



Long Duration Energy Storage Systems for a Cleaner Future

December 2022

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Our Goal: To be the leading provider
of long-duration energy storage technology

ESS is a Category Defining Company



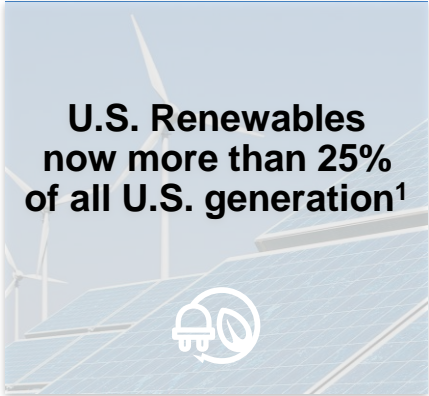
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- 1 **Large and Fast-Growing TAM:** ~\$50b in Long-Duration Energy Storage CAPEX Required by 2025¹
 - 2 **Simple Yet Revolutionary Technology:** Iron, salt and water stores energy; strong patent portfolio
 - 3 **Compelling Value Proposition:** Highest performance, lowest cost² and most sustainable
 - 4 **Low Risk Expansion Plan:** Proven³ technology, low-cost capacity growth & strong balance sheet
 - 5 **Considerable Pipeline of Opportunities⁴:** \$8b+ in projects examined under NDA
 - 6 **Premier Management Team:** Founders and inventors supported by an experienced team

¹ McKinsey, Net-zero power: Long-duration energy storage for a renewable grid, <https://www.mckinsey.com/business-functions/sustainability/our-insights/net-zero-power-long-duration-energy-storage-for-a-renewable-grid>.


² Management Estimates of levelized cost of storage (LCOS) among long duration Storage Systems.

³ Based on our Generation I products, which are no longer deployed.



⁴ Our \$9 billion pipeline of visible potential opportunities for 2022 through 2026 was determined based on named projects with customers ESS has spoken to and signed non-disclosure agreements with in order to discuss the projects. Actual pricing will be project specific. Our pipeline includes both Energy Warehouse and Energy Center projects and global opportunities. There is no assurance that we will enter into all of the markets that we have projected in our pipeline.





**U.S. Renewables
now more than 25%
of all U.S. generation¹**




**3.4m Customer*
Hours of Power
Safety Shutoffs in CA
2019-21²**



**Germany pulls its
carbon-neutral goal
up by 15 years
To 2035³**



**CA curtailed
1.5 GWh from March
to May 2022 alone⁴**



**Moving to a resilient, carbon-neutral grid
demands dramatic growth for long-duration storage**

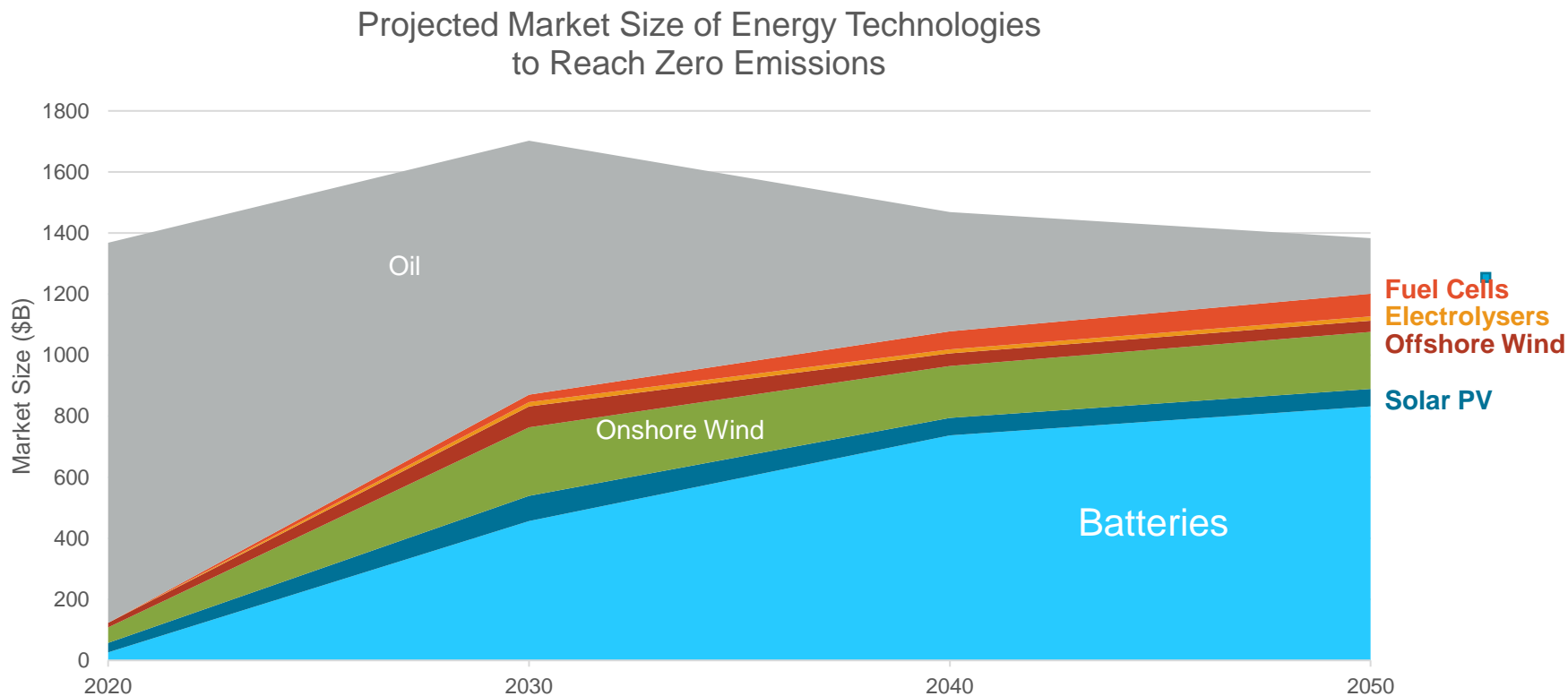
1. Energy Information Administration, June 2021 (https://www.eia.gov/electricity/monthly/epm_table_grapher.php?t=table_es1a)

2. California PUC, <https://www.cpuc.ca.gov/-/media/cpuc-website/divisions/safety-and-enforcement-division/documents/psps-docs-unsorted/cpuc-psps-event-data-oct-2013-through-oct-20211232021.xlsx>

3. Bloomberg, Germany Brings Forward Goal of 100% Renewable Power to 2035, <https://www.bloomberg.com/news/articles/2022-02-28/germany-brings-forward-goal-of-100-renewable-energy-to-2035>

4. CAISO, Managing oversupply, <https://www.caiso.com/informed/Pages/ManagingOversupply.aspx>

Batteries are a Big Part of the Solution



Why Long Duration Storage?

**Shift Supply to Meet
Demand from 4-12 Hours**

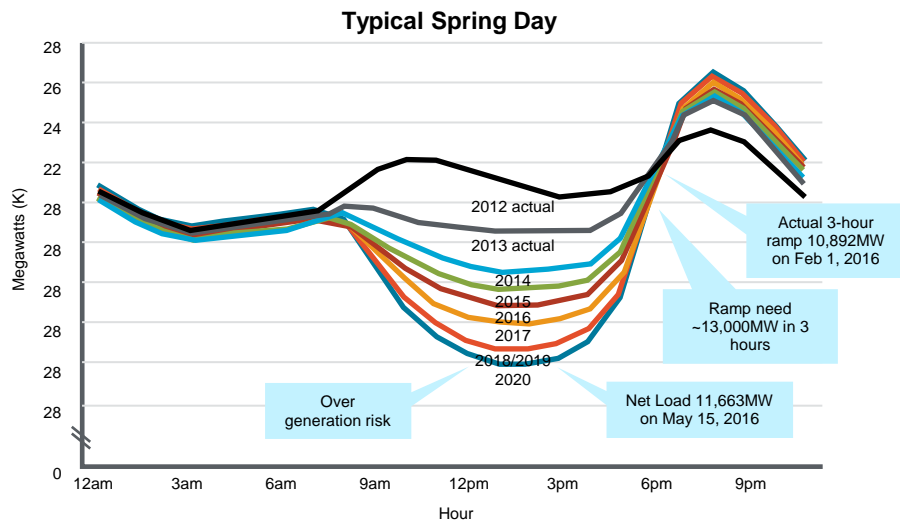
**Low Cost to Enable
Replacement of Alternatives
(Peaker Plants)**

**Reliable
(Grid Stability)**



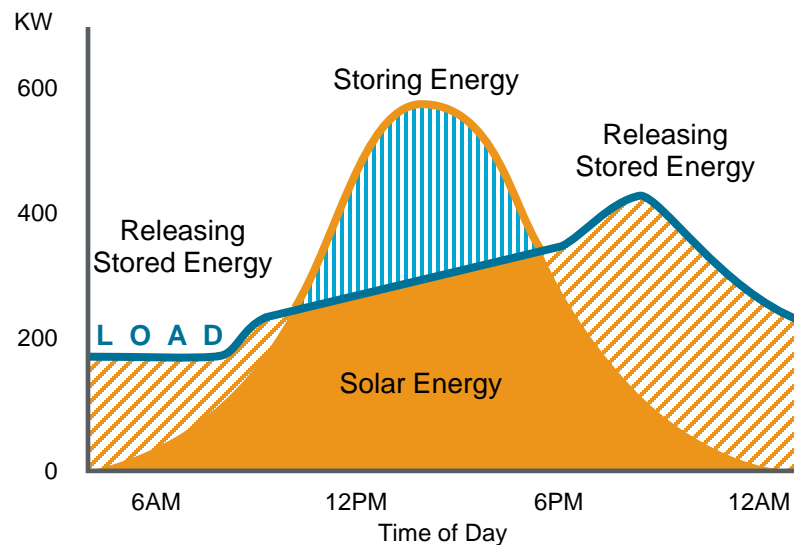
Renewable Penetration Drives Further Storage Needs

Duck Curve Evolution Shows Sharp Ramp Needs and Overgeneration Risk

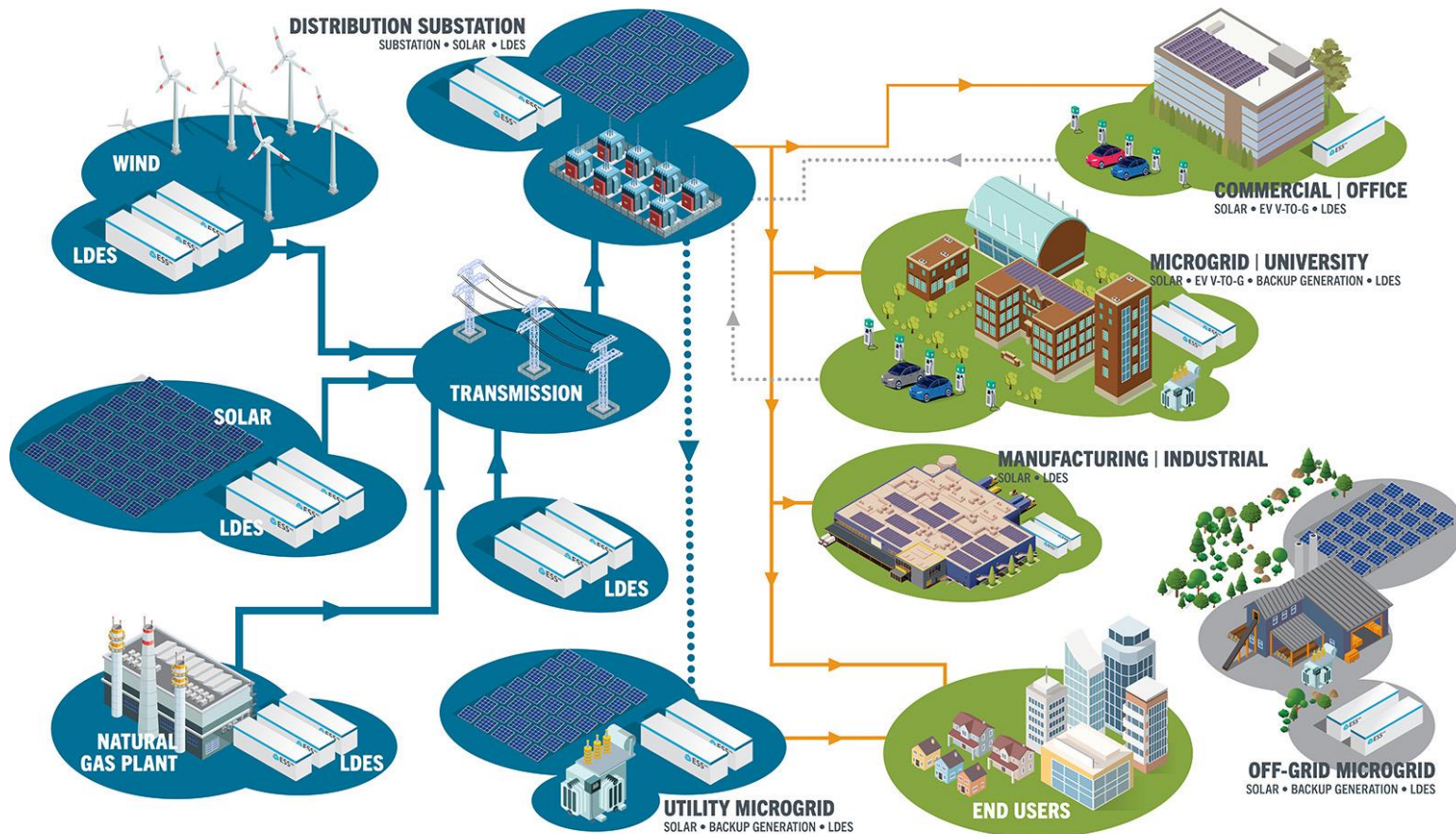


Source: CAISO and Company reports

Energy Shift to Evenings Using Long Duration Storage



Where Does LDES Play?



Challenges Face the Grid Storage Incumbent - Li Ion



THE WALL STREET JOURNAL.

Rising Battery Prices Add Uncertainty to Electric-Vehicle Costs

Demand for lithium outstrips supply, ending yearslong price declines

Bloomberg

California's Largest Battery Storage Shut Down by Smoke, Again

- Vistra closes 100-megawatt facility after system malfunction
- Incident comes less than six months after previous shutdown

ESS has received increased inbound opportunities due to Li ion uncertainty



140 TWh of Long Duration Energy Storage Needed

COP26



COP 26: Major global report by McKinsey declared that LDES is key to energy transition

LDES defined as two categories: 8-24h and >24h storage

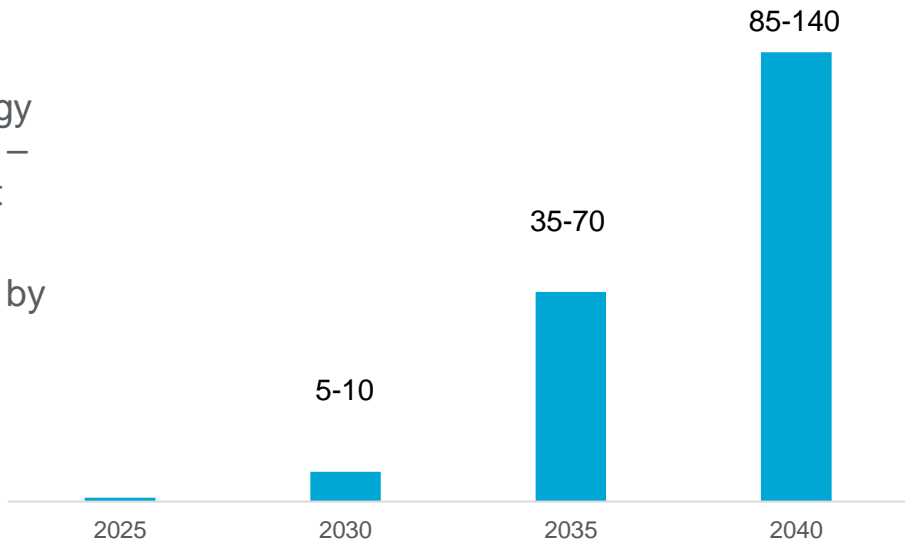
Lithium will continue to play a role for <6h but too expensive for longer durations

LDES is the largest single storage category needed

Long-duration energy storage is essential – decarbonization not feasible without it












30-40 TWh needed by 2040 in the United States alone

Cumulative Installed Energy Capacity (TWh)

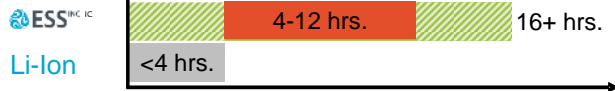


ESS Transforms the Value Proposition for Long Duration Storage

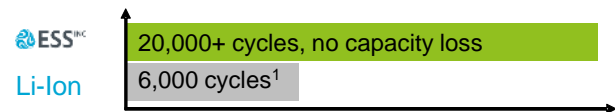


What Customers Demand		How ESS Transforms the Grid
 Longer Duration	<ul style="list-style-type: none">• Up to 12 hours (current version)• No capacity fade• No power fade	 <ul style="list-style-type: none">• Can replace coal and gas with solar and wind• Designed for utility-scale applications
 Low Cost	<ul style="list-style-type: none">• Lower LCOS than other technologies• Incremental cost of storage <\$20/kWh	 <ul style="list-style-type: none">• The first truly low-cost flow battery• Field-proven, in commercial production today
 Power On Demand	<ul style="list-style-type: none">• <1 second response time• >20,000 cycle life – \$0 marginal cost per cycle• Flexibility allows multiple revenue streams	 <ul style="list-style-type: none">• Improved grid resiliency and flexibility• Enables multiple use cases
 Safety, Reliability, and Bankability	<ul style="list-style-type: none">• Non-flammable, non-toxic, no explosion risk• Wide operating temperature range• Munich RE insures technology risk	 <ul style="list-style-type: none">• Can deploy in a wide range of geographies• No HVAC needed – cuts CAPEX and OPEX• Customers have a bankable solution
 Sustainability	<ul style="list-style-type: none">• Easily sourced materials; recyclable components• “Plug and play” with 25-year design life	 <ul style="list-style-type: none">• Environmentally sustainable• Accelerates clean energy transition

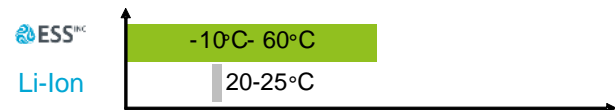
Operational Flexibility



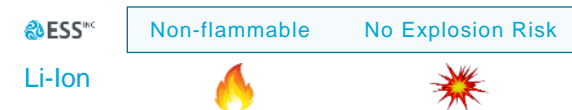
Longer Asset Life



Superior Ambient Operating Temperature



Safety



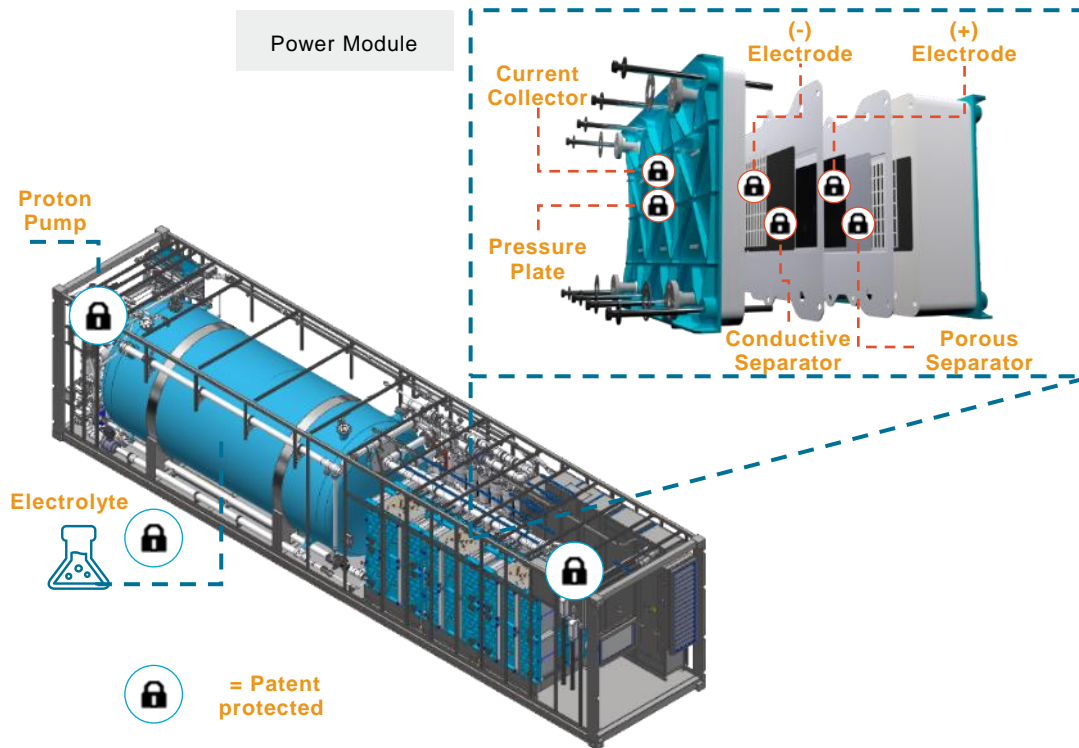
Compelling Performance

- ✓ Can cycle when needed with no impact to asset life
- ✓ Operates at peak efficiency independent of outside environment
- ✓ No heating/cooling systems needed
- ✓ Safe for deployment to urban areas or harsh and pristine environments

¹ Li-Ion cyclability from BYD energy storage system factsheets.

Differentiated Iron Flow Design & IP Protected

ESS Critical Technology



ESS IP Portfolio



140+ Patents Granted and in Pipeline Pending Applications



Undisclosed Number of Trade Secrets and Identified Patents



World-leading Iron Flow expertise, and roadmap to additional breakthroughs and advantages






~44% Employees Have an Engineering Background¹

Flow Batteries are Scalable, Low Cost, Long Duration Storage

Iron flow battery scaling

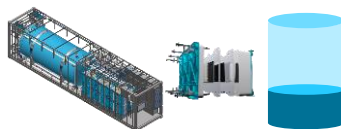
A theoretical 100kW/400kWh ESS battery contains

Component	Number	Cost
Fixed Equipment: i.e., power electronics, tank, structure/supports	1x	
Power Module	1x	
Electrolyte	4x	

- More electrolyte – Longer duration
- ESS electrolyte is low cost – made from iron, salt and water
- Incremental cost of increasing storage duration is low

Increasing storage duration = same system, more electrolyte

400kWh configuration



400kWh cost¹



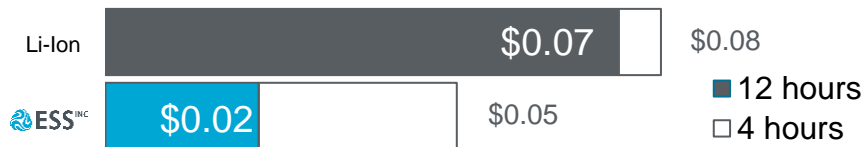
1,000kWh configuration



1,000kWh cost



LCOS at 12 hours vs 4 hours²



Increase Duration by Adding Low-Cost Electrolyte

¹ Figures shown are illustrative

² Economics based on Levelized Cost of Storage (LCOS).

$$LCOS = \frac{\sum \text{CapEx} + \sum \text{Installation} + \sum \text{Disposal} + \sum \text{O\&M}}{\sum \text{Annual Usable KWh}}$$

Energy Warehouse™ Overview



Product Summary

Behind-the-meter solution

First commercial deployment in 2015

Generation II launched in 2020

Containerized fully-integrated design for turnkey delivery

Easy to permit = Fast to deploy and commission

Current Specifications

Configurable Range	75kw – 90kW (peak power)
Rated Capacity	400 kWh
Total Capacity	500kWh
Response Time	<1 second
Module Cycle Life	>20,000 cycles
Ambient Temperature	-5°C to +50°C (*Additional weatherization option available)
Expected Life	25-year design life
Warranty	1 year comprehensive, 10-year extended warranty on battery modules and electrolyte management sys

Stackable
Seismic Rated



Energy Center™ Overview



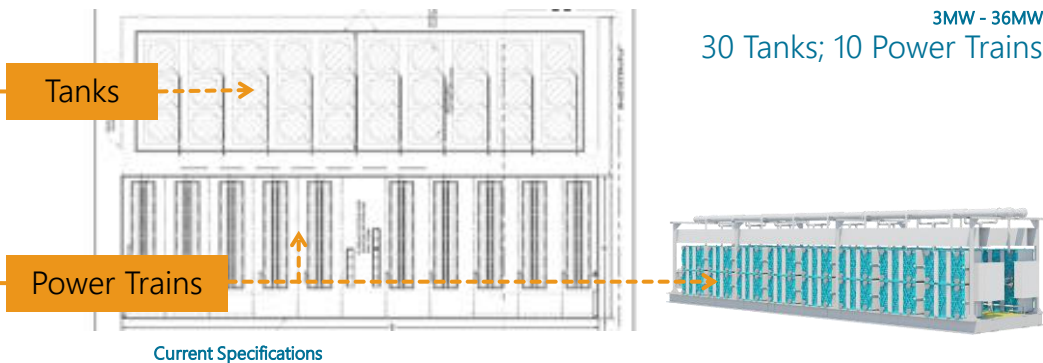
Product Summary

Front-of-the-meter solution

Deployments starting in 2023

Modular design for utility-class

Power capacities starting at 1 MW



Configurable Range	Customizable up to GW scale
Rated Capacity	10MWh / MW
Total Capacity	12 MWh / MW
Response Time	<1 second
Module Cycle Life	>20,000 cycles
Ambient Temperature	-5°C to +50°C (*Expandable range)
Expected Life	25-year design life
Warranty	1 year comprehensive, 10-year extended warranty on battery modules and electrolyte management system

ESS Technology is Proven and Insured



Munich RE

Investment-Grade Warranty

10-year extended warranty covering battery modules

Investment-Grade Project Insurance

Warranty continuity insurance provides additional surety to customers and financiers

“The ability to ensure battery performance is a key piece of the puzzle in decarbonizing our energy sector.”

–Peter Röder, Member of the Board of Management, Munich RE

Aon

Surety and Corporate Bonding
Growing project surety capacity

One Beacon

EXIM

US Export-Import Bank Qualified
Pre-qualified financing available for overseas buyers

86% Less Capital Required – Ready to Scale Globally

Simple, Low-cost Production in the USA

\$in millions/GWh of Battery Module Production Capacity

~\$140

~\$20

Li-Ion competitor



Source Lux Research.

Simple, automated
ESS manufacturing line



Expensive, complex
Li-Ion battery manufacturing line



