



L A T E R A L

ENX

ELECTRIC NEXT GENERATION

Lateral Naval Architects provide complete engineering expertise to the superyacht industry, from project conception to delivery.

Our core competence is engineering, but our unique focus is on meaningful innovation, to enable superyachts that meet the demands of today's owners and those of the future.

We believe that meaningful innovation starts with asking new questions.



A close-up, low-angle shot of a server rack. The rack is filled with various components, including cables and connectors. Several small, glowing yellow lights are visible, likely status indicators. The background is dark, making the lights stand out.

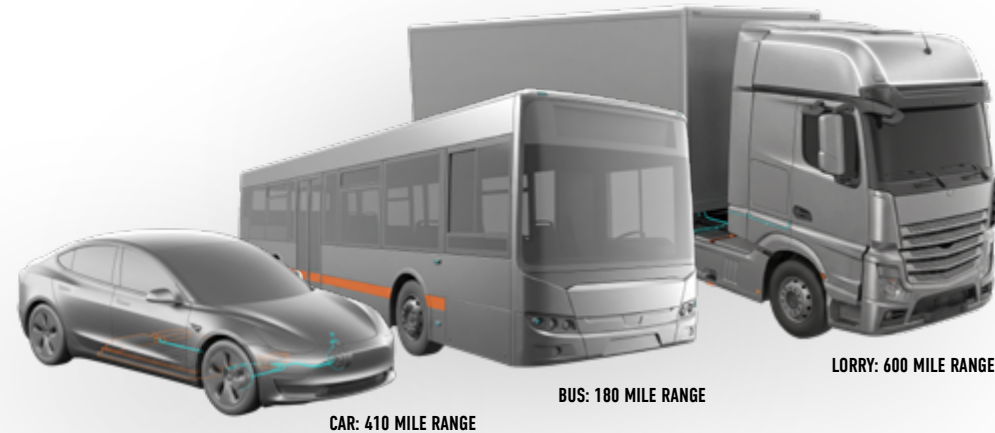
**HOW FAR CAN
BATTERIES TAKE YOU?**

The Journey of Electrification

Battery power is no longer a technology of the future. It is already all around us. From the smartphones in our pockets and the laptops on our desks to e-bikes, cars, buses, and increasingly heavy forms of transport, batteries have become an integral part of everyday life. The reason is simple: battery technology is increasingly proving to be not just an alternative, but a better proposition.

Lower running and maintenance costs, a quieter user experience, and the convenience of charging at home are powerful advantages today, and they are likely to become even more compelling as energy density improves and battery costs continue to fall. Across much of the transport sector, the direction of travel is becoming increasingly clear. The superyacht sector has also embraced battery technology. Over the last decade, battery installations ranging from 0.5 to 5 MWh have been used to reduce the generator package through peak shaving, improve operational efficiency, and create genuine emission-free periods on board.

Could future advances in battery technology ever align with the demand of a fully battery-powered superyacht?



Lateral's Electrification Journey

For Lateral, innovation in electrification has never been about a single concept or technology. It has been a progressive engineering journey, developed through real yacht projects and successive generations of propulsion and energy architecture.

That journey has moved from established diesel-electric propulsion,

through diesel-electric hybrid systems incorporating meaningful battery capacity, and more recently into electric-hybrid architectures in which batteries assume a much greater role in the vessel's operation.

In 2026, Lateral is ready to explore the next phase in electric architecture with ENX.



LATERAL'S ELECTRIFICATION JOURNEY

2018 HISWA TECHNICAL PAPER: THE FUTURE OF BATTERY ENERGY STORAGE IN LARGE YACHT SYSTEM ARCHITECTURE

2012

DIESEL ELECTRIC HYBRID
[SY BLACK PEARL]



2012

DIESEL ELECTRIC HYBRID
[MY BRAVO EUGENIA]



2018

ELECTRIC ARCHITECTURE E-HYBRID
[INCEPTION PLATFORM]



2026

ALL ELECTRIC ARCHITECTURE
[ENX PLATFORM]



2021

ELECTRIC ARCHITECTURE E-HYBRID
[KAİROS CONCEPT]



2019

DIESEL ELECTRIC
[MY LEVIATHAN]

LATERAL'S ELECTRIFICATION JOURNEY



Range Matters

Pressure to reduce emissions has pushed shipowners towards alternative fuels. Each maritime sector has distinct requirements, and two factors largely determine which option suits a given application: installed power demand and range.

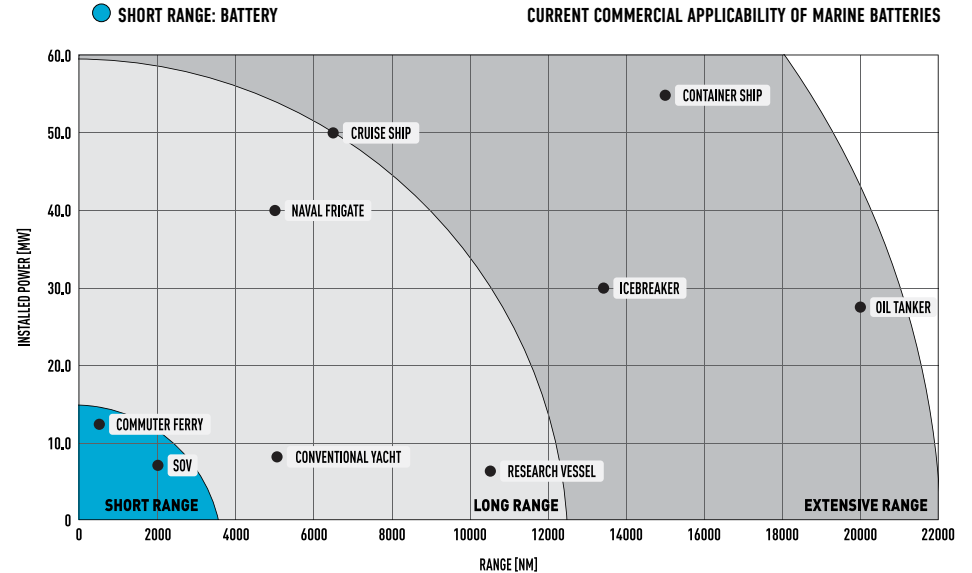
Superyachts above 50m are typically specified with 4,000–5,000nm, more where owners want the remotest destinations. That figure exists to cross

the Atlantic with reserve, and to bunker where availability, quality and price are best.

Operational profiles show it is used twice a year. In the Mediterranean, a 50–90m yacht covers around 350 nautical miles in a charter week.

For short-range vessels, hydrogen is a viable zero-emission fuel, but battery electric has since overtaken it: higher system efficiency, greater simplicity, lower maintenance, and easier integration into the vessel.

Can a superyacht be designed for guest operation powered entirely by batteries?



Maritime Electrification Underway

Today, 1,548 vessels integrate batteries on board, with another 388 on order and more than 2,148 MWh of battery capacity represented across the fleet.

Electric ferries are already working demanding routes every day. Workboats and short-sea vessels are following, while increasingly ambitious concepts are pushing battery power into larger and longer-range applications.

The direction of travel is clear.

Large battery power is becoming commercially advantageous in many marine segments

RECENT COMMERCIAL NEW BUILD PROJECTS



ELECTRIC FERRY

- > 130M LONG
- > 25KTS WITH 8 WATERJETS
- > 30NM CROSSING SIX TIMES A DAY
- > 41MWH INSTALLED BATTERY CAPACITY



ELECTRIC SOV

- > 90M LONG
- > 6,773 GT AT 13KTS
- > 150NM RANGE WITH FULL CHARGE
- > 22MWH INSTALLED BATTERY CAPACITY
- > CAPABLE OF CHARGING FROM FLOATING BUOYS



ELECTRIC CRUISE SHIP

- > 145M LONG
- > ULTRA EFFICIENT WITH 500 PAX
- > ZERO EMISSION ENTIRE COAST OF NORWAY
- > 325NM RANGE ESTIMATED
- > 73MWH INSTALLED BATTERY CAPACITY

WHAT IS A MARINE BATTERY?

CELL
THE BASIC ELECTROCHEMICAL UNIT THAT STORES ENERGY.



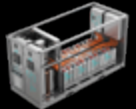
MODULE
MULTIPLE INDIVIDUAL CELLS CONNECTED.

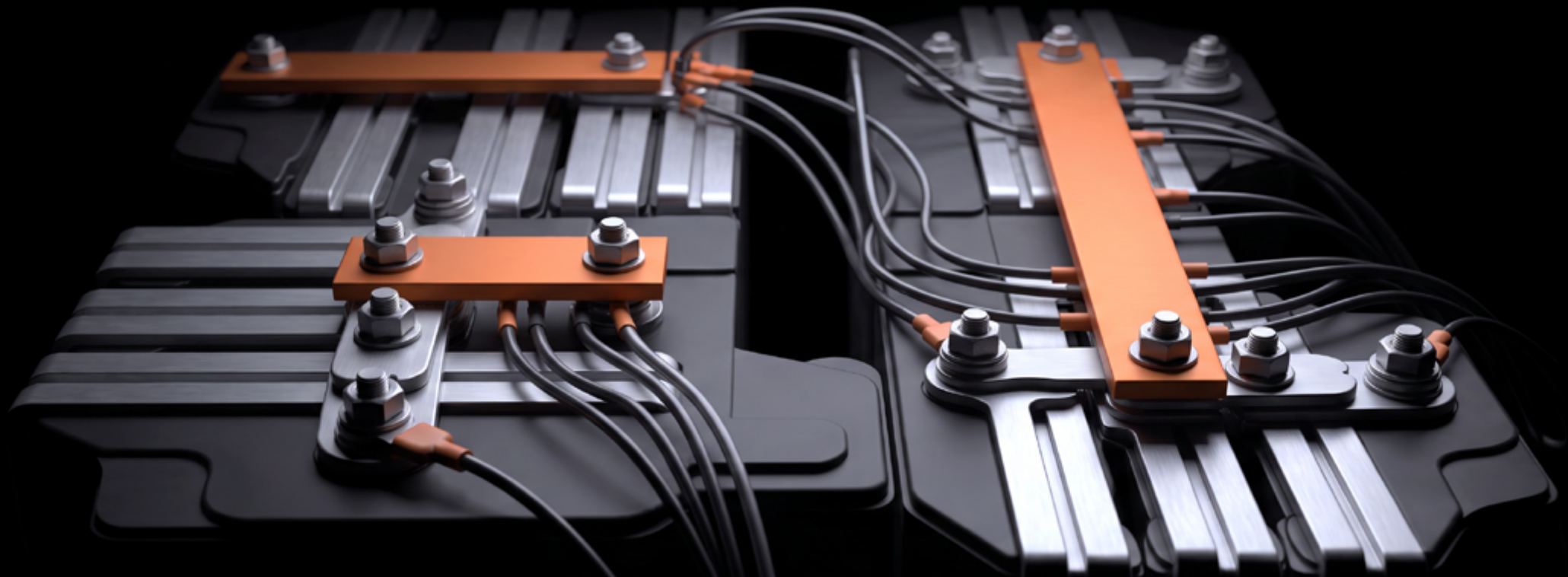


PACK
MULTIPLE MODULES CONNECTED INTO A STRING WITH BMS, THERMAL MANAGEMENT AND PROTECTION SYSTEMS.



BATTERY ENERGY STORAGE SYSTEM
MULTIPLE PACKS INTEGRATED WITH POWER ELECTRONICS, COOLING AND VESSEL SYSTEMS.





Battery Technology

The marine market offers a diverse selection of batteries, including different chemistries, cell constructions and even the use of capacitors.

Different technologies have different characteristics. It is important that the design of the yacht considers and understands the impact of these.

Traditionally the marine market has used NMC cell chemistry, and many

of today's most energy-dense marine batteries use this technology.

This is being challenged by the emergence of cheaper LFP batteries, which while on paper may have a lower energy density are well suited to the deep discharges and low discharge rate typical in yacht projects.

As the operational profile and requirements of projects vary, it is vital that an assessment of the best technology is undertaken for each project, considering battery degradation and charge/discharge rates to correctly size a battery for a safe and long lifespan.



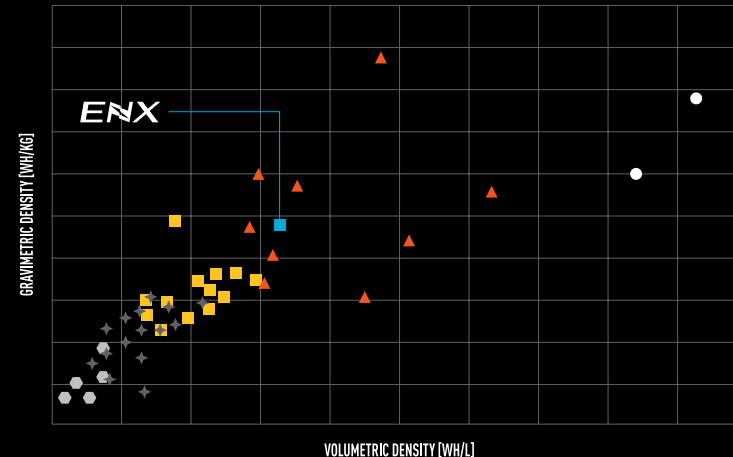
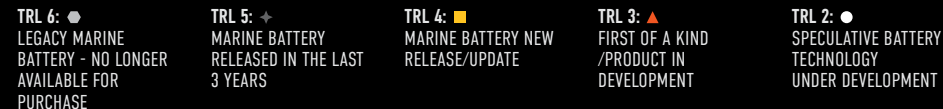
Battery Projection

Since the introduction of large marine batteries there has been a steady improvement in the energy density and capabilities of the batteries in the market.

Global research and development continues to push technological improvements with new technology constantly being reported.

Lateral undertakes ongoing research and collaboration to identify leading technology and assess it against our technology readiness scale. This allows us to assess suitable battery performance to consider and apply for all projects. Within this assessment, additional factors such as operating profile, discharge rates, installation restrictions, price and commercial availability are considered to determine suitable energy density and performance characteristics.

ENX uses this approach to predict available battery performance in 5 years, which results in an approximate 20% increase in energy density compared with today's commercially available batteries.



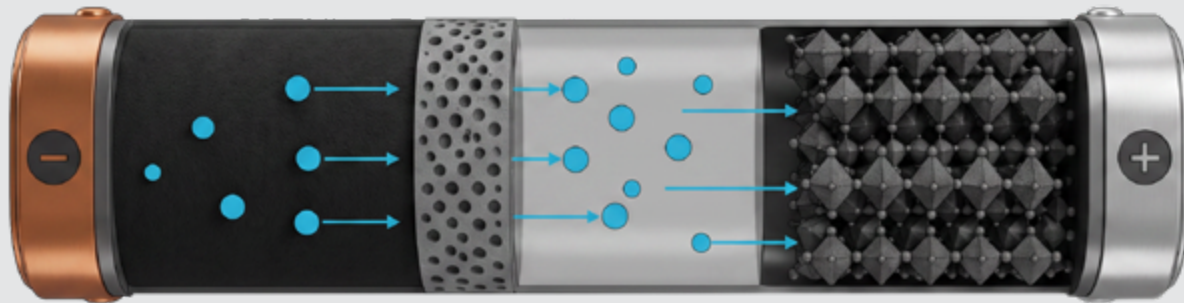
How do we keep safe?

2. CLASS TYPE APPROVAL ENSURES THAT THE BATTERY IS PROVIDED WITH A BATTERY MANAGEMENT SYSTEM (BMS) AND IN THE EVENT OF A SINGLE CELL ENTERING THERMAL RUNAWAY NO OTHER CELL IS AFFECTED.

1. PURCHASE OF HIGH QUALITY CLASS TYPE APPROVED BATTERIES FROM A REPUTABLE SUPPLIER.

4. MONITORING VIA THE TYPE APPROVED BMS, BATTERIES ARE AUTOMATICALLY SHUT DOWN IN THE EVENT OF ABNORMAL TEMPERATURE OR CHARGING CONDITIONS.

6. FIRE SUPPRESSION SYSTEM, AUTOMATED HIGH CAPACITY WATERMIST DRENCHING SYSTEM IS FITTED INSIDE THE BATTERY ROOMS.



7. EACH BATTERY COMPARTMENT IS AN A60 FIRE RATED COMPARTMENT WITH NO FLAMMABLE MATERIAL ALLOWED TO BE STORED INSIDE THE BATTERY SPACE.

3. DEDICATED BATTERY VENTILATION REMOVES HAZARDOUS GAS VIA DEDICATED EX-RATED VENTILATION SYSTEM.

5. BATTERIES ARE IP RATED TO PROTECT AGAINST EXTERNAL LEAKAGE OR WATER INGRESS.

8. THE ENTIRE SHIP'S BATTERY SYSTEM IS CHECKED AND APPROVED BY CLASS INCLUDING HAZID AND FMEA ACTIVITIES AS APPROPRIATE.

Like many systems on a yacht, batteries can be hazardous and it's vital that the system is designed to be safe by following rigorous class society regulations.



HOW DO WE KEEP SAFE?

HOW DO WE KEEP SAFE?



HOW DO WE KEEP SAFE?

Battery Materials

The manufacture of batteries traditionally requires an energy intensive process that is dependent on the mining of different rare earth minerals. This is a global political challenge and one that is being addressed in a variety of ways:

Material Selection

Battery chemistries such as LFP use fewer rare earth minerals than previous generations. By commercial necessity, the industry is adapting to supply chain restrictions.



BATTERY MATERIALS

Supply Chain Regulation

Industry control and regulation of mining practices is developing to encourage safe practice and non-exploitative working conditions in the supply chain.

Recycling

All batteries are fundamentally recyclable and large marine batteries contain economically viable sources of rare materials. The recycling industry for lithium ion batteries continues to develop as the first generation of batteries reach the end of their life. This includes second life usage for batteries in stationary applications.

EU Battery Passport

Through one life cycle and into the next, digital battery passports will allow consumers to track a battery's information, history and sustainability data.



BATTERY MATERIALS



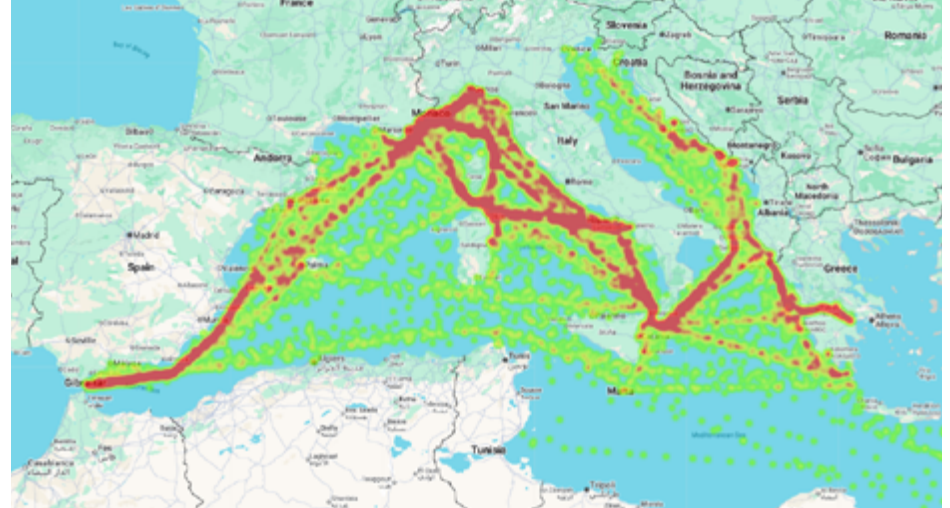
How Far is Far Enough?

To find the solution we must first understand the problem, and for electrification this requires a good understanding of the operational profile of a yacht.

AIS records for the Mediterranean charter fleet were analysed against operational experience on board: where the yachts went, at what speed, for how long, and what that movement costs in energy.

70m yachts are a key segment of the superyacht market and this size of yacht was selected for analysis.

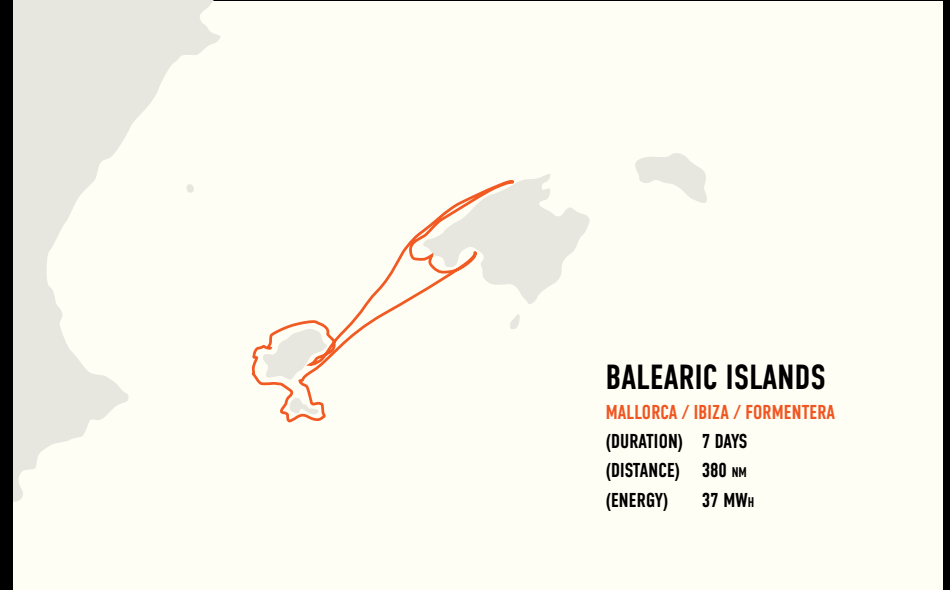
Our analysis of a large operational dataset indicates that a highly efficient 70m superyacht, of around 1,700 GT, would require approximately 37-50 MWh of energy to meet both propulsion and hotel load demands over a one-week charter on typical Mediterranean cruising itineraries.



CHARTER HEATMAP SOURCE:
BOATPRO



Through our analysis of yachts operating around the Mediterranean, we identified five representative routes, all possible within an energy demand of 50 MWh.



FRENCH & ITALIAN RIVIERA

(DURATION) 10 DAYS

(DISTANCE) 257 NM

(ENERGY) 41 MWh



HOW FAR IS FAR ENOUGH?

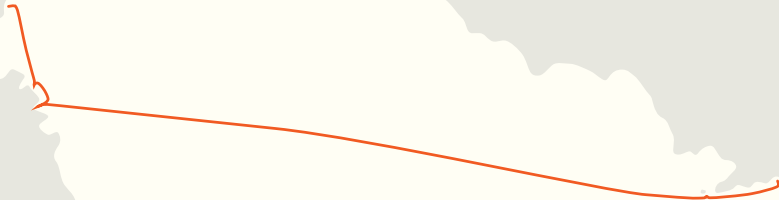
SARDINIA

CORSICA / SARDINIA / ITALY

(DURATION) 9 DAYS

(DISTANCE) 371 NM

(ENERGY) 50 MWh



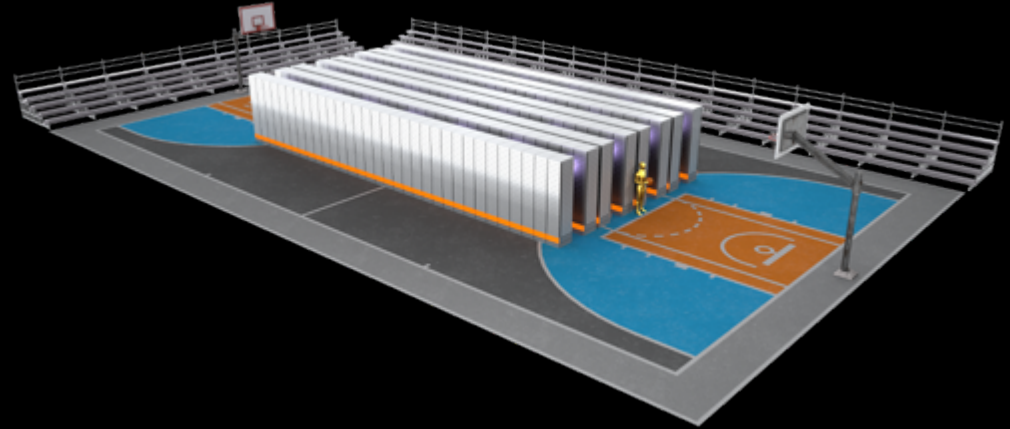
HOW FAR IS FAR ENOUGH?



Design Optimised for Battery

The same principle applies as with alternative fuels: the yacht must be inherently efficient. An optimised hull form, designed around the vessel's operational profile to minimise hydrodynamic resistance, combined with careful speed specification and an ultra-efficient hotel load, should form the foundation of a battery-powered superyacht.

To meet the observed demand and also account for end-of-life degradation and the required battery reserve, the total installed battery capacity for ENX is approximately 60 MWh, comparable to two-thirds of a basketball court, and around 300 tonnes using a projected battery technology, suitable for use in the next 5 years.



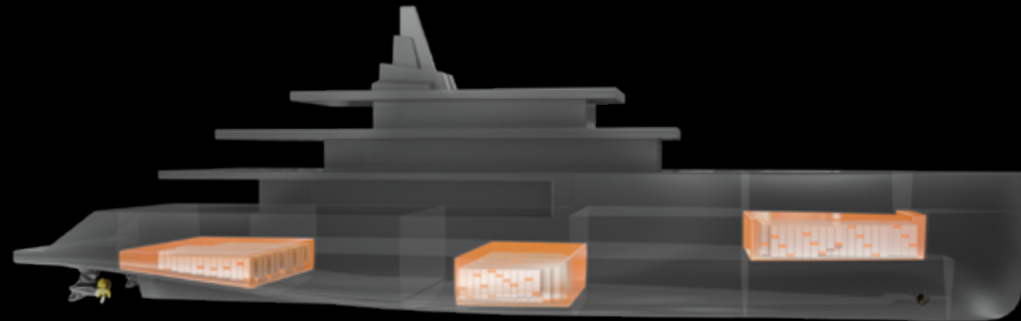
A Fine Balance

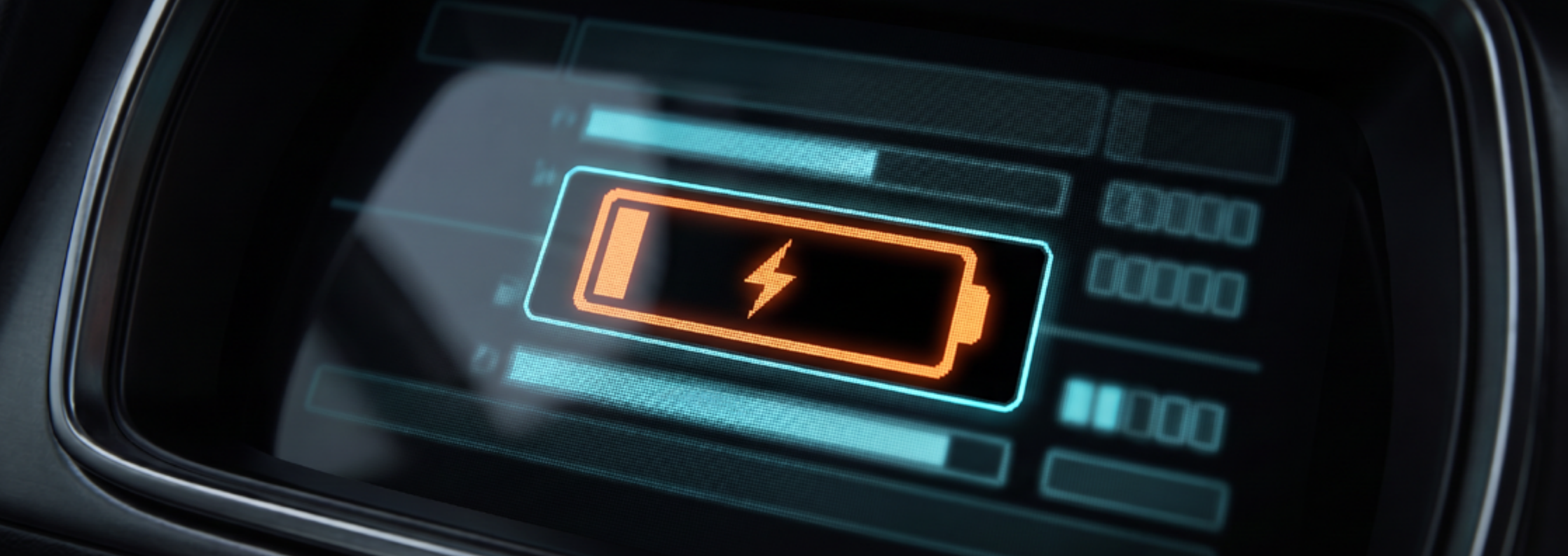
Batteries on superyachts have traditionally been accommodated within residual technical spaces: areas with insufficient headroom, or locations otherwise unsuitable for primary equipment.

For ENX this approach has been reconsidered with the yacht built around the batteries as a primary consideration.

The objective is to maximise volumetric efficiency while ensuring safe access, maintainability, and integration with the wider vessel arrangement.

The weight of the battery is carefully considered to maintain the correct trim, comfort and stability of the yacht.





Charging Options & Carbon Intensity



ZONE 1: LOW EMISSIONS ZONE:
30–150 gCO₂EQ/kWh
COUNTRIES RELIANT ON NON-FOSSIL FUEL BASED
ENERGY SOURCES, MAINLY NUCLEAR POWER.

ZONE 2: MODERATELY LOW EMISSIONS ZONE:
150–300 gCO₂EQ/kWh
COUNTRIES RELIANT ON CLEANER BURNING
FUELS AND RENEWABLE ENERGY SOURCES

ZONE 3: MODERATELY HIGH EMISSIONS ZONE:
250–450 gCO₂EQ/kWh
COUNTRIES RELIANT ON FOSSIL-FUEL
BASED ENERGY SOURCES

ZONE 4: HIGH EMISSIONS ZONE:
500–850 gCO₂EQ/kWh
COUNTRIES RELIANT ON IMPORTED
FOSSIL-FUEL BASED ENERGY SOURCES

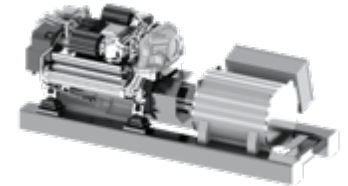


Whilst ENX is provided with its own onboard charging solution via diesel generators, shore power charging could allow lower carbon energy to be drawn directly from the grid. The current provision for high-capacity charging connections is limited, but as adoption of battery-powered vessels increases, infrastructure is likely to expand progressively, initially where commercial demand is strongest, lowering the barrier for further electrification.

The deployment of Onshore Power Supply (OPS) infrastructure across the Mediterranean is accelerating in response to European decarbonisation measures, including Fit for 55, AFIR and FuelEU Maritime. Major ports such

as Barcelona, Marseille, Valletta and Palma are investing in multi-megawatt shore power capability to serve main ferry routes, as well as cruise ship stopovers.

Charging via generator: 660–700 gCO₂eq/kWh, significantly higher carbon intensity than most Mediterranean shore power supplies.

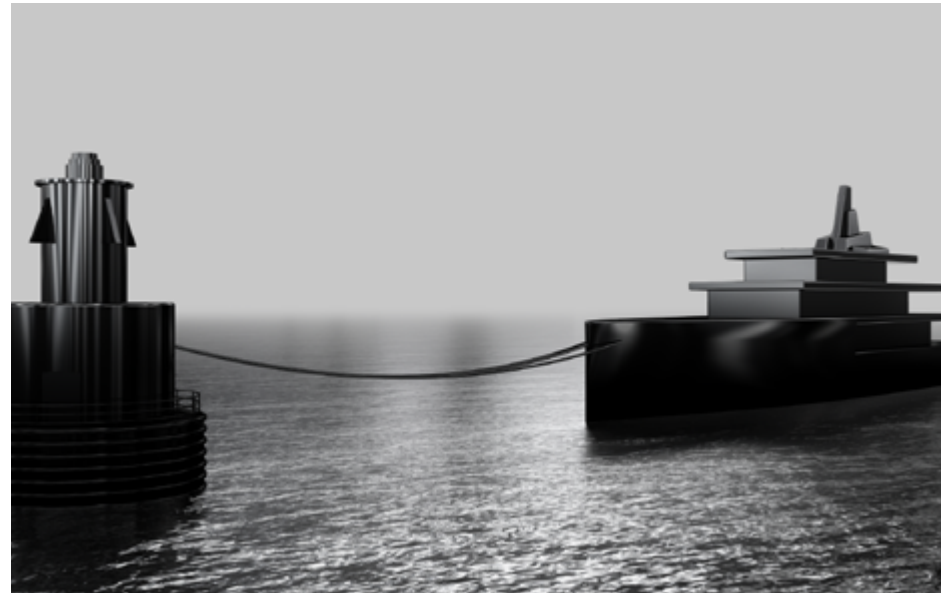


Offshore Charging

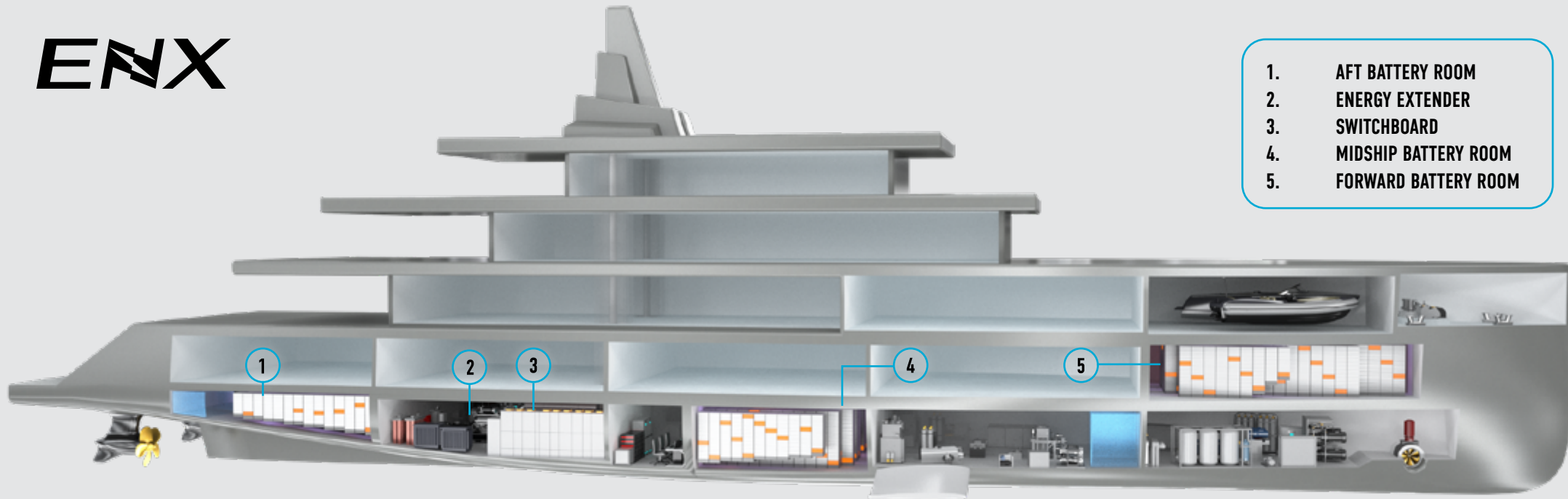
Whilst shore-side charging solutions are becoming increasingly common in ports, many vessel operations, including offshore support vessels, workboats, and autonomous craft, require access to electrical power beyond traditional port infrastructure. This has driven growing interest in offshore charging solutions, enabling vessels to recharge at sea, near shore, or along transit routes.

From floating charging stations to induction-based systems, shipyards, technology providers, and maritime stakeholders are expanding collaborations to develop innovative offshore charging solutions.

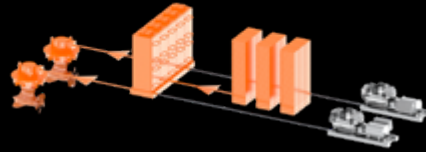
Although the technology remains at a relatively low Technology Readiness Level (TRL), the market is actively working to establish offshore charging infrastructure in the North Sea. The Mediterranean currently lags in this area; however, future investments could create opportunities, particularly for yacht owners seeking greater operational flexibility and access to sustainable energy solutions.



ENX



Battery Architecture



Advantages of Battery Architecture

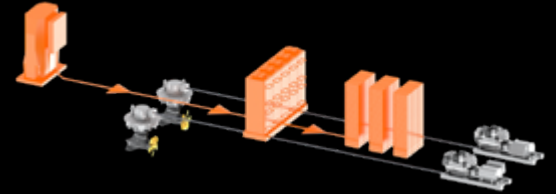
- > Zero local emissions
- > Future-proofing
- > Reduced noise and vibration
- > Highly efficient
- > Reduced maintenance requirements
- > Lower running costs

GUEST OPERATION

Typical operation throughout the charter. 100% silent running, and zero-emission utilising battery power only to meet propulsion and hotel load demand.

SHORE RECHARGE

Standard turnaround charging between Mediterranean charters. With predicted Mediterranean infrastructure, charging will typically require 10-48 hours (20-100%).



LONG-RANGE TRANSIT

The energy extender will enable extended passages between charters.

When Access Becomes Conditional



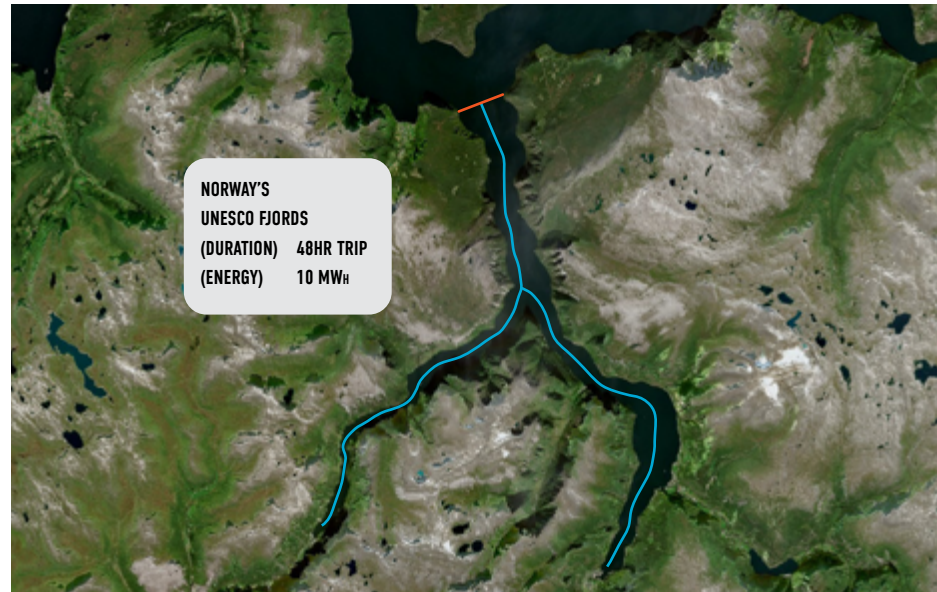
Emissions regulation has governed how a vessel operates. It is beginning to govern where it can go.

Despite regulations getting postponed, it is likely that vessels will be required to operate without direct CO₂ or methane emissions inside Norway's World Heritage fjords.

The mechanism matters more than the location: access determined by what a vessel emits on arrival. Once established, it is available to any authority with a coastline it chooses to regulate.



WHEN ACCESS BECOMES CONDITIONAL



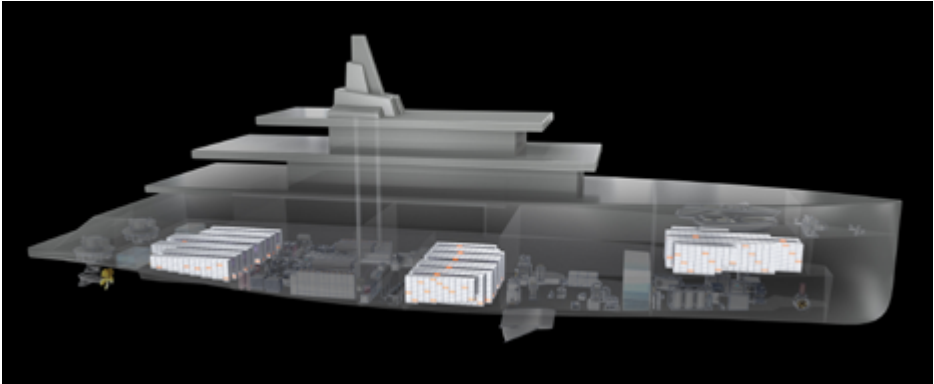
WHEN ACCESS BECOMES CONDITIONAL

Technical Platform

Achieving the best possible range and endurance efficiency is a key aspect of the ENX platform. This is enabled by applying advanced HVAC systems, thermal management and using automation to ensure careful and deliberate load management. This is combined with an efficient Lateral Series A hull form optimised for a relatively slow speed to suit typical guest operations.

Space-efficient, high-power-density, variable-speed generators are combined with a DC grid distribution system to ensure that the required battery spaces can be implemented in a space-efficient technical design.

This results in a platform optimised for the guest experience operating on stored energy alone but still having the capability to cross the Atlantic.



LENGTH OVERALL	70.0 M	PROPULSION ARCHITECTURE	ALL ELECTRIC ARCHITECTURE
LENGTH WATERLINE	70.0 M	ENERGY STORAGE SYSTEM	60.0 MWh
BEAM (MOULDED)	12.0 M	TOP SPEED	14.0 KNOTS
DRAUGHT (FULL LOAD)	3.5 M	RANGE SPEED	11.0 KNOTS
GROSS TONNAGE	1700	ELECTRIC RANGE	625 NM
NOTATION	REG YACHT CODE PART A	EXTENDED RANGE	4,500 NM

HOW FAR CAN BATTERIES TAKE YOU?

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