller shall fill in the specified parameters in the attached ESS Specifications Datasheet as applicable. Please indicate N/A for non-applicable items.

Exhibit 2: Availability and Liquidated Damages Formula

The Availability for each calendar month shall be calculated as follows:

$$Availability = \frac{D-(A+B+C+E)}{D} \text{ x } 100\%$$

For any calendar month where the Availability is less than the Monthly Guaranteed Availability, the liquidated damages for such month shall be calculated as follows and deducted from the monthly payment from the Buyer to the Seller.

$$Liquidated\ Damages\ =\ P_{MWh}\ x\ EDA$$

Where,

$$P_{MWh} = [(A + B + C + E) - D * (1 - GA)] * MW_R$$

MW_R = Guaranteed Continuous Discharge Rate
GA = Guaranteed Monthly Availability, expressed as decimal
EDA (Energy Storage Damage Amount) = $/MWh rate for liquidated damages.

A = Planned Outage Hours exceeding maintenance hours allowance and augmentation hours allowance.

- Planned Outage Hours means number of hours in a calendar month that the ESS is subject to a scheduled outage for ESS maintenance or augmentation purposes, less:
  - the remaining hours of the maintenance hours allowance, or
  - the remaining hours of the augmentation hours allowance
- Such Planned Outage Hours shall be pro-rated by multiplying
  - (1) the Planned Outage Hours and
  - (2) the percentage of the ESS that is unavailable (calculated by dividing the number of MWs unavailable, in increments of 1 MW, over the ESS capacity in MW.
- Maintenance hours allowance and augmentation hours allowance shall be mutually agreed upon by the Buyer and Seller.
- Any augmentation or major overhaul of the ESS shall be included in the proposal's Planned Outage Hours.
- Pre-defined years in which augmentation and/or major overhaul will take place shall also be provided.
- Any partial outage for maintenance during an hour shall count as a full hour for the purposes of this definition.

B = Forced Outage Hours Due to Seller means the number of hours in a calendar month during which the ESS does not perform or is not communicated to the Buyer in advance, excluding force majeure and Buyer's inability to accept energy. Such Forced Outage Hours Due to Seller shall be pro-rated by multiplying:

- The duration of the Forced Outage and
- the percentage of the BESS that is unavailable, calculated by dividing the number MWs unavailable, in increments of 1 MW, over the ESS capacity in MW.

Any partial outage during an hour shall count as a full hour for purposes of this definition. For example, an outage of seven hours and twenty-five minutes shall be deemed an eight-hour outage.

C = Performance Shortfall Hours shall mean any other hours during which the ESS is not capable of meeting the Guaranteed ESS parameters measured in each performance test; provided, that such Performance Shortfall Hours shall be prorated by multiplying:

- the Performance Shortfall Hours; and
- the percentage shortfall of the applicable Guaranteed ESS Parameter, calculated as Actual Measured value/ Guaranteed value).

Performance Shortfall Hours shall apply in the Liquidated Damages Formula only if the ESS fails the Performance Test.

D = Total Hours in the Month means twenty-four (24) multiplied by the number of days in such month.

E = SCADA Failure Hours means the number of hours the Buyer is unable to access real-time meter data from the ESS or change the ESS' operation due to SCADA equipment failure.

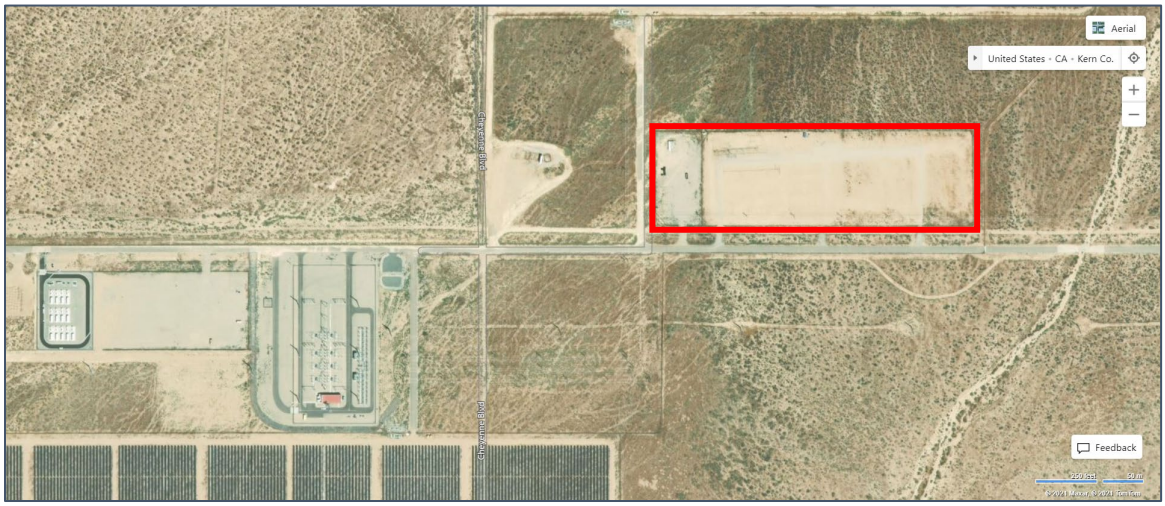
Exhibit 3: LADWP-Owned Land

The following are potential locations for ESS deployment on LADWP's land.

- Assume all dimensions are approximations and the land availability is subject to change.
- Assume interconnection voltage is 230kV for all locations in Exhibit 3.
- A Project Labor Agreement (PLA) is required for ESS deployment on LADWP's land.

Location 1 – LADWP-Owned land near Beacon Substation

- Location: Mojave, CA. 35°15'28.38"N, 118°1 0.94"W
- Total area: 9.8-acre rectangular plot, 1340ft x 320ft
- Minimum Capacity: 50MW
- Required Duration: 10 hours or more
- COD: Q2 2026 or earlier
- Technology: Not Lithium-ion BESS, specifically targeting long-duration energy storage.
- Requires transmission tie line (Seller's responsibility)
- Acceptable Contract Structures:
    - Build-Own-Operate-Transfer (BOOT): 1-year demonstration period after COD, may purchase project if performance is satisfactory
    - Energy Service Agreement (ESA): 20-year term with Buyout Price starting year 5 after COD

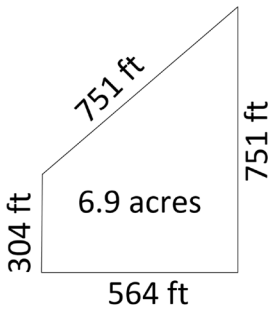


The following applies to locations 2-5:

- Located within the LA Basin
- Required Duration: 4 hours or more (Longer durations are encouraged)
- Expected COD: 2027-2033
- Project ownership by Buyer (i.e. BOOT)
- Optional Long-Term Service Agreement (LTSA)
- Expected Interconnection Voltage: 230kV

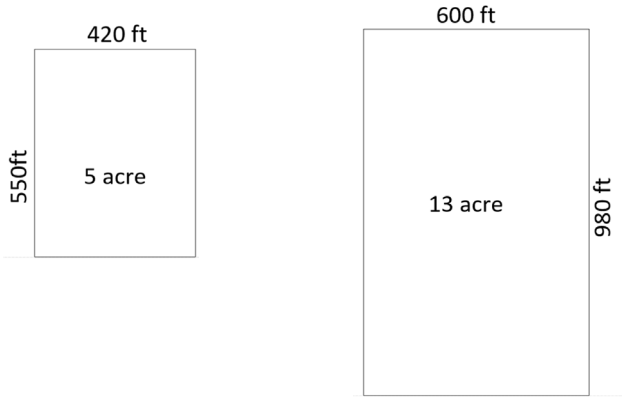
Location 2

- Total area: 6.9 acres
- Minimum Capacity: 50MW



Location 3

- Total area: 18 acres (2 plots)
- Minimum Capacity: 55MW



Location 4

- Total area: 2.75 acres
- Minimum Capacity: 50MW

Location 5

- Total area: 6.2 acres (2 plots)
- Minimum Capacity: 50MW