Lunar Energy Applications Note

Vertical modularity of 25/30 kWh

This Applications Note outlines the certifications and capabilities of the Lunar system for vertically installing 25 or30kWh of battery energy, and guidance on SolarAPP permit applications.

Aggregate Energy	Configuration	Model Number(s)
5 kWh	(1) 5 kWh DC ESS	LE-DC-UNIT
10 kWh	(1) 10 kWh AC ESS	L2-ESS-10KWH
15 kWh	(1) 15 kWh AC ESS	L2-ESS-15KWH
20 kWh	(1) 20 kWh AC ESS	L2-ESS-20KWH
25 kWh	(1) 20 kWh AC ESS + (1) 5 kWh DC ESS	L2-ESS-20KWH + LE-DC-UNIT
30 kWh	(1) 20 kWh AC ESS + (2) 5 kWh DC ESS	L2-ESS-20KWH + (2) LE-DC-UNIT

Table 1. Battery energy, configuration, and model numbers

UL 9540

Lunar's 5 kWh DC ESS (LE-DC-UNIT) is certified to UL 9540, *Standard for Safety Energy Storage Systems and Equipment,* as a Certified DC ESS (Energy Storage System Subassembly). This certification confirms that the 5kWh DC ESS contains all necessary *Modules, Power Conversion and Battery Management Systems* to be considered a stand-alone DC Battery Energy Storage System with a DC output. Lunar's 5 kWh DC ESS aligns with the UL9540A **Unit** definition - *a Frame, rack, or enclosure that consists of a functional BESS which includes components and subassemblies such as cells, modules, battery management systems, ventilation devices and other ancillary Equipment.* The DC ESS unit includes the cover and the wall bracket. Each individual wall bracket secures the 5kWh battery to the wall and is self-supported independently of any adjacent battery Units.

In addition, the Lunar AC ESS is defined by UL 9540 as a *Multi-Part ESS – An energy storage system consisting of assemblies or equipment interconnected in the field to comprise a complete system.* These parts consist of individual DC ESS units and an Inverter to make up the aggregated AC System. A 10 kWh (L2-ESS-10KWH), 15 kWh (L2-ESS-15KWH), and 20 kWh (L2-ESS-20KWH) configuration is Certified to UL 9540 as a multi-part AC ESS. As shown in Figure 1, an optional one or two DC ESS units can be vertically installed to the Multi-Part AC ESS for energy expansion.

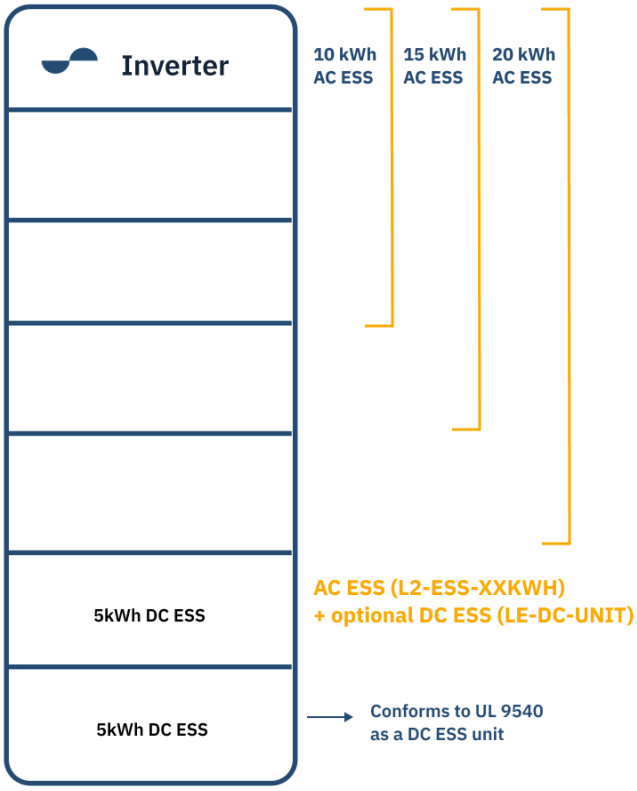


Figure 1. Lunar ESS Certification

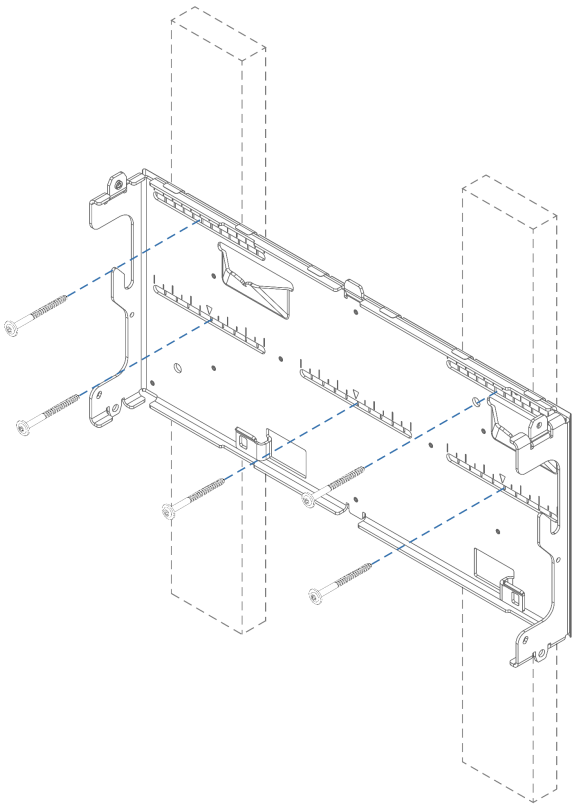


Figure 2. Individually supported wall bracket

UL 9540A Test Report

Testing has been completed for the individual DC ESS and the full multi-part AC ESS with two optional DC ESS expansions according to *ANSI/CAN/UL 9540A:2025 5th Edition, Dated March 12, 2025 - Test Method for Evaluating Thermal Runaway Fire Propagation in Battery Energy Storage Systems*, Laboratory Test Data – UL 9540A Checklist and Test Result (Unit Level), dated TBD available upon request.

As part of the UL9540A Large Scale Fire Testing, the DC ESS unit is treated as the Equipment Under Test with the appropriate sensors and cheese cloth placed accordingly. The spacing between individual adjacent vertical ESS units is fixed by the mechanical interface of wall brackets, with no additional spacing or protective devices required between vertically installed DC ESS units.

The above compliance documentation satisfies the 2021/2024 International Residential Code (IRC) definition for a “unit” from R328.5. Therefore the aggregate energy capacity of vertically installed Multi-Part AC ESS and chosen number of DC ESS expansions would need to meet the aggregate energy requirements of 1-4 of R328.5, while meeting the spacing requirements of R328.3.1.

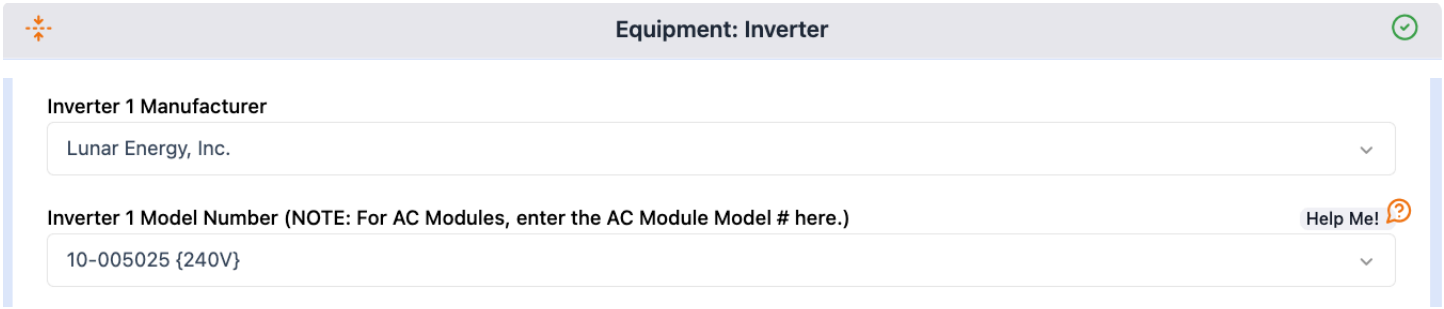


Figure 2. UL 9540A Test setup. Cheese cloth placed around the DC ESS unit.

SolarAPP

To configure systems with an aggregate energy exceeding 20 kWh in SolarApp, follow these steps:

1. **Inverter Selection:** Choose the "10-005025" inverter model.
2. **ESS Model:** Specify "L2-ESS-20KWH" as the Energy Storage System Model.
3. **DC Expansion:** Select "LE-DC-UNIT" from the dropdown menu for DC expansion models.



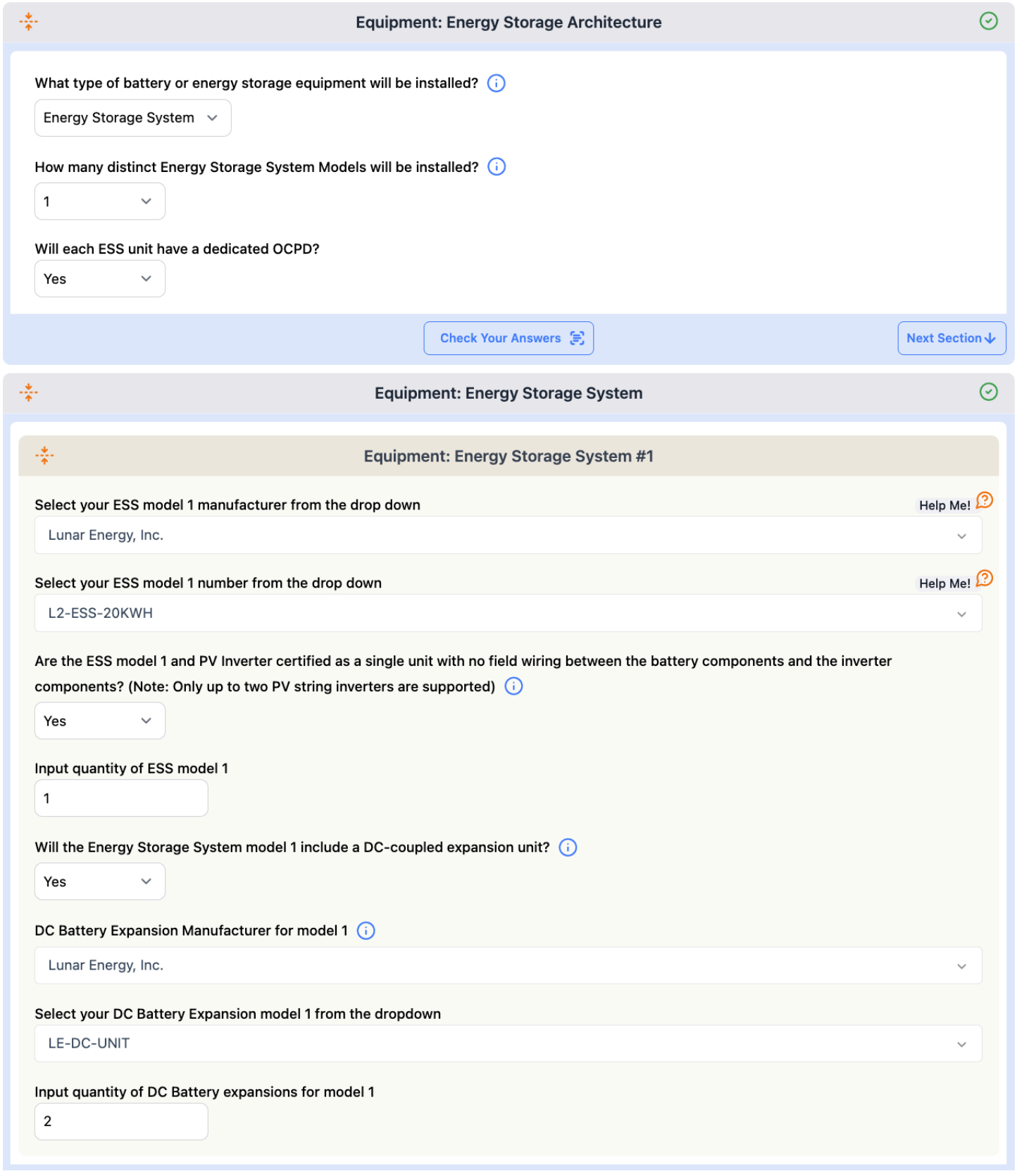


Figure 3. How to fill out SolarAPP permit applications

Revision History

Revision	Description of Change	Effective Date
1	Initial Release	11/05/2025
2	Model number update	01/05/2026
3	Permit guidance	03/08/2026