



Power Ahead Group

*The First American Sodium-Ion Battery
Energy Storage System Integrator*

INTRODUCTION: MEGA-SIB

*The World's Largest Cylindrical
Sodium-Ion Battery*

www.PowerAheadGroup.com

Background:

Tesla as a Comparator



Tesla's Shanghai Energy Storage Megapack Factory Has Been Completed and Trial Production Has Begun *

- Taking only 7 months from breaking ground to completion, Tesla's Shanghai Energy Storage Megapack Factory has already begun trial production of its Megapack commercial energy storage battery system.
- Megapack is recognized as the world's largest electrochemical energy storage equipment to date.
- It is reported that each Megapack unit can store more than 3.9MWh of energy – enough to meet the one-hour electricity demand of 3,600 families.
- Tesla's Shanghai energy storage plant plans to produce 10,000 Megapacks annually, with an energy storage scale of nearly 40 GWh to supply the global market.

** Information from Article - China Securities Times, 2025.01.09*

Tesla's Energy Storage is "Soaring"

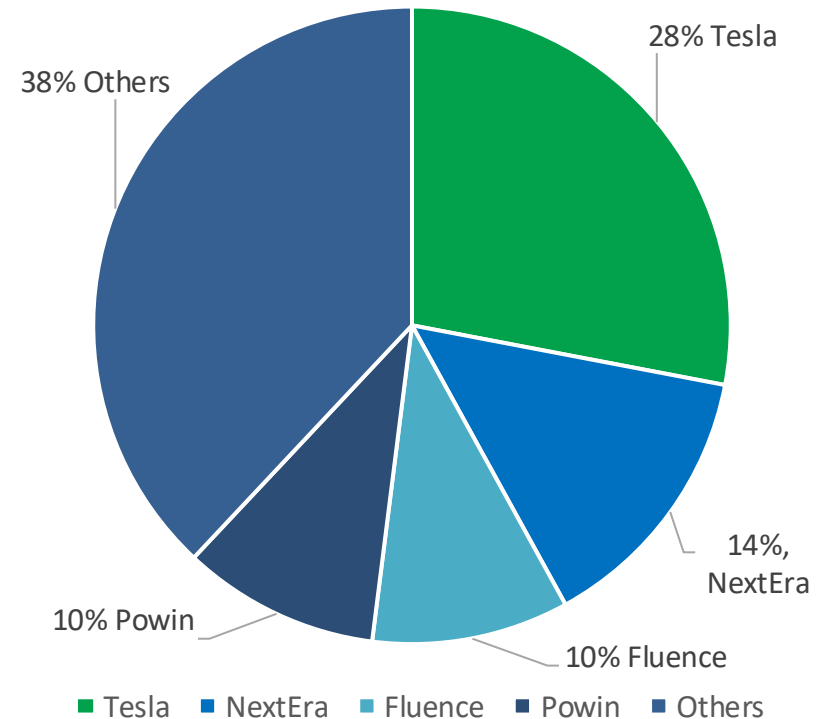
- Tesla breaks another record in the fourth quarter 2024 with a quarterly deployment of 11 GWh
- On an annual basis, in 2024, Tesla's energy storage deployment reached 31.4 GWh, another record and an increase of 100% compared with the 2023 deployment of 15.7 GWh.

(Source: China Energy Storage Network)

Tesla's Market Share and Growth Potential

- According to Szechuan's Chaodian Think Tank, in Q1 of 2023, Tesla accounted for 28% of the market share among large-sized integrators in the United States, ranking first.
- NextEra, Fluence and Powin account for 14%, 10% and 10% of the market share, respectively.
- Tesla CEO Elon Musk said that Tesla's energy storage business may even surpass its electric vehicle business in the future, noting that Tesla plans to build an energy storage project on a scale of 100GWH.
- Tesla's energy storage business could have future growth of more than 10x.

Market Share of U.S. Installations By Large Energy Storage Integrators





Tesla Eyed as Key Investment (Continued)

- For Morgan Stanley, Tesla's biggest future draw is its new energy and energy storage business.
- On June 25, 2024, Morgan Stanley released a report that Tesla held a "key card" and would be the key "winner" of the next round of AI investment. This "trump card" is not Tesla's AI or robot business, but its solar energy and energy storage business.
- Morgan Stanley analyst Adam Jonas is firmly optimistic about Tesla's energy storage business – he believes that the the electricity demand brought about by the AI boom will establish Tesla as a key player in the U.S. energy market.

Source: Wallstreetcn, 2024.06.26, Morgan Stanley, In the next round of AI investments, Tesla is the key "ace in the hole".

Tesla Eyed as Key Investment (Continued)

- Jonas said that AI data centers are currently being built across the United States, which will incarnate as "power-swallowing beasts" and bring a huge load to the U.S. power grid.
- Jonas predicted Tesla Energy's revenue would exceed \$7 billion in fiscal year 2024, and by 2025, its profit margin may exceed that of Tesla's automotive business.
- In the future, Tesla's energy storage business will grow faster than its solar energy business. And by 2030, it will be making a significant contribution to Tesla's overall profitability and give Tesla Energy a forecast valuation of \$130 billion.

Source: Wallstreetcn, 2024.06.26, Morgan Stanley, In the next round of AI investments, Tesla is the key "ace in the hole".

Energy Storage Systems:

Why Sodium-Ion Batteries over
Lithium-Ion Batteries?

Problems with Lithium-Ion Batteries

- Safety concerns
- Temperature challenges
- High raw material costs
- Low recyclability
- Limited resource



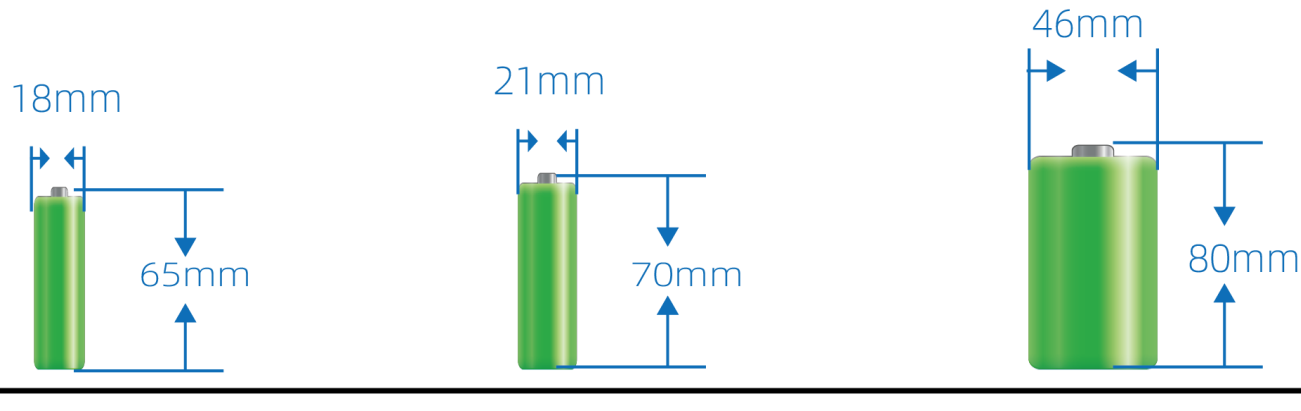
Benefits of Sodium-Ion Batteries

- Safe
- Lower cost
- Unlimited resource
- High performance
- Wider temperature tolerance
- Recyclable
- Longer lifespan



Energy Storage Systems: Does Size Matter?

Tesla Development History of Cylindrical Batteries



Size:	1865	2170	4680
Type:	Lithium Ion Battery	Lithium Ion Battery	Lithium Ion Battery
Year:	1990	2017	2020
Manufacturer:	Sony	Tesla and Panasonic	Tesla
Application:	Tesla Roadster Energy Storage	Tesla Model 3 Energy Storage	Tesla Model Y Energy Storage

This is an 8-fold increase in battery volume over a 30 year span.

Introducing MEGA-SIB:

The World's Largest Cylindrical Sodium Ion Battery from Power Ahead Group

Introducing MEGA-SIB

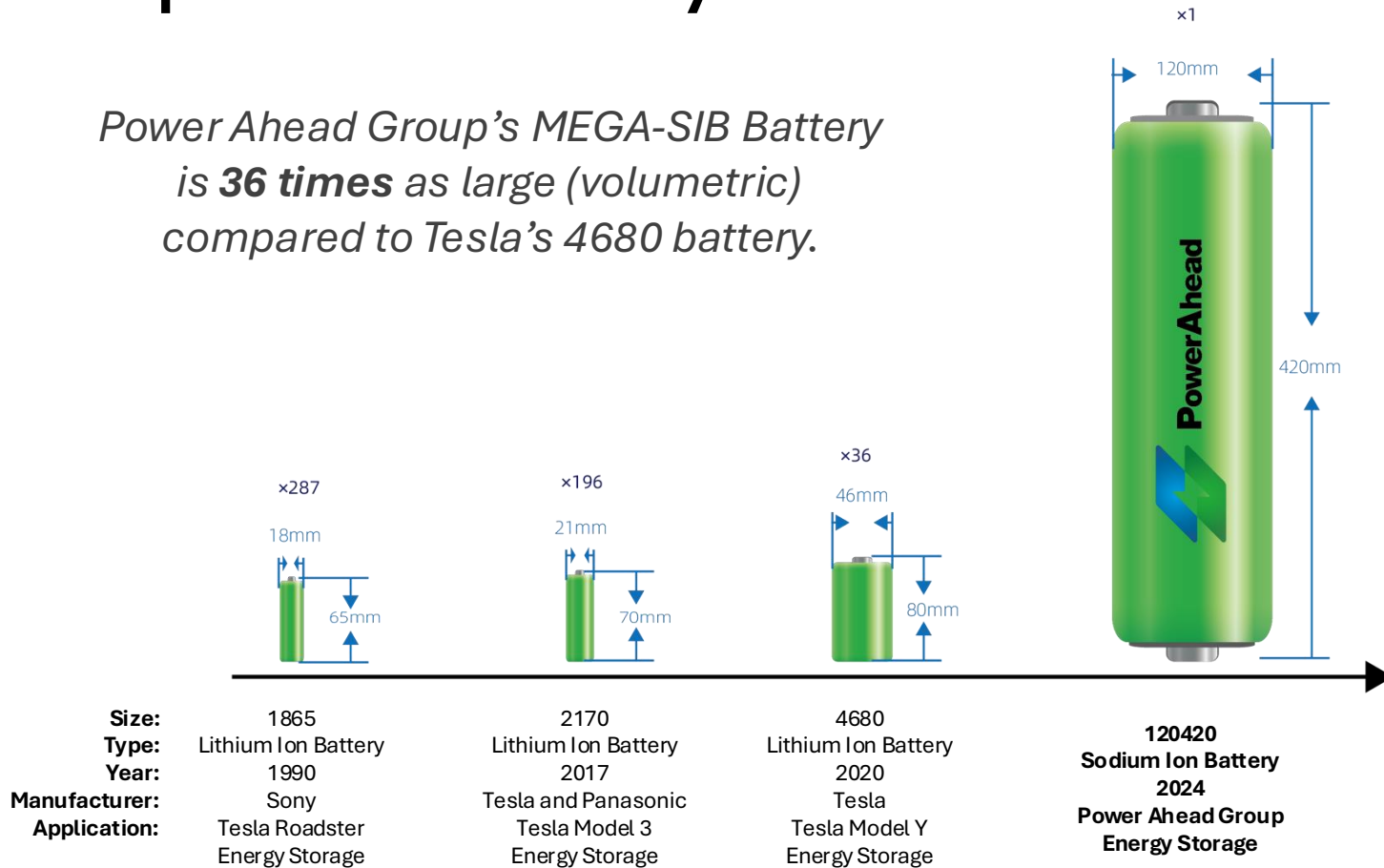
The World's Largest Cylindrical Sodium Ion Battery from Power Ahead Group



- Type: 120420
- Capacity:
3.0V/280Ah

Size Comparison – Tesla’s Batteries vs Power Ahead Group’s MEGA-SIB Battery

*Power Ahead Group’s MEGA-SIB Battery is **36 times** as large (volumetric) compared to Tesla’s 4680 battery.*





MEGA-SIB's Advantages

1. Safety

- Lithium-ion batteries are vulnerable to catching fire and/or exploding – high temperature, over-charge/discharge, compression, punctures, collisions, can cause lithium batteries to catch fire and explode. **Lithium-ion batteries are extremely unsafe as energy storage solutions.**
- Sodium-ion batteries solve the safety pain points that exist in lithium-ion batteries. MEGA-SIB batteries use polyanion positive electrode materials, which are very safe, not flammable, and not prone to explosion risks. **Sodium-ion batteries, in terms of safety, are a far superior option for energy storage.**
- MEGA-SIB has a temperature-controlled ejection system, providing an additional layer of safety and performance security.
- This system provides constant temperature monitoring of each battery within a configuration. When a battery exceeds a predetermined temperature (e.g., 60 °C), it will be immediately “removed” from the configuration . **This dual insurance ensures the safety and efficiency of the entire MEGA-SIB system.**

MEGA-SIB's Advantages Cont'd

2. High Production Efficiency

- The capacity of one MEGA-SIB is equivalent to:
 - 36 units of 4680 battery
 - 196 units of 2170 battery
 - 287 pieces of 1865 battery
- Manufacturing fewer and larger batteries requires less production equipment, a smaller factory area, smaller land area, and fewer workers

3. Cost Advantages

Compared with other cylindrical batteries, MEGA-SIB:

- **Saves 66%** of shell material + 36 welding points compare with 4680 battery
- **Saves 83%** of shell material + 195 welding points compare with 2170 battery
- **Saves 85%** of shell material + 287 welding points compare with 1865 battery

MEGA-SIB's Advantages Cont'd

4. High Performance

- MEGA-SIB uses a polyanion plus hard carbon system, bringing high safety and long cycle times, with cycle times exceeding 6000 cycles
- The discharge capacity retention rate at -40 °C is $\geq 89\%$, bringing excellent advantages in high-altitude/latitude regions
- Full pole ear technology reduces battery internal resistance and minimizes battery heating

5. Assembly Advantages

- The capacity of one MEGA-SIB battery is 0.8 KWh, which can obviate the PACK process and thereby achieve high assembly efficiency
- Each module uses fewer battery cells and fewer connecting materials



MEGA-SIB's Advantages Cont'd

6. Convenient Manager for Battery Pack

- The module requires fewer battery cells and fewer BMS control points, making it easier to manage the system
- Using same-capacity for a PACK comparison, MEGA-SIB can bring reductions of :
 - 286 control points compared with a 1865 battery
 - 194 control points compared with a 2170 battery
 - 36 control points compared with a 4680 battery.

7. Ease of Replacement

- When a battery cell reaches end of life, other components in the energy storage system can continue to be used—only the battery cell need be replaced.
- The cost of battery replacement is as low as \$27.4/kWh, greatly reducing the cost of the energy storage system.

MEGA-SIB's Advantages Cont'd

- MEGA-SIB does not contain lithium ions or other toxic elements such as cobalt and nickel.
- The recycling process is environmentally friendly and low cost, and the recycled materials can be used for new batteries.

8. Environmental Advantages



MEGA-SIB:

Energy Storage Products

Residential Energy Storage



Capacity: 5-100 KWh

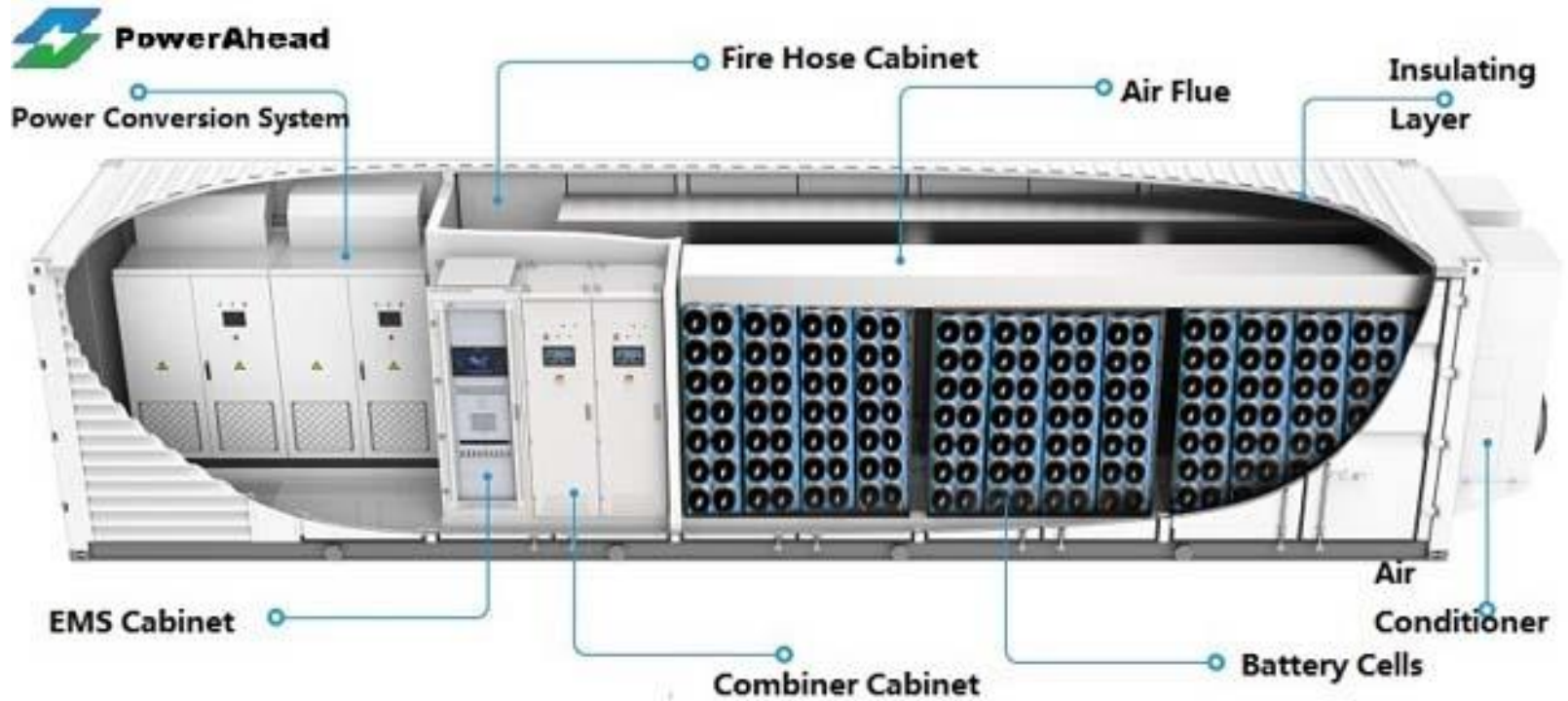
Commercial Energy Storage



**Capacity:
100KWh-1.0MWh**



Industrial Energy Storage



Capacity: 1.5 MWh per 20' container
3.5 MWh per 40' container

Patents & Know How Technology

- Cathode material
- Anode material
- Diaphragm
- Electrolyte
- Battery Management System

- MEGA-SIB Technology Patents
- MEGA-SIB Utility Patents



Thank You

Power Ahead Group

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**For more information please contact:
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