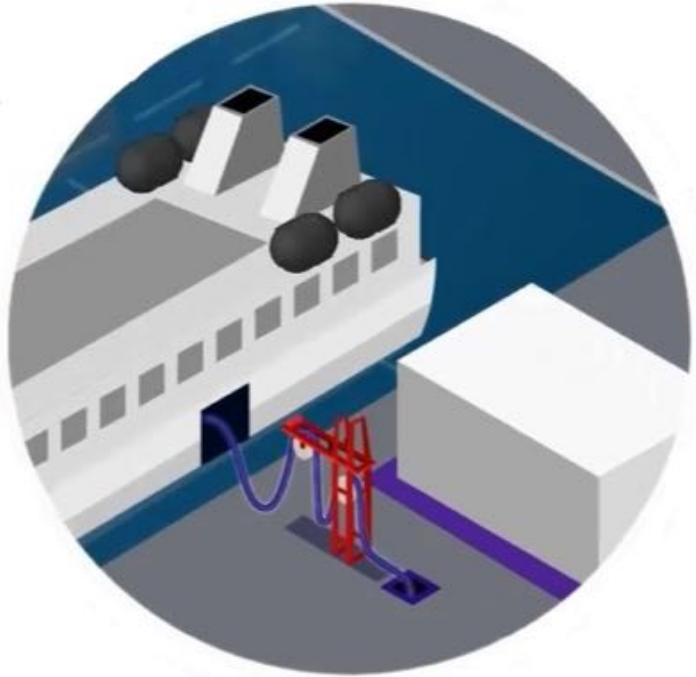
elemed

electrification
in the **e**astern
mediterranean

Approaching an Innovative e-Ferry Design

Polychronis S.MERTIKAS
Naval Architect & Marine Engineer



Powering zero-emission marine transportation

Athens, 27/2/2018

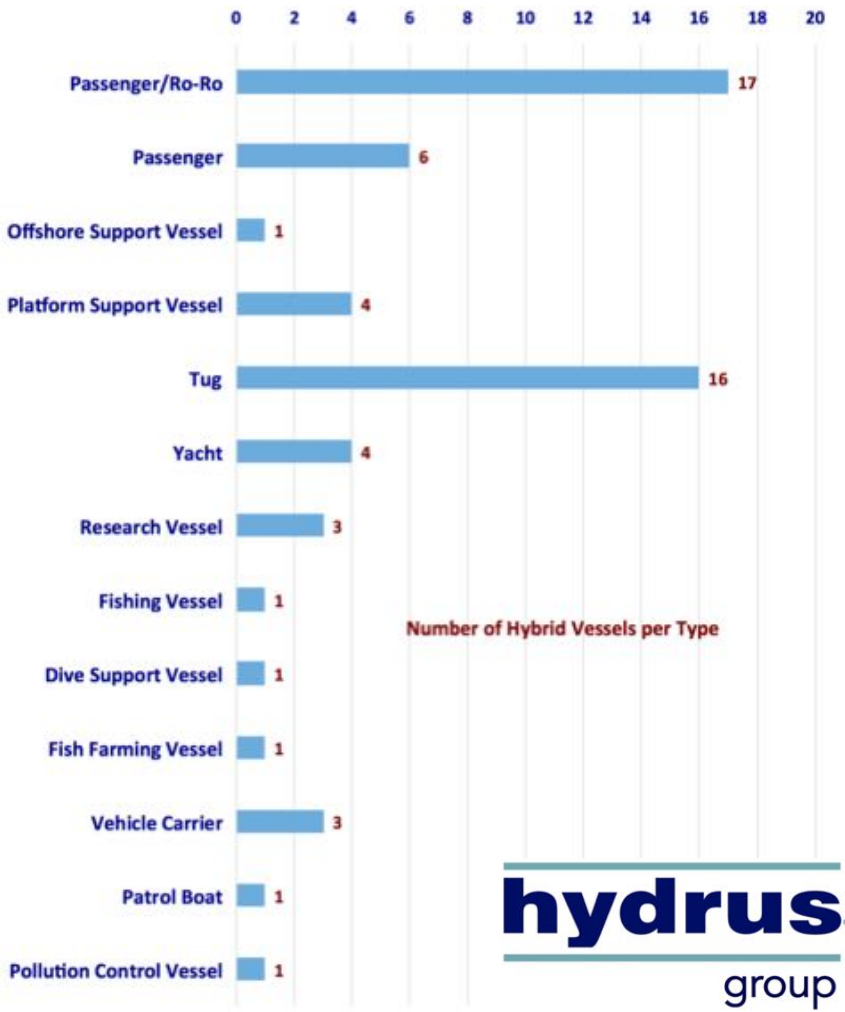
hydrus group

Co-financed by the European Union
Connecting Europe Facility

Recent Developments

Case-studies reported under ELEMED indicate that:

- ✓ Hybrid and all-Electric vessel designs operating in European waters mainly cover Passenger/Ro-Ro vessels and Tug boats with installed battery packs of embedded power up to 2700kWh;
- ✓ Hybrid designs are significantly more in number and refer to larger power installations;
- ✓ Hybrid and all-Electric vessel designs increase both in number of applications as well as volume of power embedded in the battery packs;



elemed

hydrus group

Benefits of an all-Electric Design

- ✓ Evident improved environmental impact due to zero-emission by design
- ✓ Improved impact due to noise and vibration
- ✓ Amelioration of quality life onboard and around the ports
- ✓ Increased overall efficiency
- ✓ Reduced maintenance costs
- ✓ Flexibility in machinery arrangements
- ✓ Potential leverage of renewable energy in shipping
- ✓ Facilitating sustainable growth

Zero-emission by Design

elemed

hydrus group

Scope of an all-Electric Ferry Design

- ✓ Optimize operational characteristics (capacities, range and speed) against power requirements and the size as well as cost of battery packs installation
- ✓ Tackle the particularities of East-Med coastal needs (connecting ports distance, meeting rush-period needs, port facilities and sizes)
- ✓ Design size and characteristics that would allow construction within the East-Med region targeting feasible realization and sustainable growth
- ✓ Enhanced safety and reliability
- ✓ Enhancing uptake of innovative technologies
- ✓ Optimum blending of proven naval architecture and engineering solutions with cutting edge available off-the-shelve technologies

elemed

hydrus group

Proposed all-Electric Ferry Concept Design

- ✓ Twin-hull design optimizing carrying capacities
- ✓ Operation range of abt. 20nm and speeds of up to 19 knots making the most out of feasible battery power pack installation
- ✓ Electric motor driven propeller shafting design with customized side thrusters arrangements to meet specific needs
- ✓ Customized accommodation size and arrangement

Leading to potentially

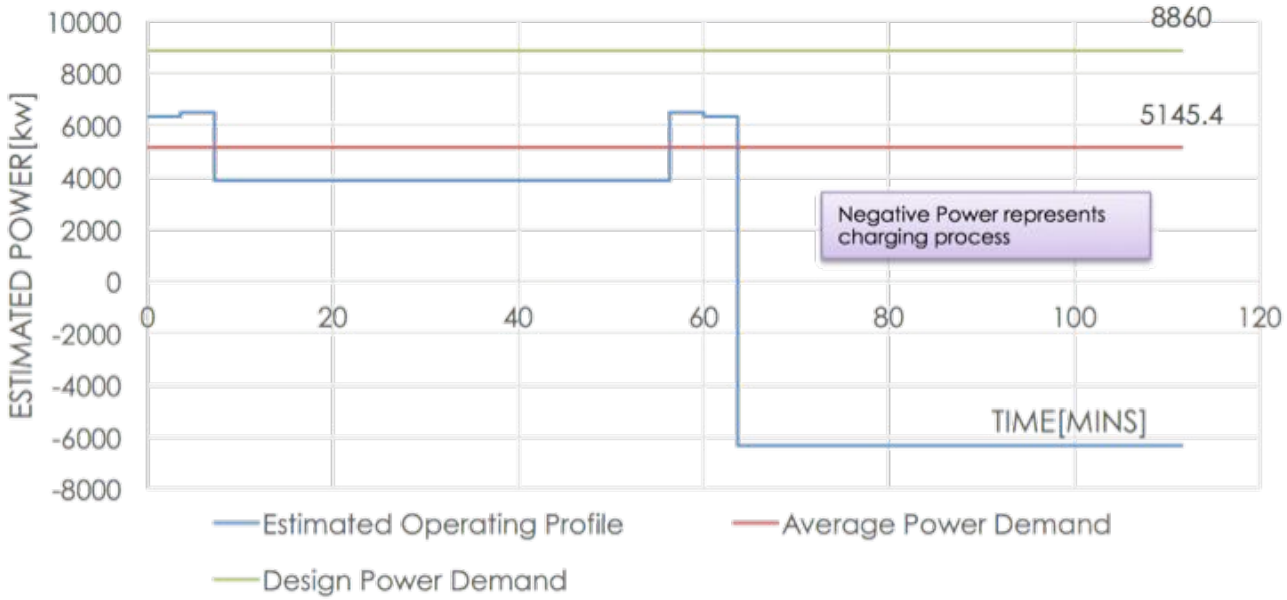
Largest sized battery installation in the East-Med

elemed

hydrus group

Proposed all-Electric Ferry Concept Design

The Battery Energy Storage System is expected to provide reliability in terms of adequate embedded energy and weight minimization:



Requirement: Adequate port infrastructures for charging facilities

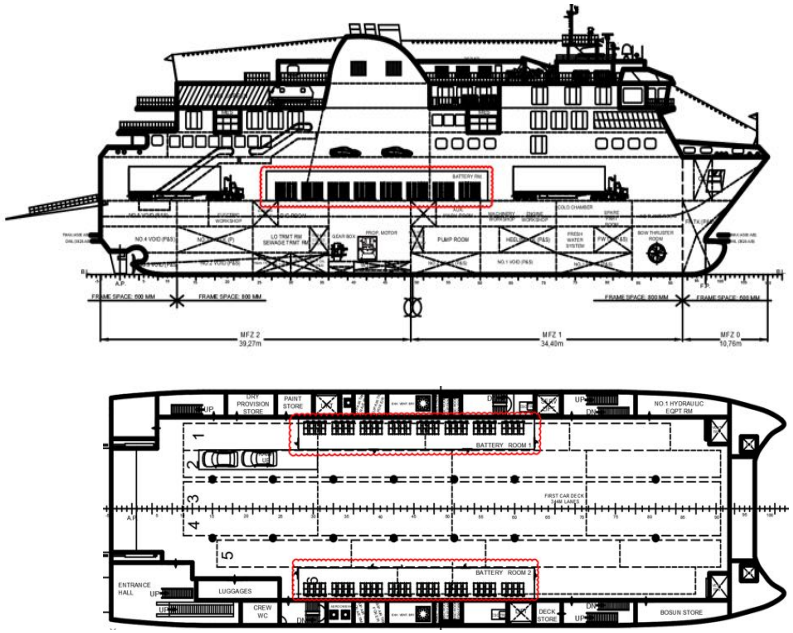
elemed

hydrus group

Proposed all-Electric Ferry Concept Design

Principle characteristics:

- ✓ Length: abt. 85m
- ✓ Capacities: abt. 1175 Passenger
  abt. 87 cars
  abt. 288m of Truck Lanes
- ✓ Speed: 17 knots
- ✓ Battery: 8MWh



elemed

hydrus group

Approaching the Approval-in-Principle Stage

Core design submitted for evaluation towards meeting approval-in-principle for the Battery Energy Storage System:

- ✓ Battery Room Layout and Proposed Locations
- ✓ Technical Description of Proposed Charging Method
- ✓ Shore Connection Charging Room Design
- ✓ Battery Room Design Installation Criteria
- ✓ System Integration & One-Line Diagram
- ✓ Technical Description of Propulsion Motors, Side Thrusters, Auxiliary Engines, Power Conversion Equipment, Circuit Breakers, DC Distribution System
- ✓ Ventilation & Cooling Arrangements for the Battery Rooms
- ✓ Fire Protection & Explosion Prevention Measures
- ✓ Orderly Evacuation and Abandonment Plan

More to be announced within the next few exciting weeks!

elemed

hydrus group

elemed

our future charged

Thank you

Polychronis S. MERTIKAS
Naval Architect & Marine Engineer
mertikas@hydrus-group.gr

hydrus group

Co-financed by the European Union
Connecting Europe Facility