



CASE STUDY: MARINE APPLICATIONS



ADVANTAGES OF SODIUM-ION BATTERIES OVER LITHIUM-ION AND LEAD-ACID

The maritime industry needs safe, efficient, and cost-effective energy storage for electric vessels, hybrid propulsion, and port electrification. Sodium-ion batteries (SIBs) outperform lithium-ion (LIBs) and lead-acid (PB-acid) in safety, durability, and sustainability, making them ideal for marine use.

1. RELIABLE PERFORMANCE IN HARSH CONDITIONS

Challenge: Offshore vessels and ferries face saltwater exposure, temperature swings, and humidity, which degrade lithium-ion and lead-acid batteries.

- **Better Cold & Salt Tolerance:** Works from -30°C to $+60^{\circ}\text{C}$, resisting moisture and corrosion.
- **Longer Cycle Life:** Lasts 3,000+ charge cycles, outlasting lead-acid and matching lithium-ion.

2. LOWER COSTS & REDUCED MAINTENANCE

Challenge: Hybrid ships and electric workboats need affordable, long-lasting batteries without constant upkeep.

- **Longer Lifespan:** Lasts 3-5x longer than lead-acid, cutting replacement costs.
- **Low Maintenance:** No acid refilling or complex monitoring.
- **Cheaper Materials:** Sodium is abundant & low-cost, reducing production expenses.

3. SUSTAINABLE & EASIER TO RECYCLE

Challenge: Ports must cut emissions, but lithium relies on scarce materials, and lead-acid is toxic to dispose of.

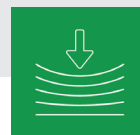
- **No Lithium, Cobalt, or Lead:** Ethical, low-impact sourcing.
- **Simpler Recycling:** No hazardous waste, unlike lead-acid.
- **Supports Green Ports:** Ideal for portside battery storage, reducing diesel reliance.

CONCLUSION

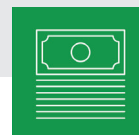
Sodium-ion batteries provide a safer, more resilient, and cost-effective solution for maritime energy storage with better durability, lower fire risk, and improved sustainability.



Safer



Resilient



Cost effective



Lower fire risk

Batri design, develop, and manufacture battery materials and cells targeted at the sodium-ion battery industry. The materials utilise locally sourced supply chains and reduce the reliance on imported materials.



Batri's Composite Carbon anode material engineered for sodium-ion batteries

Offering higher power performance while remaining cost effective. Our anode material delivers outstanding:

- initial capacity
- superior initial coulombic efficiency (ICE)
- extended cycle life
- impressive capacity retention and exceptional stability across a wide range of currents



BATRI MATERIALS



We are pioneering a new era of energy storage with our sodium-ion battery cells

Using locally sourced, abundant, and sustainable resources like sodium, carbon, aluminium, our cells deliver exceptional performance while reducing reliance on imports and scarce materials.

Our cells are safer than lithium due to non-toxic and non-flammable electrolyte systems. Due to differing cell chemistries sodium batteries can be fully discharged to 0 V allowing for safer transportation.



BATRI CELLS

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