Ahead of the Current

The future of electric vessels

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AKA Energy Systems

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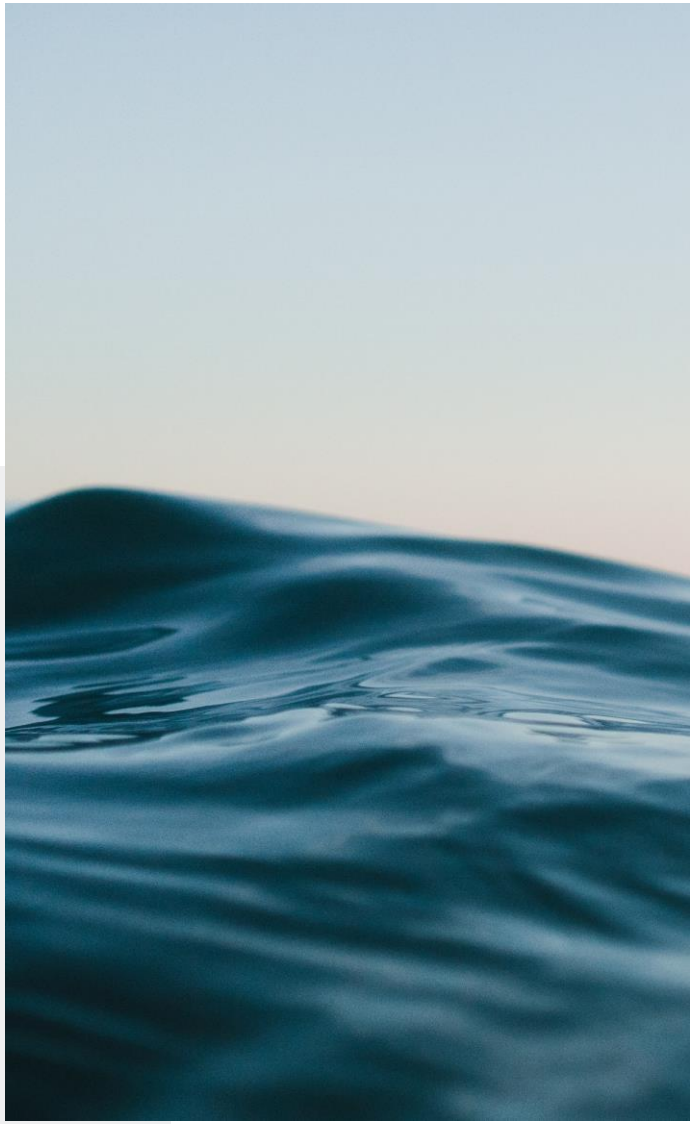


ABOUT US

AKA: Marine, Offshore, Land-based

- Founded in 1996
- MAN Partner 40% (2017)
- Extensive depth of electrical power systems and energy management
- Always pioneering and often the first
- Unrivalled expertice in emission reduction around marine operations while mitigating operational risk
- World leader in safe closed bus operations

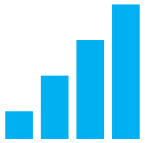
AKA Energy Systems

WHY AKA

Our Design philosophy

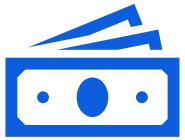
REDUCE ENVIRONMENTAL IMPACT

We deliver solutions that reduce the environmental impact associated with the same operations.



INCREASE RELIABILITY

Our systems provide a step change from the gold plate industry standard for system reliability.



REDUCE OPERATING COSTS

AKA provides the above increased reliability and reduced environmental impact while at the same reducing the cost of operation.

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Working with some of the most influential Marine companies in the world

Shell

MAN Energy Solutions

Transocean

KOTUG

SIEMENS

seaspan CORPORATION

FUGRO

DAMEN

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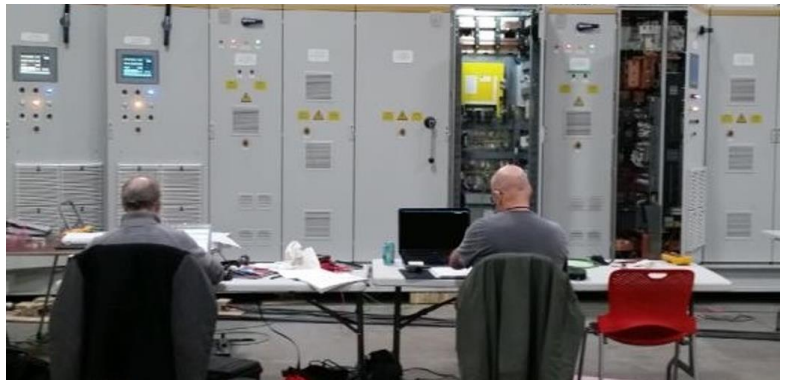
Design, Manufacturing and Testing, All in House



100,000 ft²

Manufacturing Facility

100 +

Projects

The manufacturing facility in PEI is a state-of-the-art electrical assembly area, a low to medium-voltage test bay, and a mechanical fabrication shop.

AKA Manufacturing Floor Walk-Through - YouTube

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2000

AKA tech deployed on Xpress Class Rigs

2001

Concept Conversation (Eco Tour Vessel)

2003

Development of Advanced Generator Protection (AGP) Prototype

2004

First AGP Installed

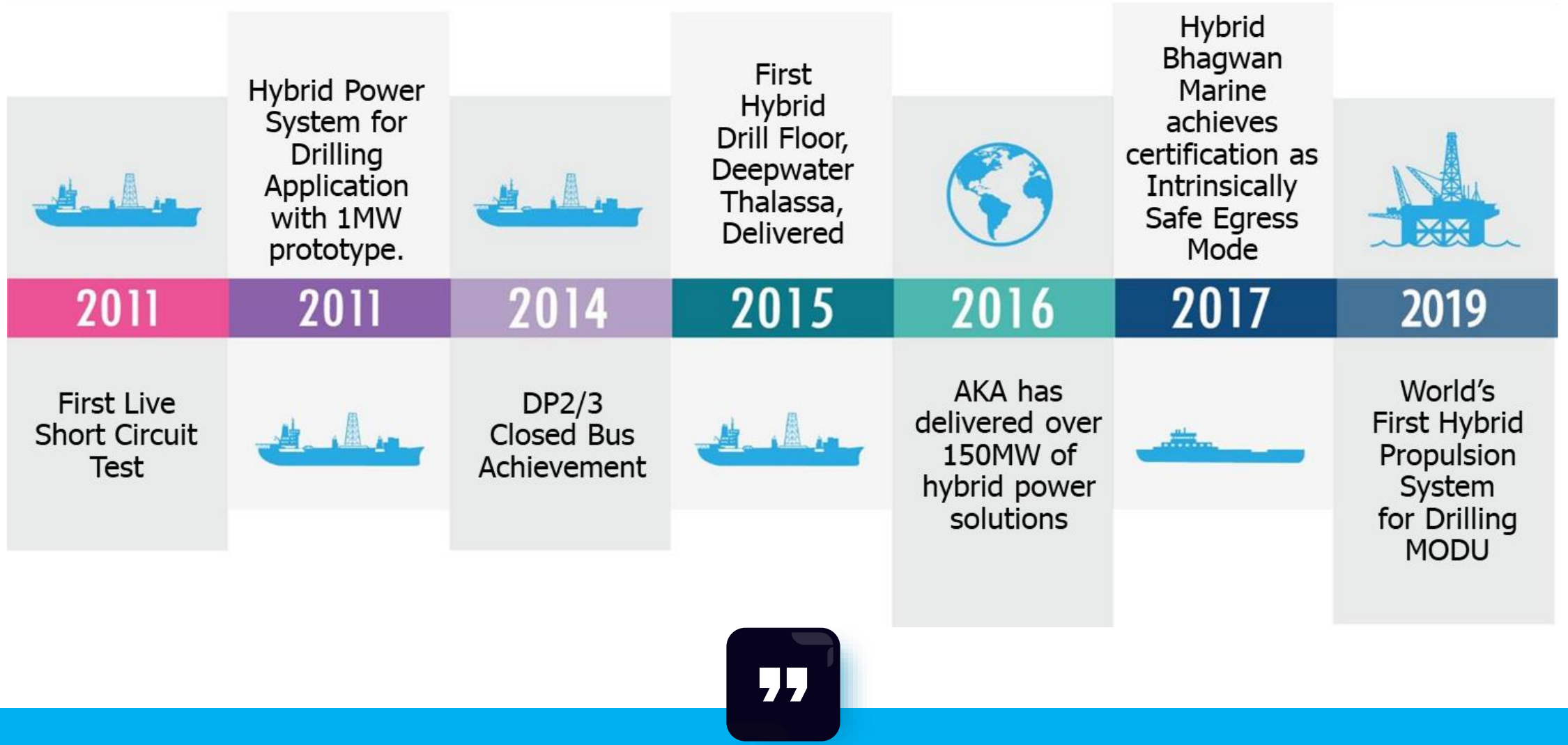
2007

First Hybrid MarinePower System Contract

2009

First Hybrid Propulsion System Delivered

Ahead of the Current, The journey so far



Ahead of the Current, an impressive track record

Marine Electrical systems

Criteria

- Operational profile
- Available Infrastructure
- New built or Retrofit

Options Available / Proposed

- Fully Electric
- Diesel Electric
- Hybrid

Battery Selection criteria

- Energy density
- Cost
- Power
- Life Span
- Performance
- Safety

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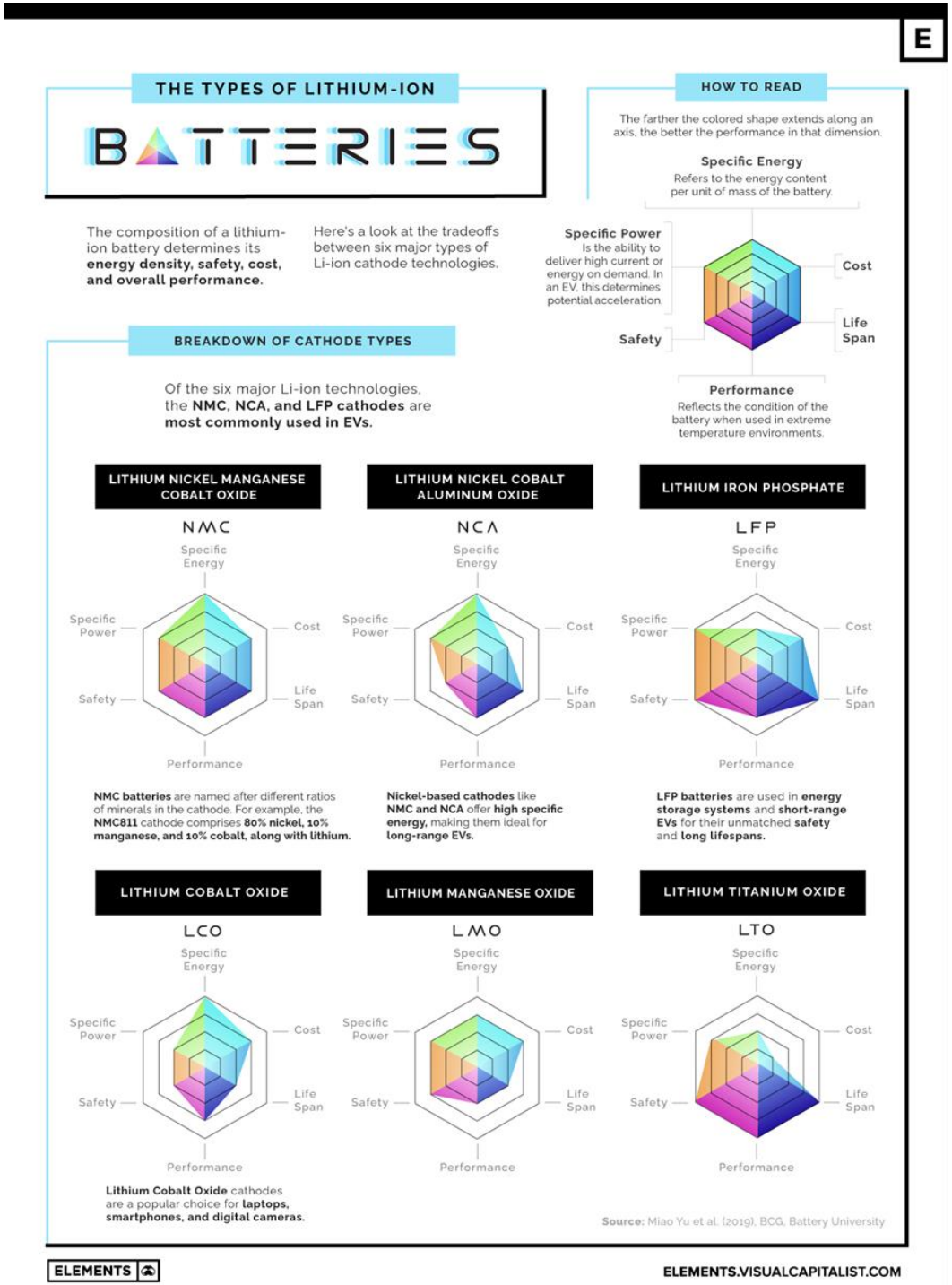

The challenge for the Insurance industry is when new technology is involved there is no track record or data available. So the risk assessment is dynamic, constant moving when more data becomes available.

The Marine Industry has moved from NMC to LFP when the technology evolved and more safety data became available and LPF is now the most used battery chemistry in the Marine Industry, for now...

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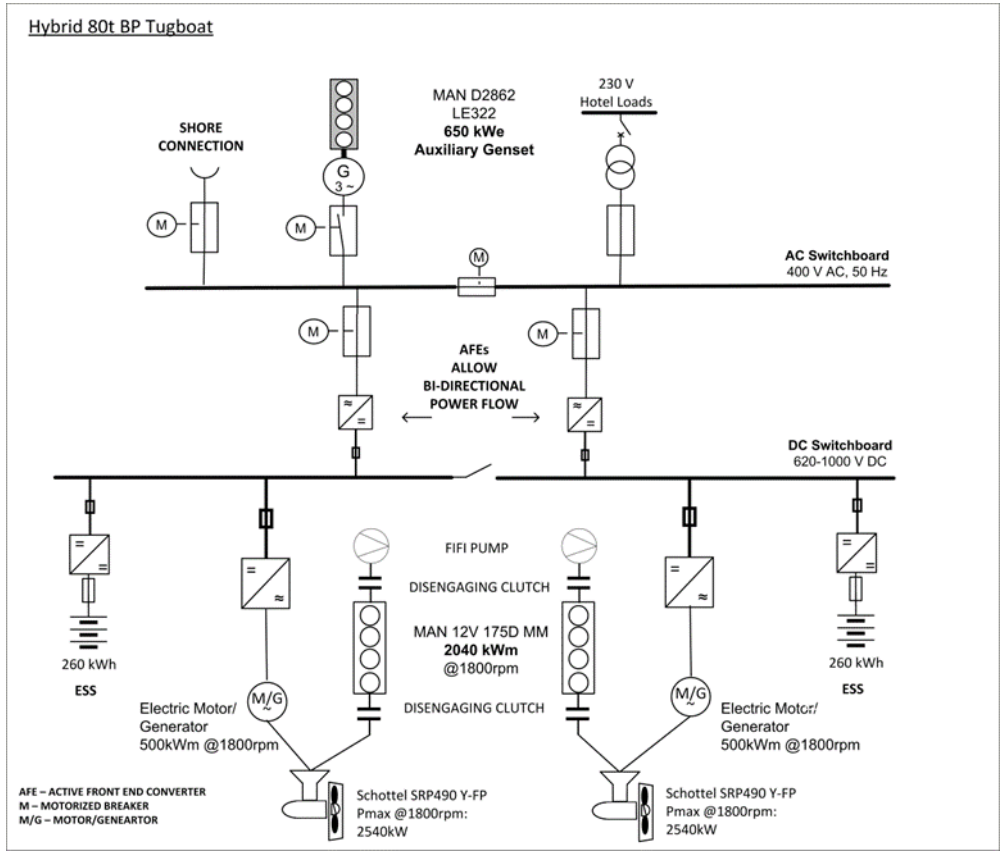
IMO 40% emission reduction by 2040

- Further electrification DC centric
- Fuel cell technology
- More Data driven decisions /AI
- New Battery development
- Alternative fuels
- Nuclear (small molten salt reactors)
- Wind assisted propulsion



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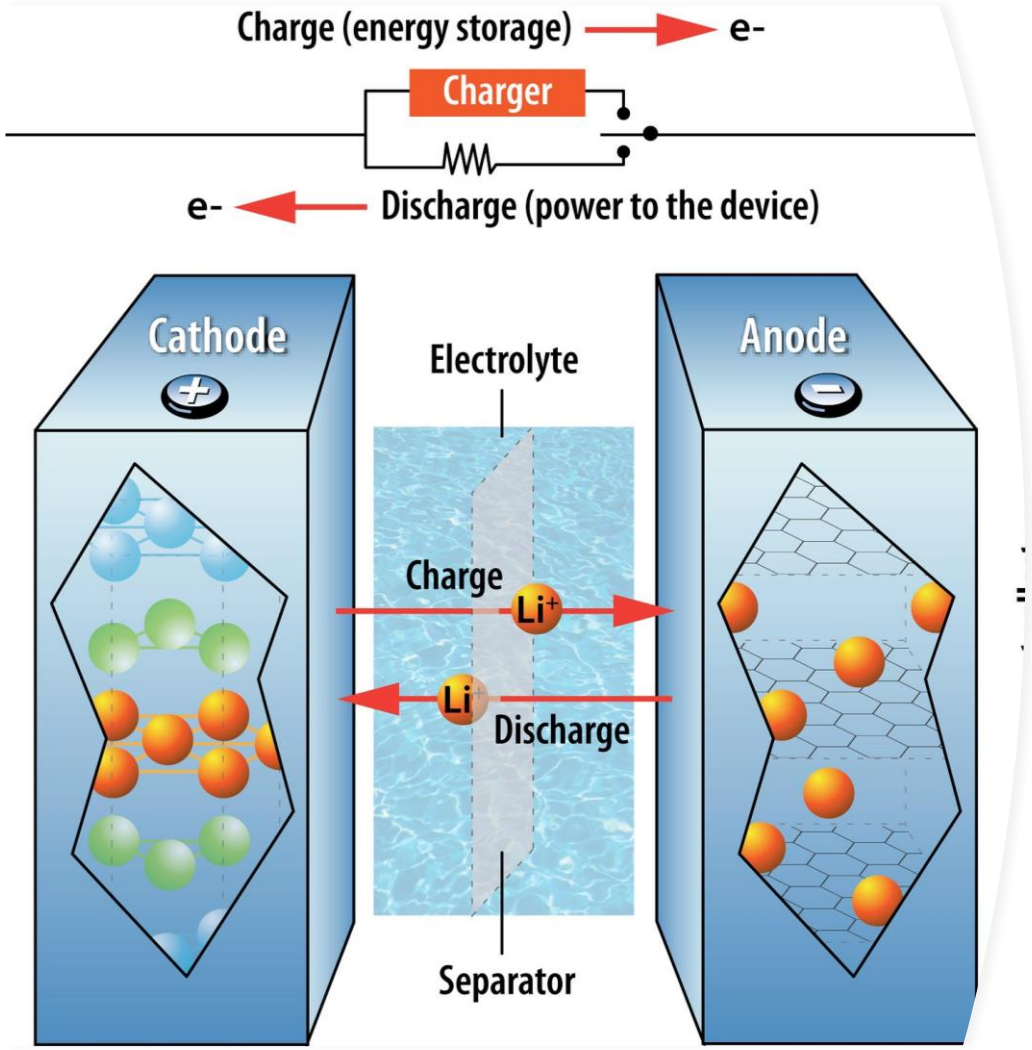
Use of Fuel cell technology

- No Carbon emission provide that the fuel used is from renewable source
- Technology is known but fuel cells are still limited in capacity and will be not a solution for bigger vessels
- Regulation around fuel cell and in particular the use of hydrogen
- Not a lot of data and/or experience available in practical Marine use

Data driven Industry

- Marine Industry is already data driven
  - Logistics
  - Vessel Management
  - Power and Propulsion plant
- Electric vessels are highly automated
- Better predictability
- What will be the role of AI, how to insure this?

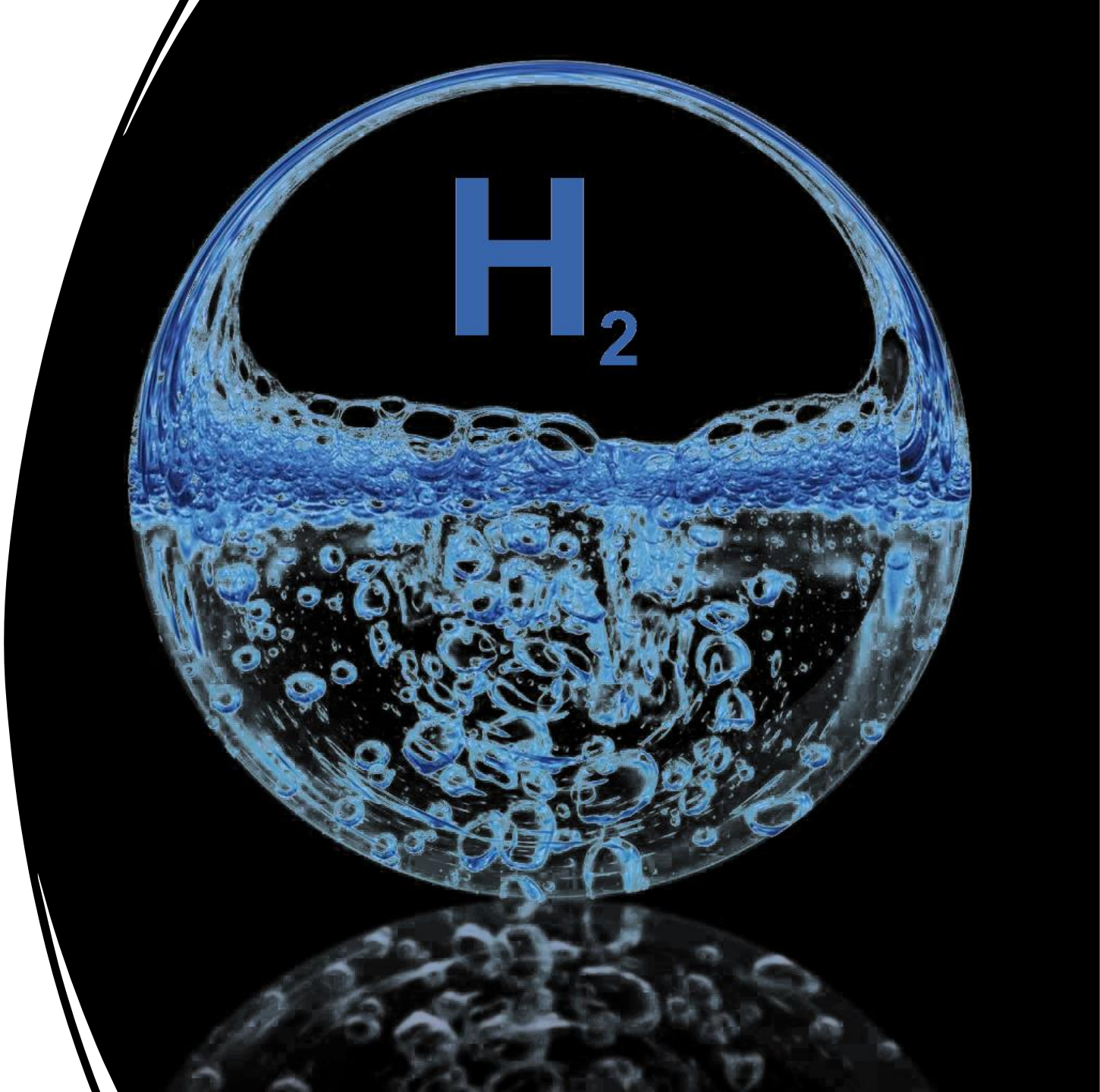


Battery Development

- New chemistry
  - Focus on safety
  - Energy density
  - Low cost
  - Recyclability
  - Life span
  - Weight to density ratio
- Solid State battery
  - >10,000 cycles

Alternative clean Fuels

- Hydrogen
  - Combustion or Fuel Cell
  - Near shore
  - Storage challenge
  - Rules and regulation
- Ammonia
  - Nox emission
  - Easy to store but corrosive
  - Long haul, not for all because of smell
- Ethanol
  - Carbon emission
  - Captured Carbon
- Bio Diesel
  - Carbon emission
  - Source



The future will be innovative using new technologies and very dynamic.

Electrification will be a major part of the future, regardless of the energy source.

There is an important role for the Classification societies and the Marine Insurance Companies to work with industry to ensure the safety of our industry and enable the innovation needed to meet the 2040 goals.

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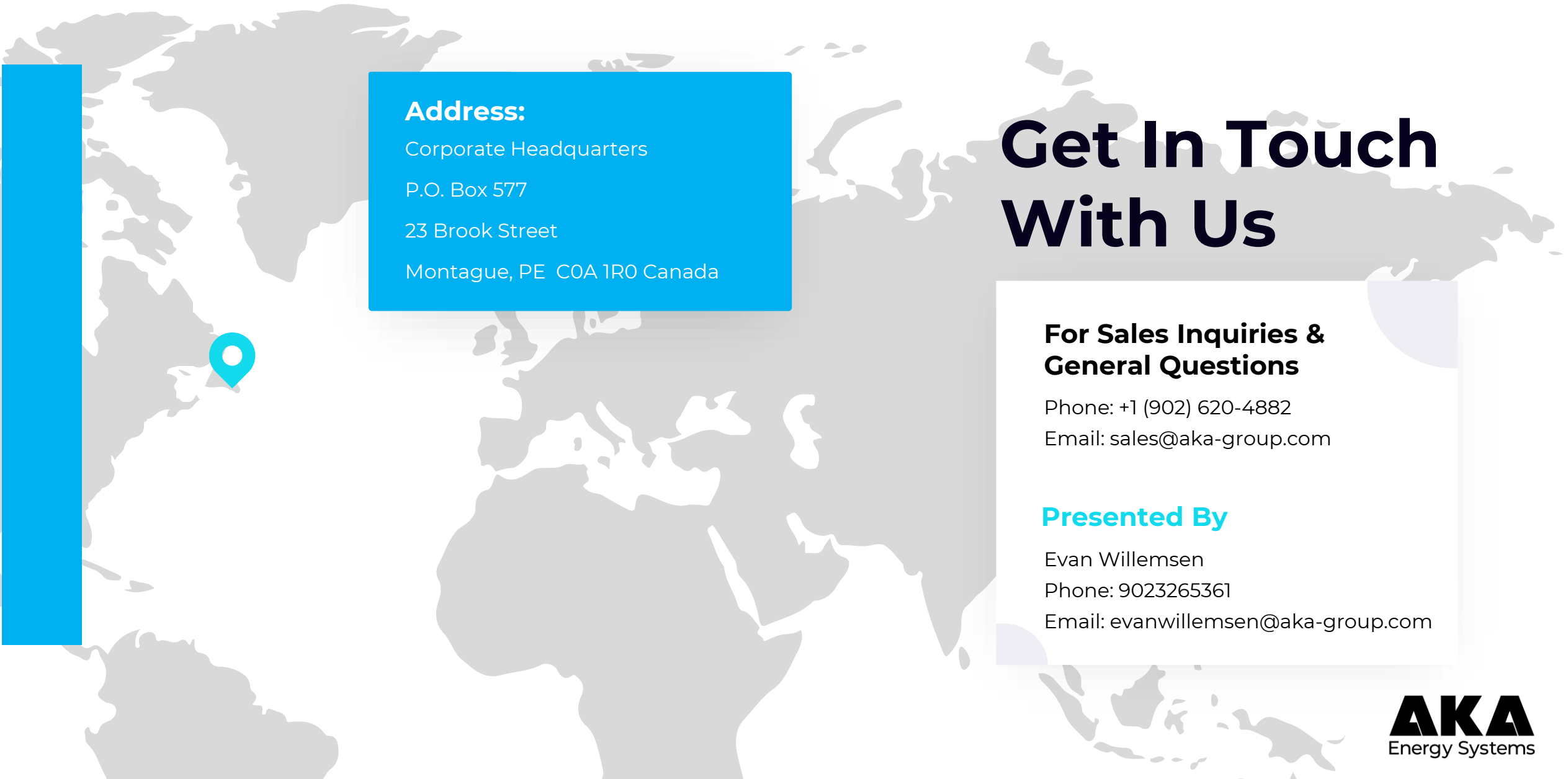

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Thank You

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