Eos Energy Enterprises

General Overview

November 2024

Eos. Positively ingenious.®

eos™

Who We Are & What We Do

Founded in 2008 … HQ & Lab in Edison NJ – (In house R&D)

Manufacturing facility in Pittsburgh PA

400+ team members

NASDAQ: EOSE in Q4 2020

State-of-the-art manufacturing design & IP for a fully scalable alternative to Li-Ion

Lower LCOS (Levelized Cost of Storage) analysis than current storage solutions

Our Core Technology

Reliable & Local Raw Materials

No conflict materials, domestic sources ,widely available supply chain, not subject to volatile commodity swings

Inherently Safe Design

Zinc electrolyte is non-flammable & non-explosive, eliminating fire suppression and environmental controls

One-stop Shop with US Manufacture

R&D and manufacturer of patented, BMS and AC/DC Block battery technology with 91.1% domestic content

Long Life

Capacity guarantee for 20 + years, no augmentation and minimal degradation enabling complex duty cycles

Technology & Product

Eos Product Embodies Circular Economy

Manufacturing

- *No clean room required*
- *71% lower water footprint vs. Li-ion*
- *Battery-to-battery test charging: 75% energy reduction*

Operations

- *No fire suppression*
- *No water use during lifetime*
- *No HVAC -> 70% lower aux load*
- *No Degradation*

End of Life

- *Fully recyclable w/ existing process*
- *Life extension and reuse plan*
- *Can repurpose sites after decommissioning*

Raw Materials

- *5 widely available commodity materials: zinc, bromide, conductive plastic, graphite felt, plastic*
- *No conflict minerals*
- *Extensive reserves of Zinc*

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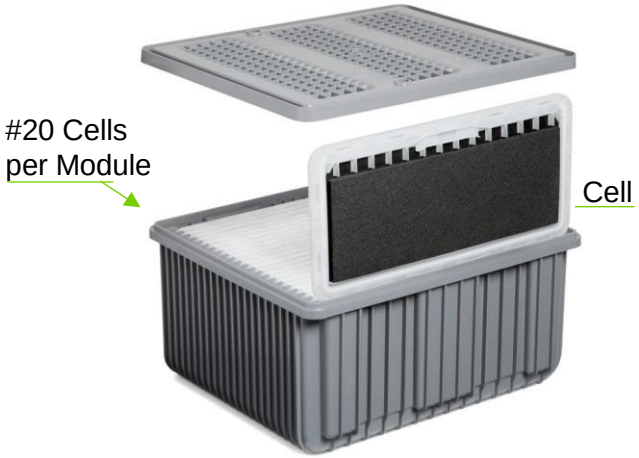
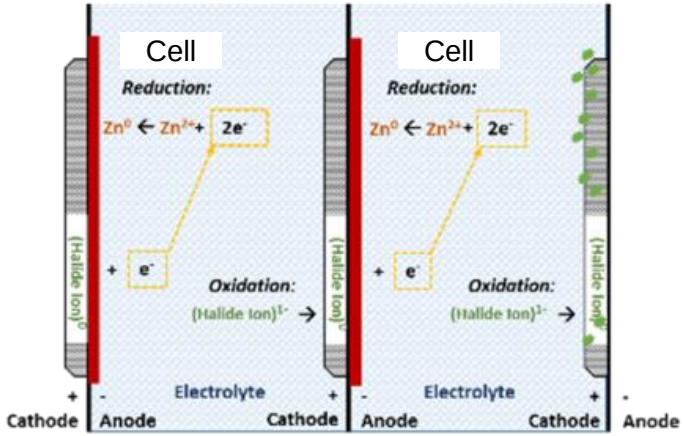
Eos battery module and chemistry

Static & sealed bi-polar Battery Module



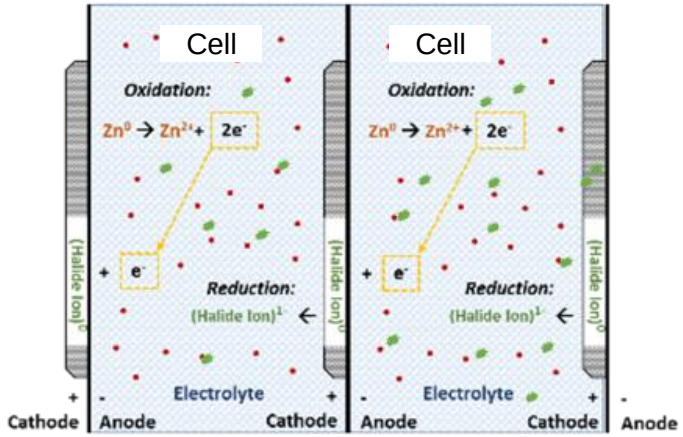
Reversible zinc plating and halide redox with large aqueous electrolyte pool in a sealed bipolar battery module

Top of Charge



Zn & Zn2+ accumulate at the anode. Ha & Ha- accumulate at the cathode.

End of Discharge and System Load Balancing



Back to natural status at the end of the discharge.

No sudden death – No increase to cell resistance over life – No swelling or electrode mechanical degradation

Designed for LDES application from C/4 to C/16 applications

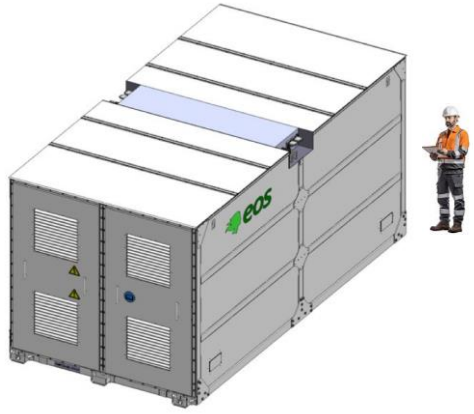
Energy Cube - System Configuration

ILLUSTRATIVE

Battery Module

20 cells

Improved energy density and manufacturability



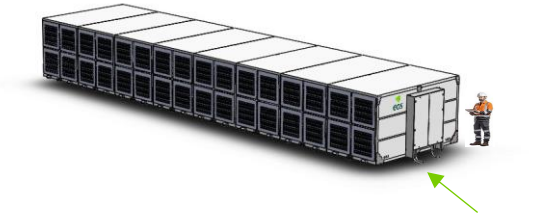
Energy Cube

672 Battery modules

16.5ft x 8.5ft

Compact enclosure to increase kWh/sqft

No HVAC / fire suppression needed (-20C / +50C)



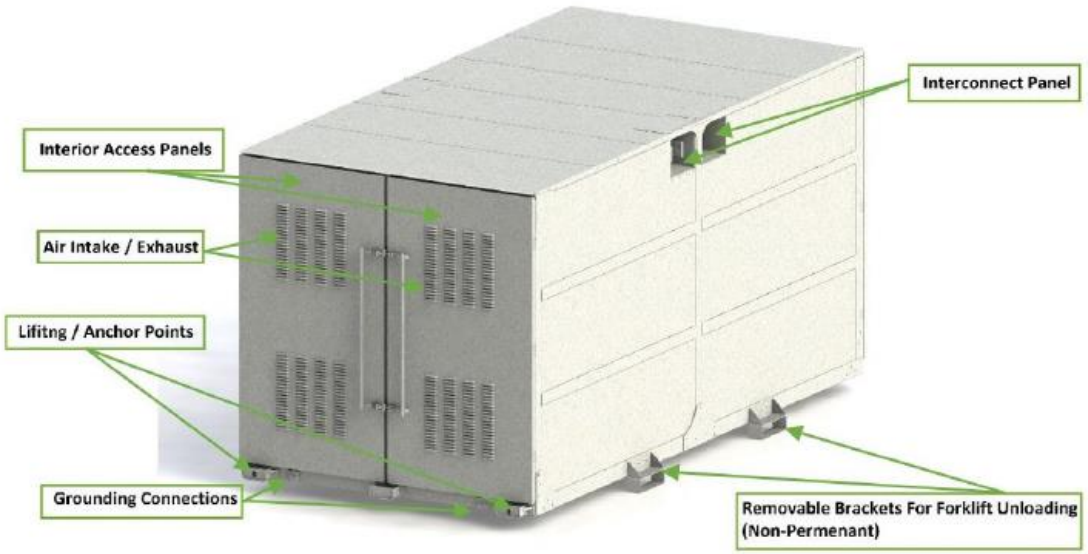
Up to 12 Energy Cubes

16.5ft x 104ft

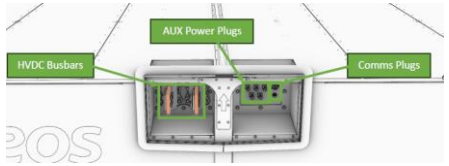
Internal bus bar / cable jumpers between enclosures for easy and low-cost installation

Energy Capacity	
Discharge Duration	**Dependent on C Rate**
1 Cube *672 modules/cube	Up to 800kWh
12 Cubes	Up to 9.6MWh
Energy Density	Up to 5.6kWh/Sqft

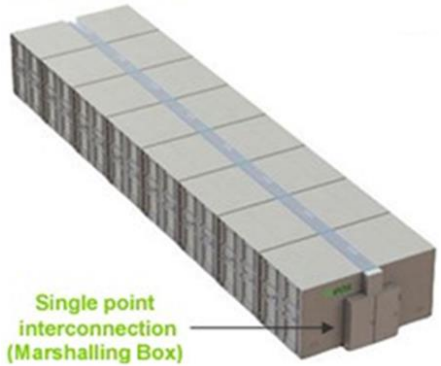
Optimized Cube design



Interconnection Panel



Up to 12 cube behind 1 marshaling



Designed for easy installation

Plug and Play solution

Energy cube shipped fully assembled – no need of auxiliary power for storage at site.

Up to 9.6MWh behind 1 marshaling cabinet

Cubes connected through integrated busbar

1 point for Interconnection cables … less traches & cost

Civil works

No need for continuous cement slab foundations .. Four piles at the corners

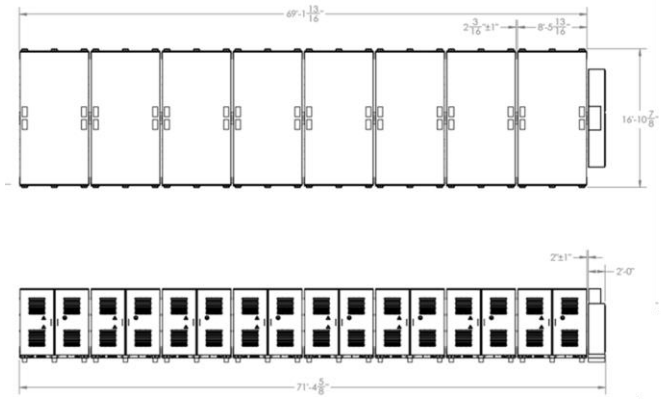
Typical industrial tolerance for foundation

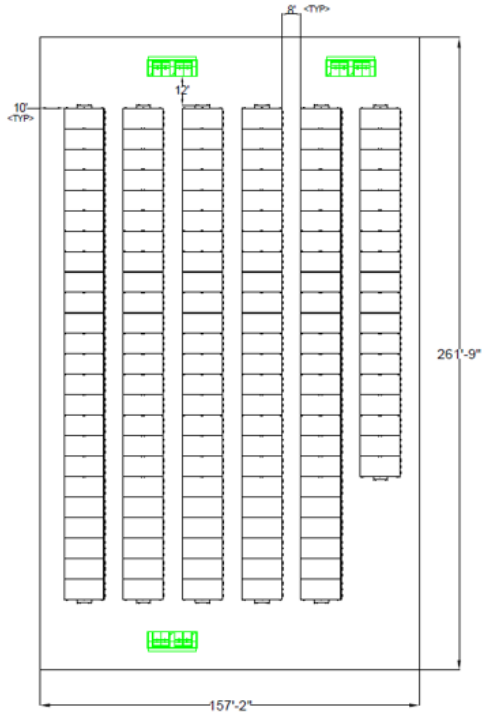
Easy to install

No fire suppression, no HVAC or cooling water piping

Forklift capability

Plant layout





100MWh … ~1 Acre

Installation & footprint

Up to 9MWh cube behind one marshaling

24 cubes with 2 marshaling at the edges … minimizing footprint

Reduced number of cables and tranches

Inverter optimization … 1500VDC

Easy permitting and footprint optimization

No fire risk … no minimum spacing requirements

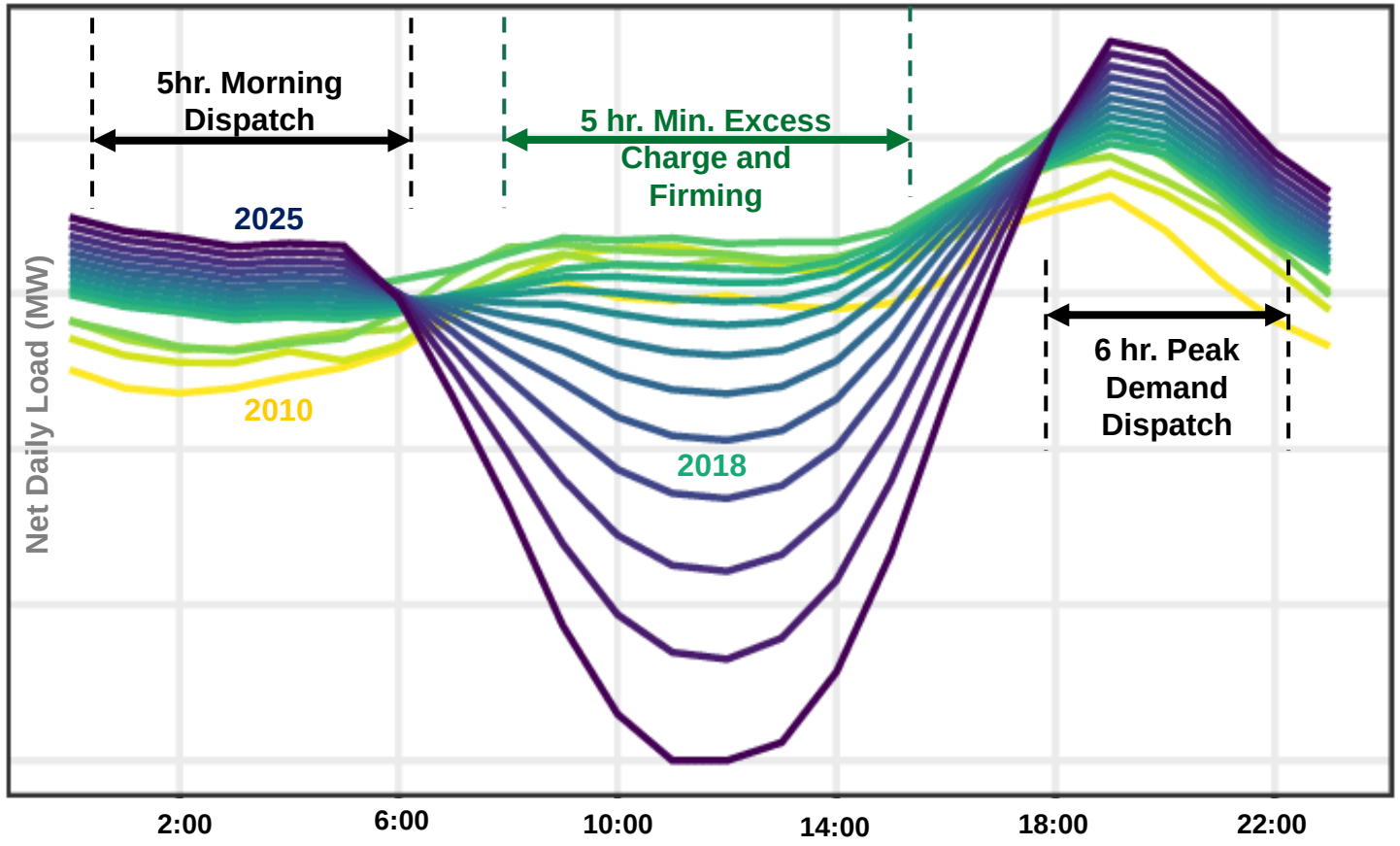
Minimum space for maintenance between cubes lines of 8 feet

No Noise … 65dBA at 10 feet … residential areas acceptability

~100MWh in 1 Acre .. Including PCS

The Eos Economic Advantage

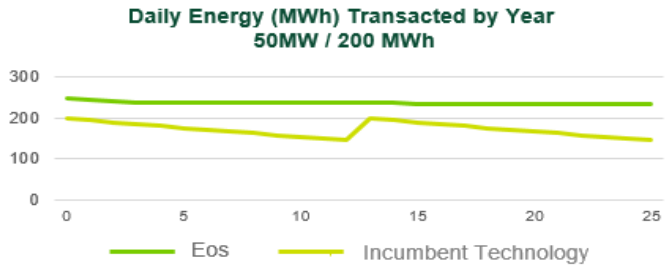
Changing dynamics in many RTO markets lead to more complex duty cycles and long duration discharges



Flexibility to Capture Unrealized Value

- ✓ Opening more complex duty cycles
- ✓ Flexibility to operate the system across changing landscapes
- ✓ Access to perform Ancillary Services in addition to Peak shifting

Eos Levelized Cost of Storage



Eos vs. Incumbent

Capex ($/kWh)	+ 10 – 20% $/kWh
RTE	-10%
Mid – Project Augmentation	+33%
Peak Shifting (MWh)	+8%
Ancillary Energy Services (MWh)	+25%
Daily Duty Cycle	Multiple Cycles
Total Energy @ 25 years (MWh)	+37%
Eos Total LCOS Advantage	**+31%**

Note: LCOS calculation based on sample 50 MW/ 200 MWh Eos BESS

Longer Product Lifecycle with Minimal Degradation

Improved flexibility and opportunity to run multiple cycles per day

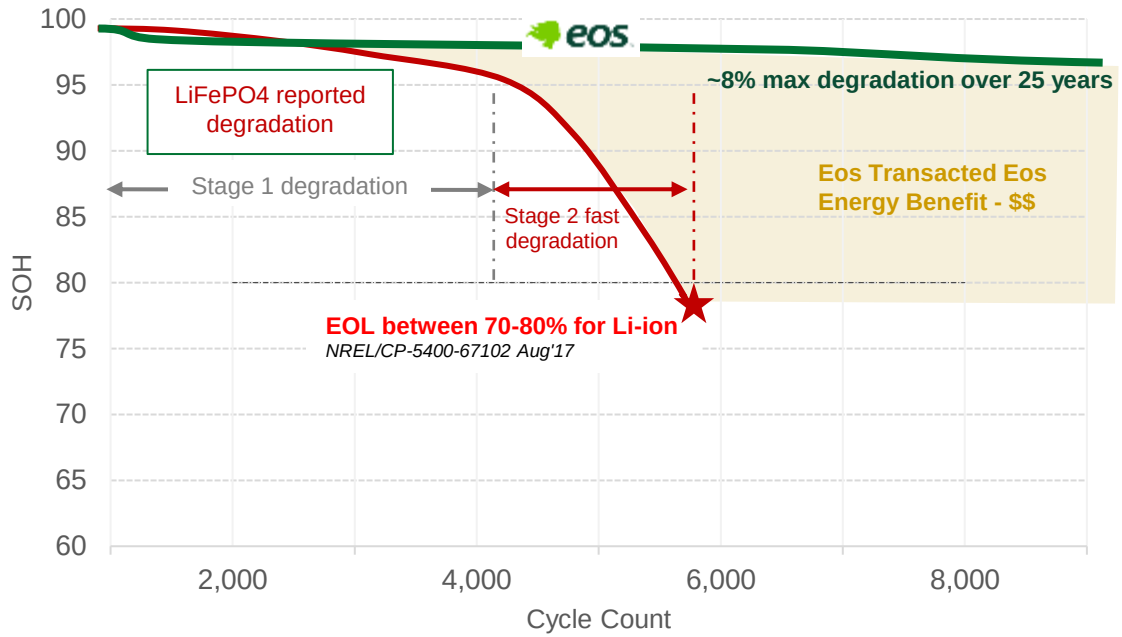
Long life & flat degradation

- *8% degradation in 25 years*
- *No sudden death – No increase to cell resistance over life – No swelling or electrode mechanical degradation*
- *Li-ion sharp "knee" & fast capacity degradation*
- *Eos customers benefit from with large transacted energy and no cell replacement costs*

Eos degradation is minimal over life of project

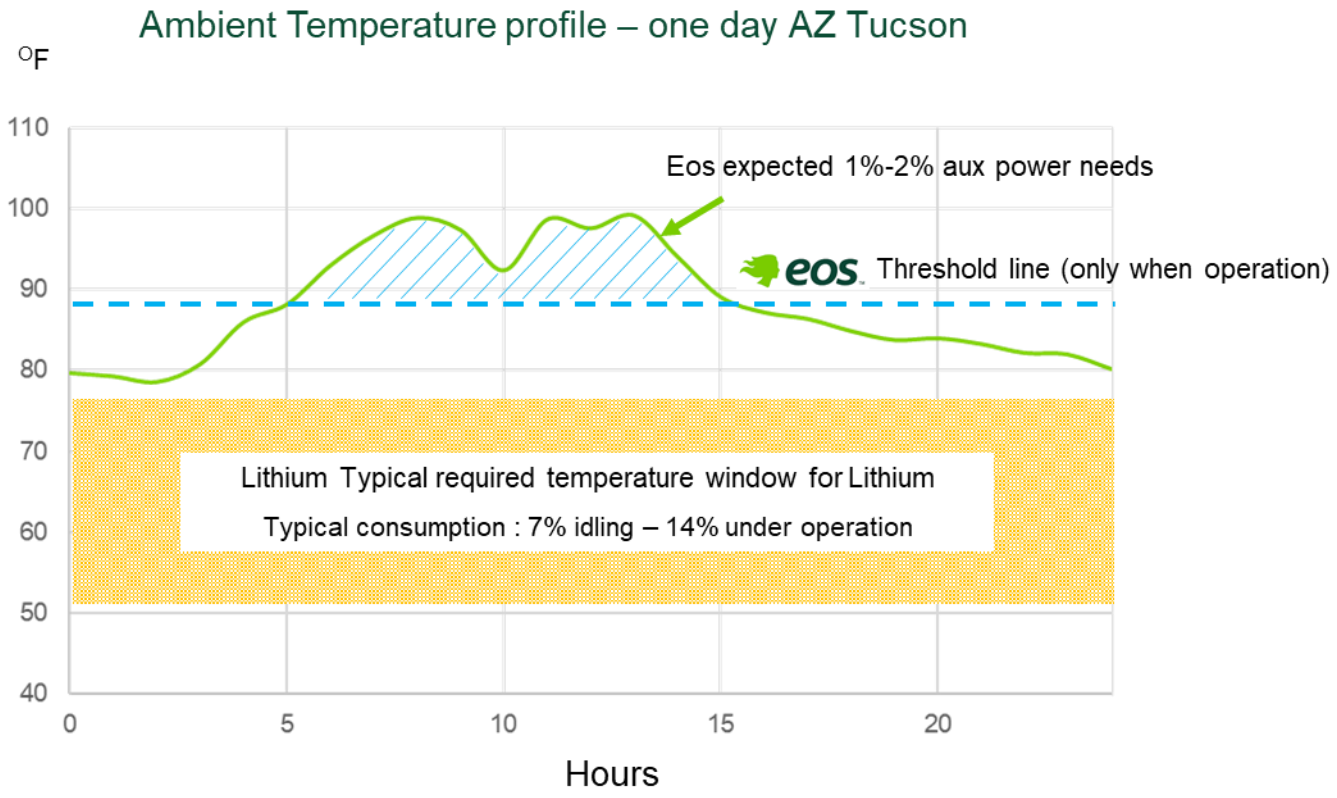
- *Cycle defined as full cycle – 0% to 100% to 0% cycle – Degradation only function of energy throughput*
- *No Calendar degradation*
- *No degradation from temperature or humidity*

Capacity Degradation Curve[1]



[1] Source: Kate Qi Zhou, Yan Qin, *Lithium-ion Battery State of Health Estimation by Matrix Profile Empowered Online Knee Onset Identification,* IEEE EMA-EP011-SLEP-001, April 2023

Auxiliary power consumption



Lithium HVAC always on

- *Narrow acceptable temperature window (exp. 50ºF to 75ºF)*
- *Required Aux Power from 7% to 14% of installed energy*
- *Expected average consumption approx. 10%-11%*
- *Low temperature (below 40ºF) requires massive heating*

Eos simplicity & low Aux power consumption

- *Cooling required only above 87ºF and SOC >1%*
- *Required aux power exp. from 1% to 2% installed energy*
- *Limited heating below 32ºF only before starting up*

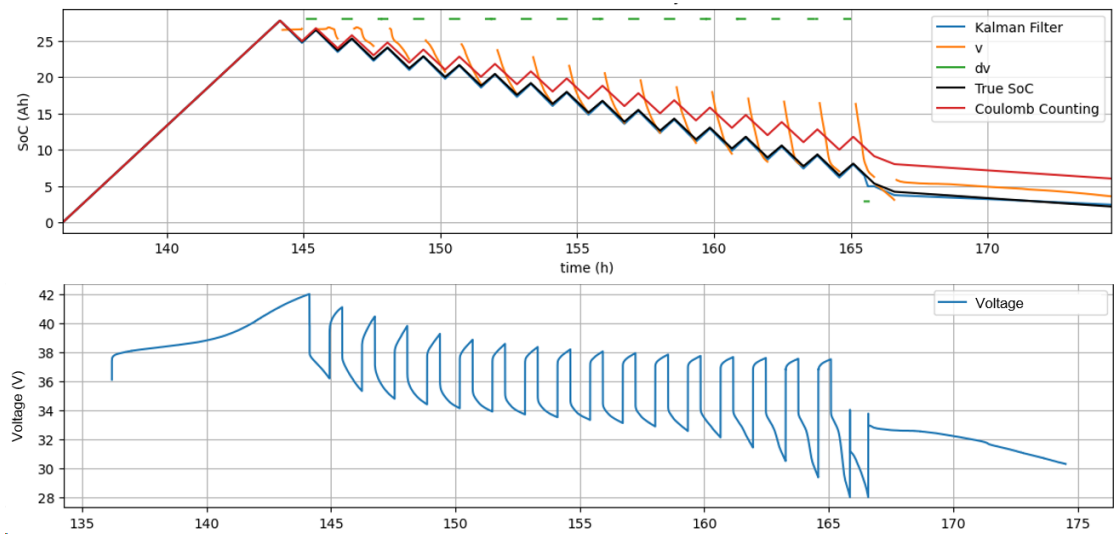
200MWh case … Annual exp. Aux Power cost

- *Eos expected **$170K***
- *Lithium **$1.1MM***

State of Charge (SoC) & State of Health (SoH) Algorithms

State of Charge – improving accuracy & performance

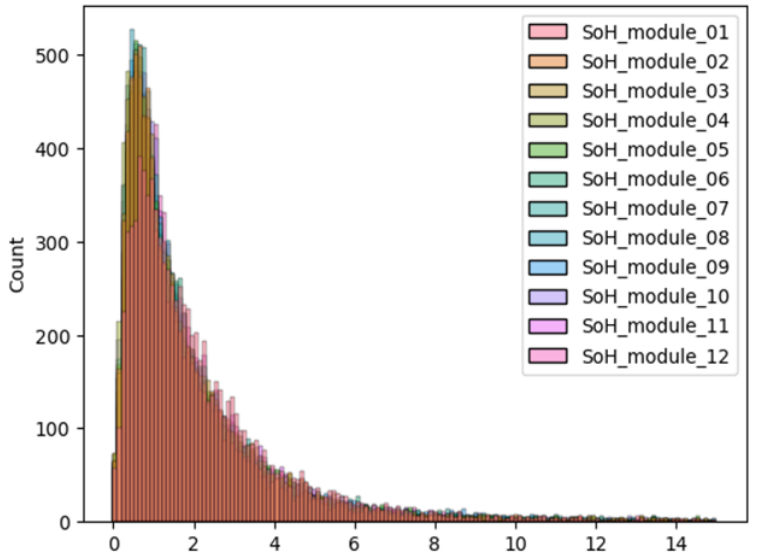
- *Advanced SoC algorithm utilizing Kalman-Filter*
- *Combines multiple inputs (current, voltage and temperature)*
- *Removes accumulated error over time without need to reset SoC to 0*



Eos SoC algorithm is more accurate than traditional SoC calculation methods

State of Health – extending life and performance

- *SoH uses a wide range of physical inputs like temperature, voltage & current*
- *It estimates the condition and balance of strings and modules*
- *Indicates when and how much to charge / discharge batteries*



Eos SoH histogram – lower values indicate healthier modules

Eos Digital Capability

Advanced control systems enabling larger installations with simpler system integration

Large Scale LDES Industry Challenges

State of Charge

System Balancing

Auxiliary Systems Management

Integrated Eos Offering

Eos's BMS simplifies operations

Custom Electronics
Balance batteries precisely

State of Charge
Highly accurate battery capacity

State of Health
Detailed condition of batteries

AI / ML
Calculation Engine

Customer Benefits

↑ Increased Revenue

- ✓ Increased site energy
- ✓ Increased availability

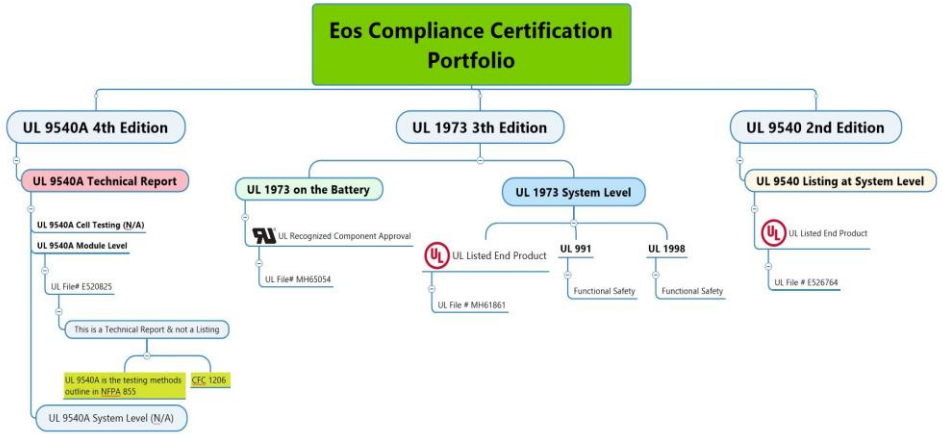
↓ Reduced Downtime

- ✓ Increased reliability
- ✓ Easy integration with EMS

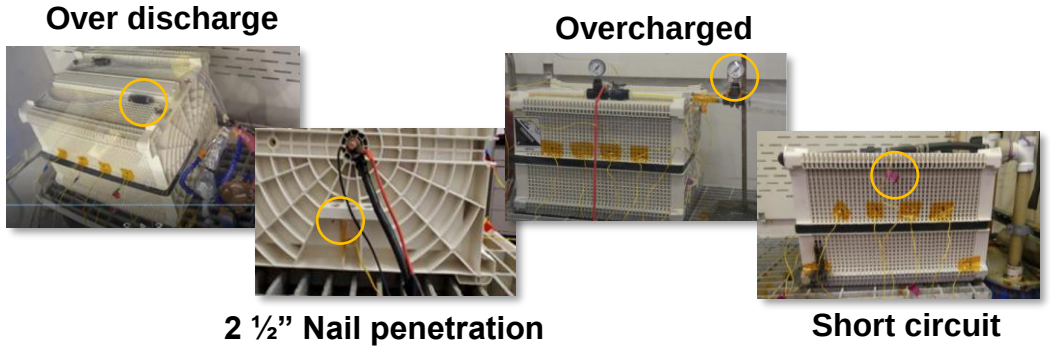
↓ Control Complexity

- ✓ No HVAC
- ✓ No Fire Suppression

Third Party Certifications



UL 9540A testing with UL/CSA



No fire - No explosion - Steam/gas released

UL9540A: Fully validated & completed - no thermal runaway events.

UL1973: Z3 module Certified

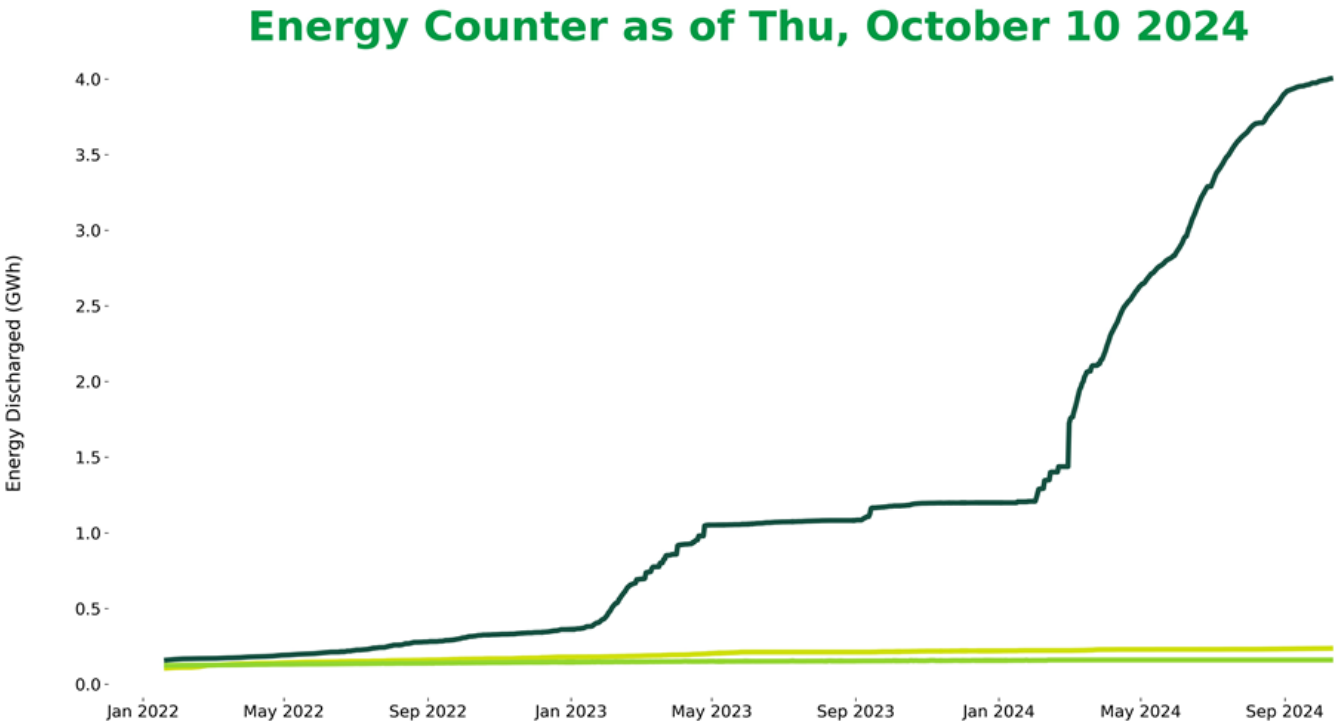
UL9540: Undergoing … Q4 2024

CE mark: Undergoing … Q4 2024

NFPA855: Compliant

Total Customer Viability: Eos delivering 4 GWh+ and Growing

4.2 GWh *Field*	.3 GWh *FAT*	.2 GWh *Lab*	4.4 GWh *TOTAL*



North Carolina - >1 MWh Microgrid

New Jersey - 2 MWh Microgrid

Texas - 50 MWh Stand-Alone BESS

Building Znyth™ Operating Experience with a 2.4 GWh backlog[2]

(1) Numbers shown as of 7/25/2024
(2) Numbers shown as of 6/30/2024

The Eos Design Advantage

Leaders in Corporate Social Responsibility

Eos materials are conflict-free

Eos systems are nonflammable

Proudly US Made, Designed and Maintained

100% recyclable with standard processes

Inherent Technology Benefit

✓ Environmentally Safe	No Hazardous Material
✓ Designed Inherently Safe	Non-explosive/flammable
✓ Responsible	No ‘Conflict’ materials
✓ High Domestic Content	91.1% maximizes ITC
✓ On-Shoring Supply Chain	Made in USA
✓ Fire Suppression	Not required
✓ Environment Controls	No A/C needed
✓ Low Auxiliary Power	1-2%
✓ Low Noise	A quiet neighbor
✓ Greenhouse gas (GHG)	84% lower than Li-Ion

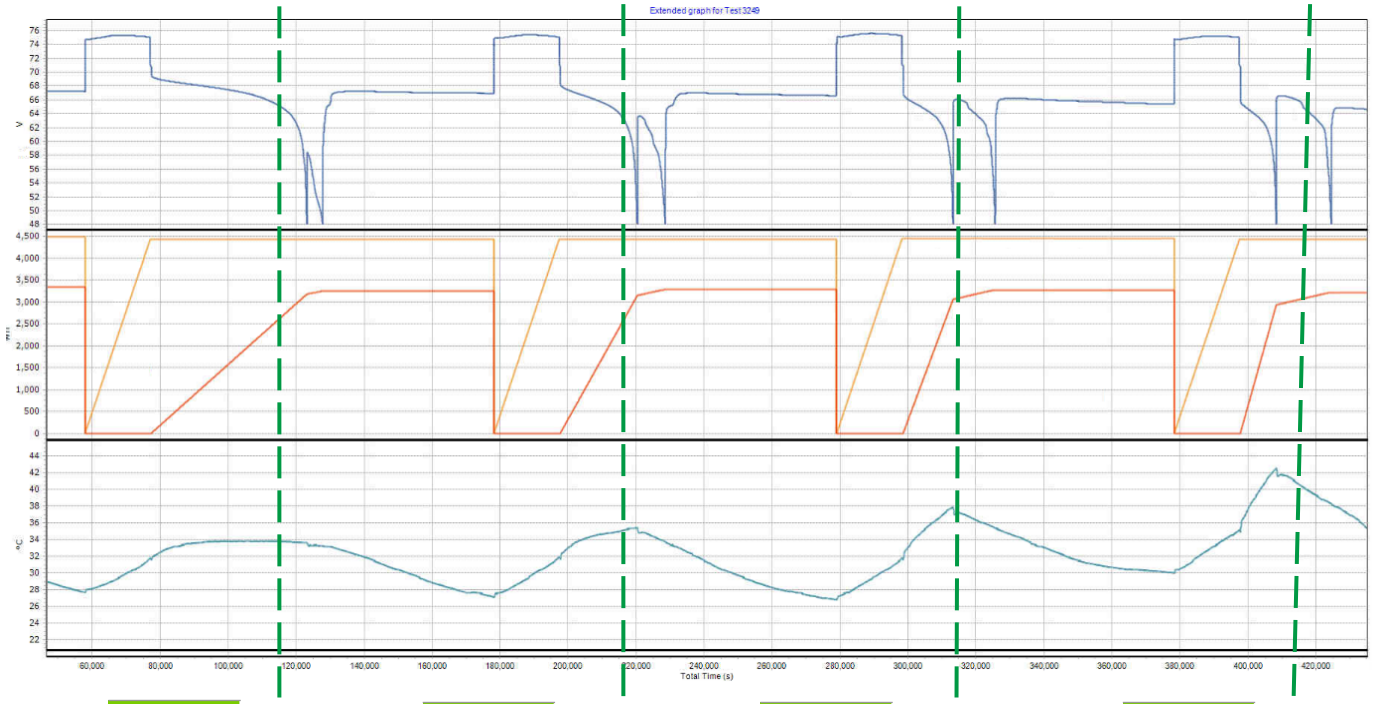
Product High Flexibility

12.7 h discharge (250 W) *(36 KW per container)*

6.3 h discharge (500 W) *(72 KW per container)*

4.1 h discharge (750 W) *(108 KW per container)*

2.9 h discharge (1000 W) *(144 KW per container)*



Day 1 | Day 2 | Day 3 | Day 4

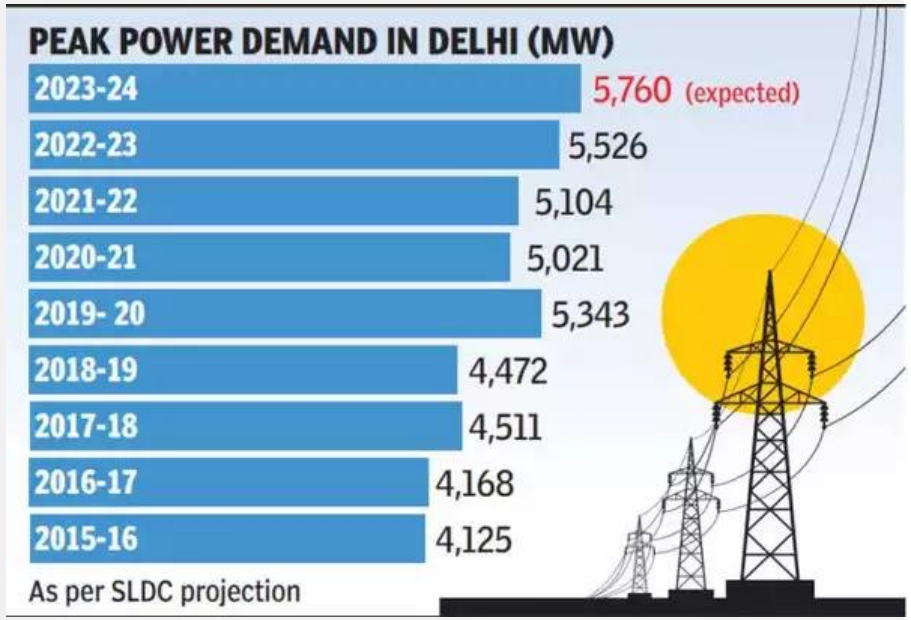
- Same system, different cycles from 3 to 12 hours
- Consistent performance with flat efficiency
- Constant voltage level for different cycle
- Minimal thermal variation

Value Shifting to Longer Duration (Intraday) Storage

Use cases beyond 5-hour energy storage favor Eos technology

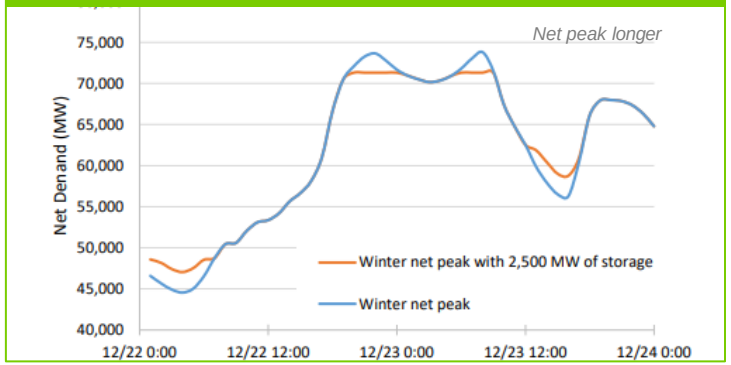
As extreme weather conditions increase, peak demand is becoming more significant in winter

Winter Peak Demand in Delhi



A Similar scenario in ERCOT (TX), Solar penetration reducing summer net peaks, while heating increasing winter net peaking requiring longer durations of storage

Winter



Push towards real emission reductions

kWh

kW at required 'h'

Net peak in winter is ***typically 8+ hours*** and can actually be higher total demand than in summer for areas that depend on heating….

Grid will require ***longer than 4-hour*** durations of storage to support winter peaks….

Increase push towards real emission reductions need Time matched RE Solutions which typically **require 6+ Hours energy shift storage products**

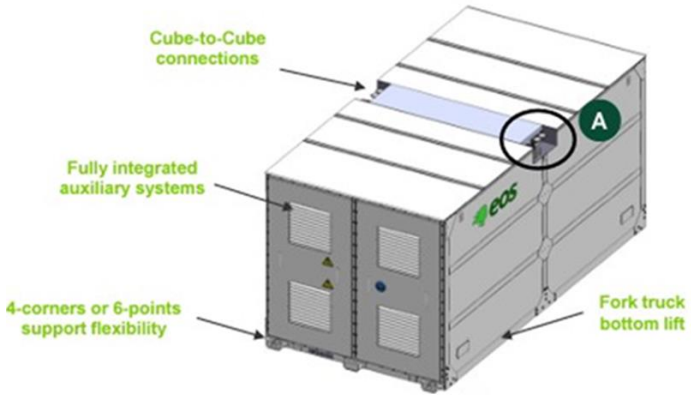
Eos. Positively ingenious.

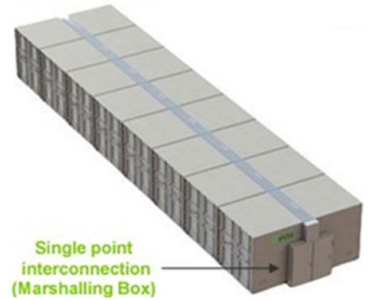
Financial Express, Denholm, Paul, Wesley Cole, and Nate Blair. 2023. *Moving Beyond 4-Hour Li-Ion Batteries: Challenges and Opportunities for Long(er)-Duration Energy Storage*. Golden, CO: National Renewable Energy Laboratory. NREL/TP-6A40-85878.

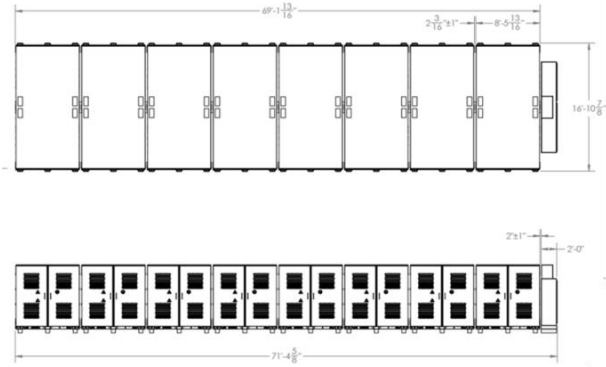
Latest Eos design

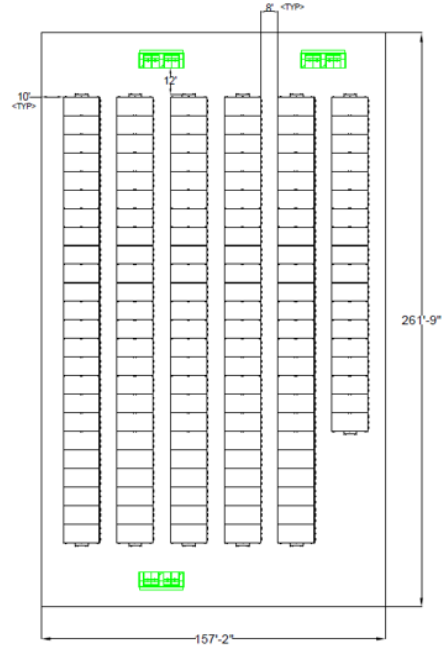
- **Enhance density … ~25% reduction**
- **Eos expected EPC cost … ~$120 - 170/KWh (pre-ITC)**
- **BOS**
  - *Voltage range @ 900-1500VDC … As per all major inverter providers*
  - *Reduce number of inverter based on new in line cubes*
- **Electrical**
  - *Inline solution via busbars … 12 Energy cubes (9MWh) per one marshaling cabinet … easy installation*
  - *Minimized cables … one point of connection for 9MWh*
  - *Auxiliary power at 480V … no external aux transformers*
- **Earth work**
  - *Reduced footprint with inline cube*
  - *No specific foundation requirements .. 2% tolerance and piles solution*
  - *Forklift capability*
  - *No fire risk … minimum spacing for maintenance only*

Eos solution









Delivering RTC Solutions

Conditions to be met

Contracted Capacity: 100MW

Min. Hourly Supply: 50MW

Min. Annual PLF: 80%

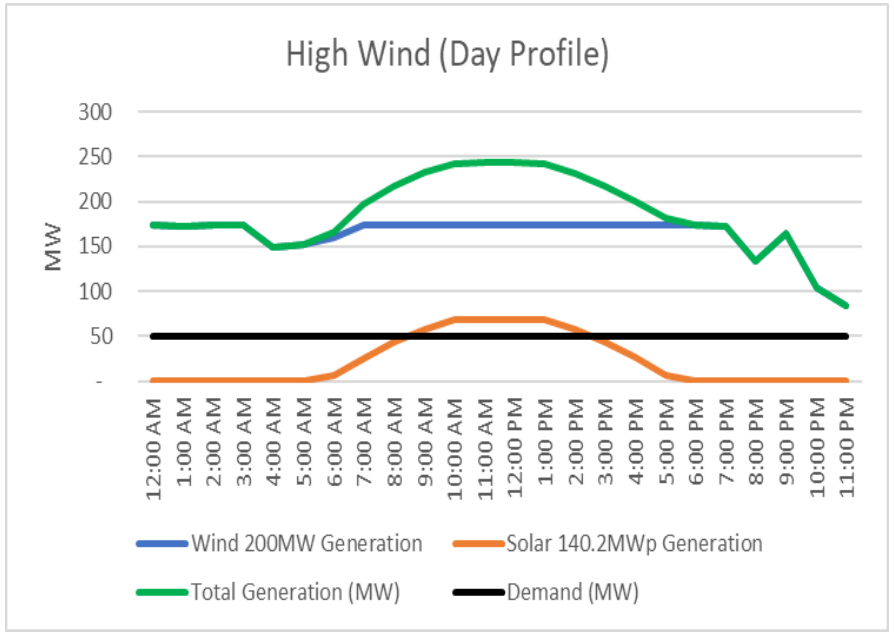
*Sizing Assumptions**

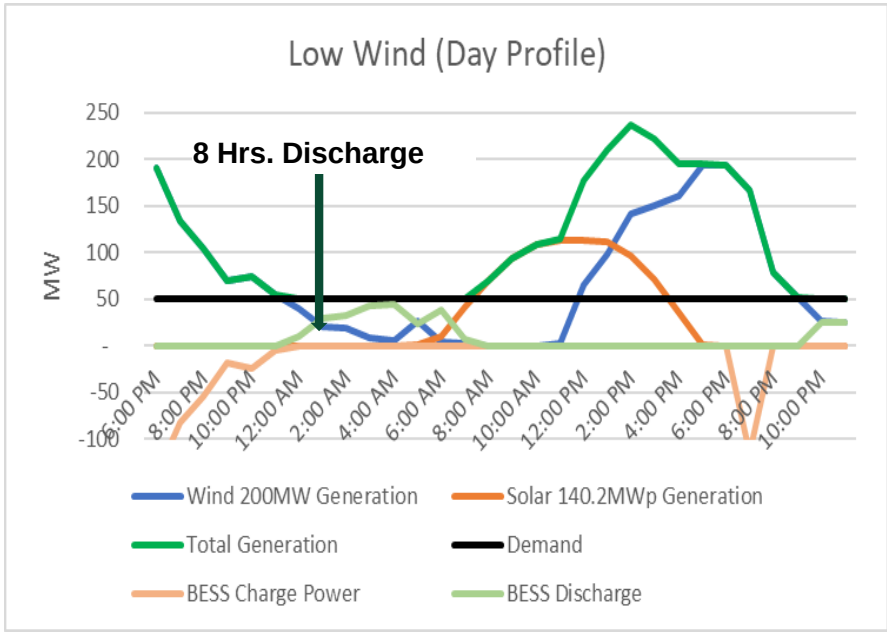
Contracted Capacity: 100 MW

Current Solution: Wind: 200 MW,

Solar: 100 MW

BESS: 8 Hrs.





- ***Leads to non utilization of BESS during certain point of time in high wind season***
- Li will age without use (***calendar aging degradation) vs Eos can sit at 0% SOC without loosing capacity***

- ***Low wind confirms the need for Long Discharge Storage (8 hrs.)***
- ***Eos is well positioned to meet the requirement***

Eos Technology Value Propositions: High Financial Returns

1. Expected **20 + year lifespan** with minimal degradation with ability to handle tough duty cycles
2. **Wide operating temperature range** (-20/+50ºC) & 1-2% aux. power needs vs. incumbent 6-12%
3. Flexibility - same system **operates from 4 to 12 hours** - allowing for future operational changes
4. Depth of discharge: **From 0% to 100% to 0%** - Full utilization of available energy
5. Safety: **no fire suppression** required - **No HVAC required** – **UL certified**
6. Long life with **20+ year capacity guarantee** – No cell replacement over life
7. Low LCOS in energy storage – **Upwards of 30% lower** than incumbent technologies

Thank you!

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