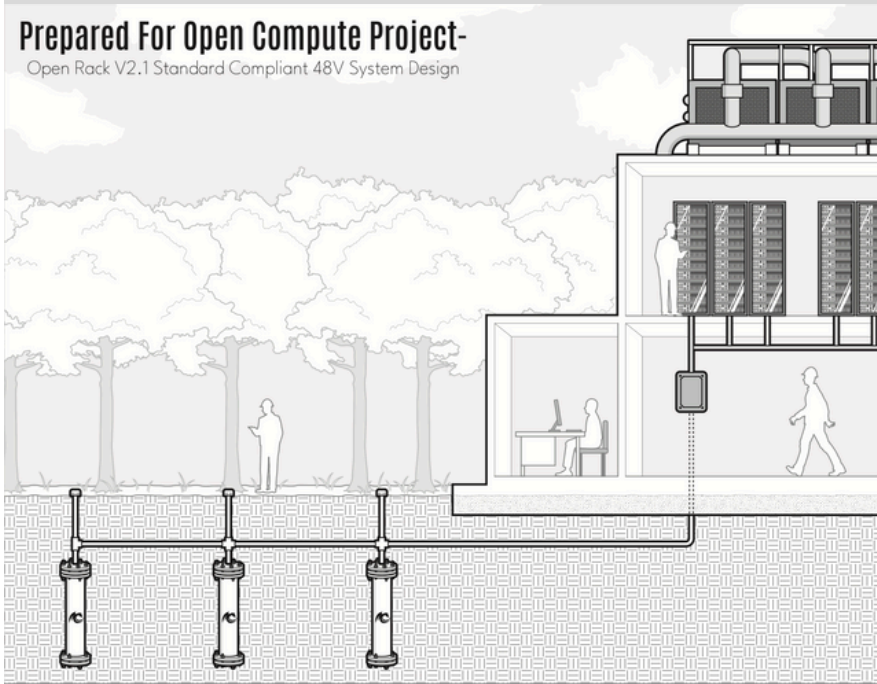


DATA CENTER ESS - CONCEPT

Efficient and Fire Resistant Energy Storage

Prepared For Open Compute Project-

Open Rack V2.1 Standard Compliant 48V System Design



DRAGON Q ENERGY

Dragon Q Energy's data center ESS concept delivers safe, robust, and efficient, large-format energy storage where space is constrained and real estate is at a premium

Dragon Q Energy's 0.25 MWh data center ESS is a subterranean battery system engineered for mission-critical, space-constrained sites where uptime and safety are non-negotiable. Installed fully below ground, it delivers high-density, large-format storage without occupying surface area and remains naturally shielded from environmental and human risks.

Designed for high-heat and high-humidity conditions, the system operates within a hermetically sealed, Argon-filled environment where fire cannot occur. Its corrosion-resistant construction and passive geothermal cooling further enhance efficiency and durability. Once buried, the ESS becomes a low-maintenance, long-life asset—providing stable, reliable power tailored to data center demands.

Value Propositions:

- **Maximize Usable Space** – Unlock underground capacity to add 0.25 MWh of energy storage per unit where real estate is constrained- leaving surface available for further use.
- **Ensures Operational Safety** –In addition to five on-board safety mechanisms designed to vent and prevent the spread of thermal runaway, the subterranean, fire-resistant design eliminates exposure risks for both personnel and critical assets.
- **Optimized Power Usage Effectiveness** – By integrating passive geothermal cooling and hermetically sealed underground architecture, the system minimizes auxiliary energy demand for thermal management. This improves overall PUE, delivering more usable power to IT loads while reducing both operational costs and environmental footprint.
- **Standards & Hyperscaler Alignment** – Designed in line with hyperscaler (META/Google) modernization efforts and the Open Compute Project's 48VDC Rack & Power initiatives, ensuring compatibility with next-generation data center infrastructure.

Proposed Technical Specifications

Performance Specifications

Chemistry	Li-Ion (NMC)
DC Voltage - 14S (Nominal)	48 VDC (51.8 V Nominal)
Cell Type	46120
Cell Capacity (Ah)	42 Ah
Cell Voltage (Nominal)	3.7V
Cell Energy	155Wh
Cell Configuration (Data Center)	127P14S (1778 Cells)
Total Pack Energy	.25 MWh
Pack Capacity (Ah)	5,334 Ah
Moderate Charge/Discharge Rate	2,500 A (0.5C)
Power (W)	129.5 KW
Internal Resistance (IR)	0.55 mΩ per pack
Ripple Voltage	< 0.5% @ 2500A
Temperature Regulation	Passive Geothermal
System Round Trip efficiency	0.99
Battery Management System (BMS)	Active Balancing, RS485, CAN Bus

Environmental Specifications

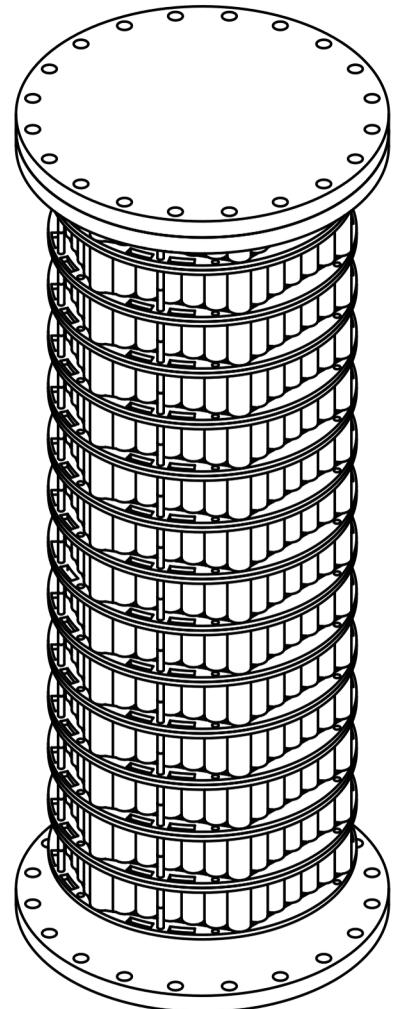
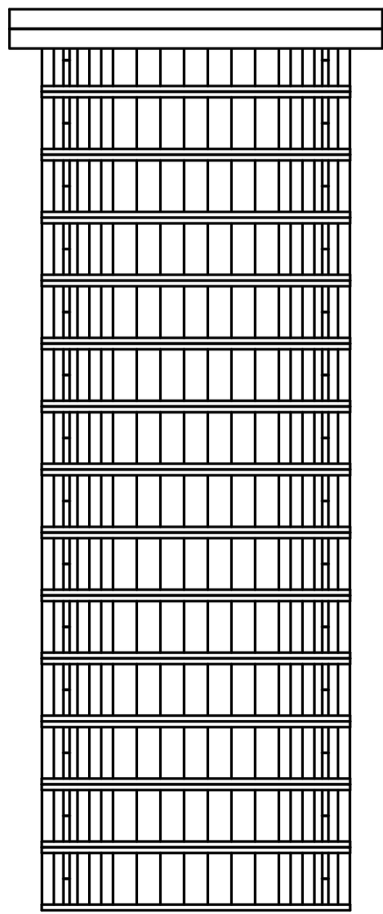
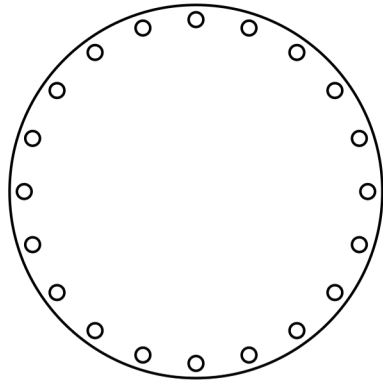
Pack Operating Temperature (Max Permissible)	-20°C to 55°C (-4°F to 131°F) Discharge 0°C to 45°C (32°F to 113°F) Charge
Pack Operating Temperature (Max Cycle Life)	0°C to 30°C (32°F to 86°F) Charge/Discharge
Recommended Temperature (Air) - With ESS Underground	-73°C to 76°C (-100°F to 170°F)
Recommended Temperature (Soil)	0°C to 37°C (32°F to 100°F)
Humidity	Up to 100%, condensing, standing water

Safety Specifications

Pack Thermal Runaway (TR) Mitigation	Positive Argon pressure keeps TR in cell casing. Hermetic environment starves initial fire of oxygen
Pack TR Propagation Prevention	Pressurized Argon extinguish flames from ruptured cells
Primary TR Control (Retention)	Pack can retain smoke, gases, chemicals of cell TR, while venting the pressures to prevent pack explosion and deflagration
Secondary TR Control (Retention)	Pack can retain smoke, gases, chemicals of 2nd cell runaway, while venting the pressures to prevent pack explosion and deflagration
Tertiary TR Control (Release)	Pack can release smoke, gases, chemicals of cell TR overboard through a port and customer conduit, to prevent container explosion and deflagration
Proposed Certification	UL9540A, ATEX, UL Class I, Div. 2 for hazardous locations, UN38.3

Dimensions

Height	1.8M
Width	0.6M
Weight	1100kg (2425 lbs)



DRAGON Q ENERGY

CREATED BY: GAGE HEINZE		DATE: 7/8/2025		APPROVED BY: DPC		DATE: 7/8/2025	
TITLE: DATA CENTER ESS 0.25 MWh				PART NUMBER: 20000			
				SCALE: 110	REV: 1	DATE: 7/8/2025	SHEET: 1/1