

Energy Infrastructure and Innovative Technology: Battery Storage

Washington Public Ports Association

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Topics Covered

- **Introduction to Ameresco**
- **Load Growth and Energy Storage**
- **Battery Technology and the Battery Energy Storage System**
- **Why Now –ITC, Safety, Contracting**
- **Benefits to the Ports, the Customers, and the Utilities**
- **Example Projects**



**Ameresco (NYSE:AMRC) is a
leading energy infrastructure company
delivering integrated solutions to provide
reliable power & modernize infrastructure.**



Expert Integrators

Connect technologies, infrastructure & expertise with a vendor-neutral approach



Full Lifecycle Partner

Develop, design, finance, construct, operate & maintain critical infrastructure



Driven by Customer Success

Trusted to deliver measurable results across complex environments





Leading energy infrastructure company delivering integrated solutions to provide reliable power & modernize infrastructure



Founded in 2000



Grounded in technology independence

Performance contracting pioneer

\$15B+

of diversified infrastructure solutions delivered since inception

5+ GW

of contracted energy resources

25+

years as a trusted partner

Frost & Sullivan named Ameresco a leader for

Microgrid Technology Innovation

1,500+

employees across North America & Europe delivering local expertise

Committed to reducing our customers' carbon footprints by a cumulative

500M

metric tons by 2050

Full lifecycle partner for public & private sector customers, delivering critical infrastructure that performs for decades

Develop ► Design ► Finance ► Construct ► Operate & Maintain

Power Infrastructure

Reliable resources for surging demand

Firm Generation

Renewable Generation

Grid-Edge Solutions

Grid Integration & Delivery



Buildings & Public Infrastructure

Efficiency & renewal for aging systems

Building & Energy Systems

Smart Buildings & Controls

Public Infrastructure

Advisory & Performance Services



The Broader Electric Power Landscape

Increasing Demand

- Total U.S. electricity demand will increase 21% by 2030 and 39% by 2035 from 2026 levels (ICF)
 - Demand during peak periods, when the grid is under the greatest stress, is also expected to climb sharply—up 14% by 2030 and 25% by 2035.
 - Mostly in regions that are already constrained and with fastest growth in data centers
 - Forecasts 445 GW of U.S. generation capacity additions from 2026 through 2030, yet only 68 GW is expected in 2026

Energy Storage

- In 2025, more than 57,000 MWH of new energy storage was added in US (about 30% increase from 2024).
- By 2030, the market is set to exceed annual installations of 110 GWh/47 GW

What is it?

- **Cathode**

- Aluminum bare foil coated with a Lithium Metal powder (e.g. LiCoO_2)

- **Anode**

- Copper bare foil coated with graphitic carbon

- **Separator**

- Thin, non-conductive isolation layer

- **Electrolyte**

- Lithium salt organic solution
- Medium for ion transportation

Common Li-Ion Chemistries

- **Lithium-Iron-Phosphate (LFP)**

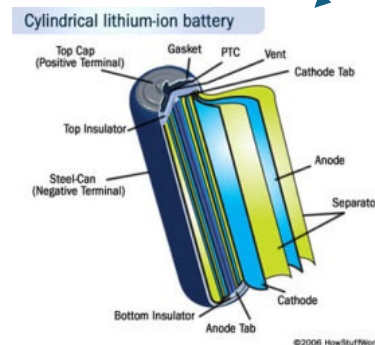
- LiFePO_4

- **Nickel Manganese Cobalt (NMC)**

- LiNiMnCo

Three common “form factors”

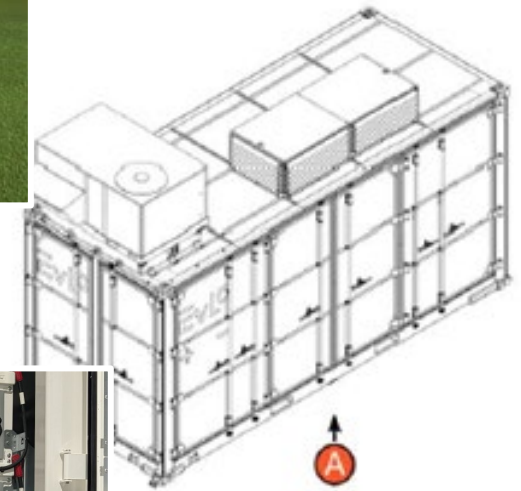
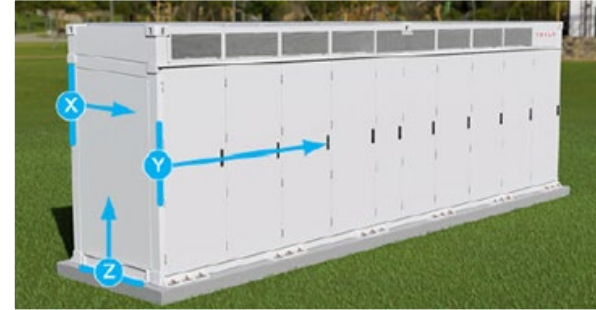
1. Cylindrical Cell, ~2.5 Ah
2. Prismatic Cell, ~30-90 Ah
3. Pouch Cell, ~20 Ah



BESS Architecture

- Major Equipment in a BESS
 - Battery Container
 - PCS (Power Conversion System) /Inverter
 - Transformer/Balance of plant
- Battery Container
 - Battery modules, racks
 - BMS (Battery management system)
 - Cooling system (HVAC or liquid cooling)
 - Fire detection / monitoring & suppression

Up to 6 MWH in one standard 20-foot container



BESS Architecture Continued

- PCS (Power Conversion System)

- Convert DC voltage from Batteries to AC voltage
- DC voltage 1500V
- AC voltage 480V, 690V...

- Transformer(s)

- Step up power from 480V or 690V to grid connection voltage

- EMS

- Energy Management System, communicating to BMS, microgrid controller, plant controller, SCADA etc.



Architecture, Continued

- Switchgear, Control Housing & Electrical Equipment
 - Enables protection, control, and power distribution
 - Can also drive lead-times depend on project specs
- SCADA (Supervisory Control and Data Acquisition)
 - Enables system monitoring, control, and dispatch
 - Interfaces with site controller, utilities, and market operators
 - Requirements vary significantly by project
- Fire Protection
 - Thermal monitoring and alarms are standard requirements



It's Cost Effective

- Investment Tax Credit
 - 30% (Prevailing Wage and Apprenticeship)
 - +2 to 10% Domestic Content and 10% for Energy Communities
 - Energy Storage will continue to be ITC eligible with new FEOC rules
- Costs are Down
 - Lithium Prices have dropped dramatically (over 80% drop from 2022 peak)
 - Challenges: Tariffs, Trade Investigations for Chinese suppliers, possible FEOC challenges

Safety

- **Safety Improvements**

- Containerized products general meet latest fire and deflagration standards
- Fire and propagation testing for battery products are now standard
- Industry moving away from requiring active intervention to fight battery fires—passive protection and containment let fires burn themselves out
- Dominant chemistry is now more-stable and cobalt-free Lithium Iron Phosphate (LFP)

Ways to Contract for Energy Storage

- Utility Contracts
 - Tolling Agreement: Third party ownership
 - Third party engineers, procures equipment, constructs, O&M, ITC etc
 - Third party guarantees Capacity, Availability, Round Trip Efficiency
 - Utility pays fixed amount per month
 - Utility responsible for dispatching the BESS
 - EPC Agreement: Utility owns the BESS
 - EPC contract to Engineer, Procure equipment, Construct, Commission
 - O&M contract (may or may not include guarantees)
- Power Purchase Agreement (Third party with Customer)
 - Behind the Retail Meter (Similar to Tolling agreement)

All Contracting Approaches Involve the Utility

- Coordination with utility is necessary
 - Interconnection Processes (Feasibility, System impact, Facilities)
 - Scheduling
 - Reliability Compliance
 - Settlements
 - Dispatch
 - Outages
- Early and frequent interaction and planning between the port, regulatory agencies, and utilities
- Increased efficiencies, potential cost savings, and partnership and information sharing opportunities.

Benefits to Utilities

- Enhance System Reliability
 - Support the energy demands of a highly digitalized society
 - Provides flexibility needed to reliably manage and utilize renewable resources to be able to serve the load
- Relieve Transmission and Distribution Constraints
 - Prevent future overloads on the transmission or distribution system while providing voltage and reactive power support capabilities
- Energy Arbitrage and Ancillary Service Value
 - The utility can use the storage resource to lower the costs assigned by BPA for imbalance energy and ancillary services
 - Can also participate in the wholesale market (in areas where there is an RTO/ISO)
- Address resource adequacy (RA):
 - Serve as an RA resource and reduce the utility's RA obligations

Energy Storage and Washington Ports

- **Energy Storage Boosts Reliability, Cost Effective and Reduces Carbon**
 - Electric power is needed to meet load growth for economic development
 - Data centers, advanced manufacturing, electric vehicles, and broader port electrification
 - Energy storage reduces strain on the grid
 - Saves off peak to produce during peak periods
 - Reduce power surges and manage power fluctuations
 - Energy storage postpones the need for new transmission and distribution lines needed to serve the growing load
 - Energy storage supports integration of solar and wind to serve the load

Example: Increasing Data Center Load

Provide local Resource Adequacy and support SVP's distribution system

Arbitrage CAISO energy prices (charge when energy is cheap, discharge when expensive)

Reduce dependance on gas peaking generation

Integrate more renewables into SVP's power mix

Silicon Valley Power Battery Energy Storage System

Location: Santa Clara California

Customer: Silicon Valley Power (City of Santa Clara)

Size: 50 MW / 200 MWH standalone energy storage project, also includes BESS substation

Contract: Tolling agreement for 20-year term, Ameresco also provides EPC / LTSA

Example: Reliability and Price Volatility

- Load shifting
- Reduce Costs from Bonneville Power Administration
- Integrate renewables

Ameresco BESS Asset with Snohomish PUD

Snohomish Public Utility District, WA

Arlington County, Washington

25 MW / 100 MWH standalone energy storage

Contract: Tolling agreement for 25-year term, Ameresco also provides EPC / LTSA

Example: Reliability and Price Volatility

- Load shifting
- 8 substations throughout the system
- Integrate renewables
- Reduce Costs



United Power (Rural Cooperative)

Colorado's Northern Range

Total ~78 MW / 313 MWH Standalone storage at Substations

Contract: Tolling agreement for 20-year term, Ameresco also provides EPC / LTSA

Examples Continued

Nucor Steel Mill: Behind-the-Meter

- 50 MW / 200 MWH: Onsite battery will help stabilize the electric load from Nucor's new arc furnace
- Reducing strain on the grid so utility can manage power fluctuations and boosts the use of renewable energy

Pu`uloa Microgrid – Joint Base at Pearl Harbor (In-Front-of-the-Meter)

- 99 MW: 11 dual-fuel reciprocating generators, 6 MW solar, 30 MWH BESS
- Interconnects to the HECO's O'ahu grid at 46 kV
- Resiliency for Joint Base Pearl Harbor-Hickam if island grid failure
- Grid stability
- Black Start if needed to recover from a major grid outage



THANK YOU
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