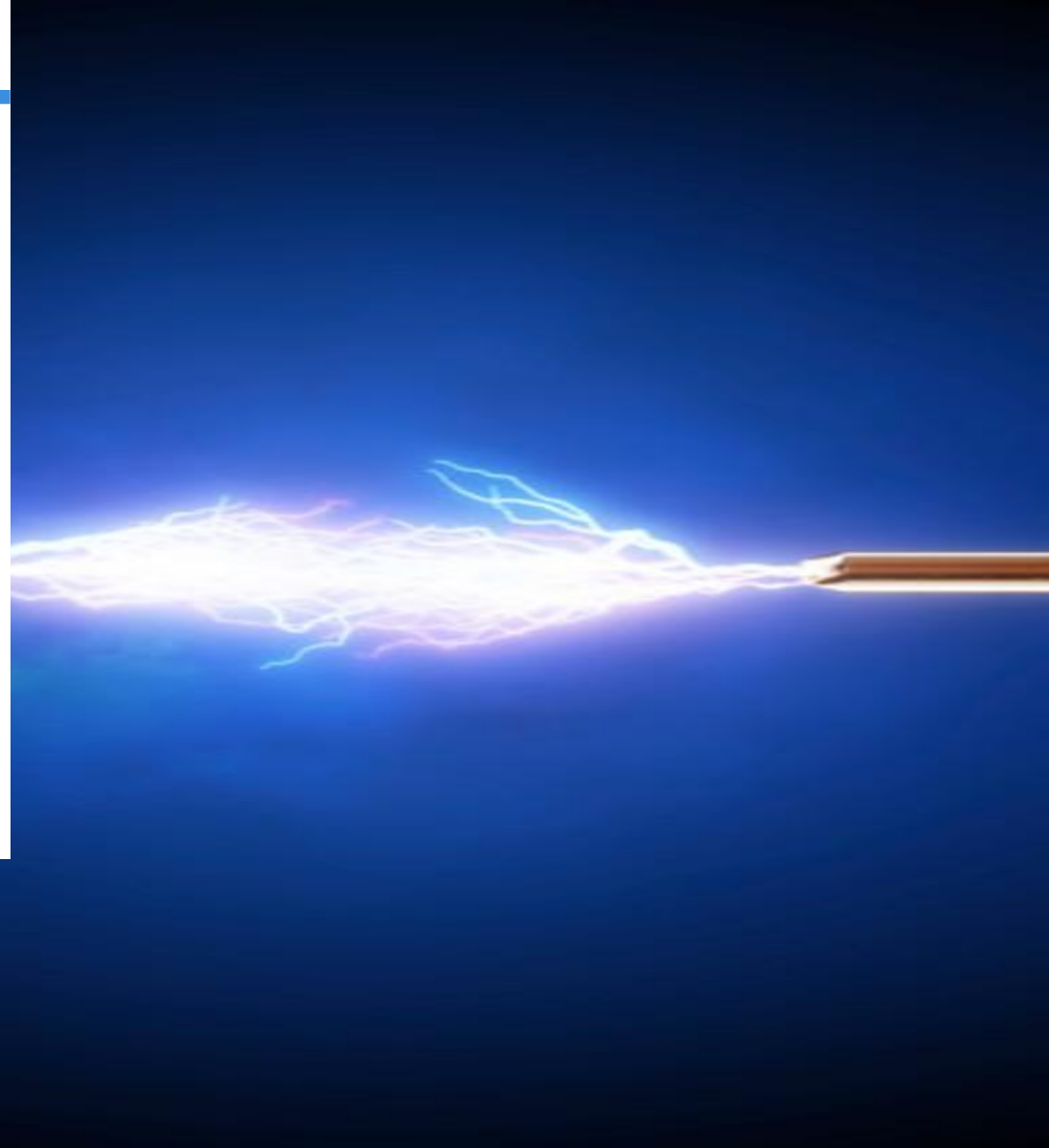


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# Driving Electrification; the case of ELEMED project

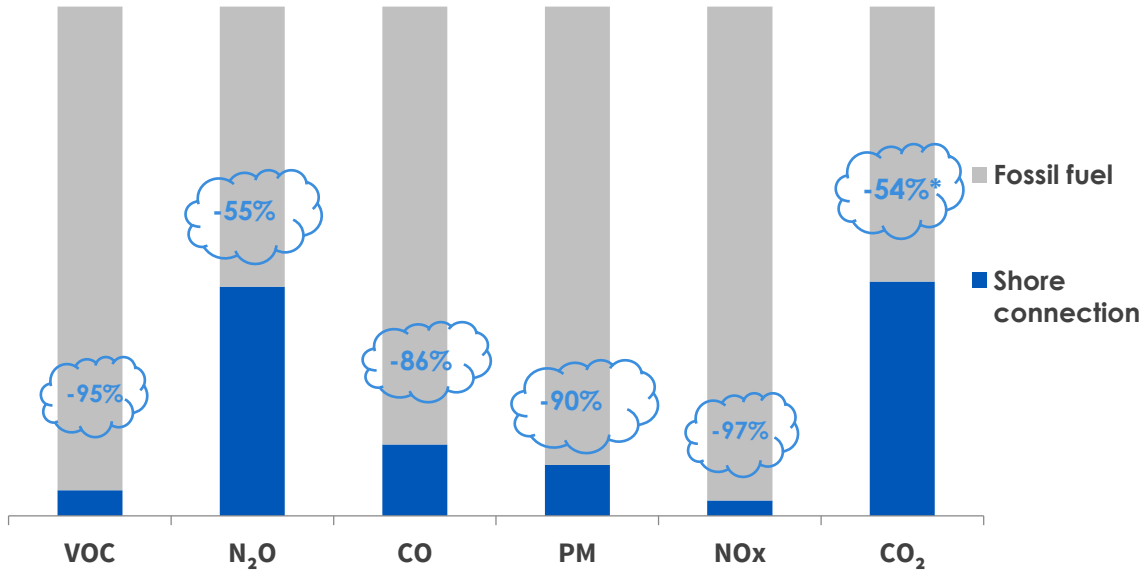
4<sup>th</sup> Mediterranean Shipping Conference

**Theo Kourmpelis**, Surveyor, Electrotechnical  
Systems Marine & Offshore South Europe



# Setting the course for 2050: good & true

## Reduction of emissions thanks to shore connection



\*45% with modern diesel engines

Source:  
SIHARBOR The shore connection system for berthed ships; Shore-side power supply for eco-friendly ports Unrestricted Siemens AG 2016

## Marseille-Fos to invest €20M in cold ironing

News 26 Jul 2019 by WCN Editorial

Marseille Fos port authority is to spend €20M over the next six years to extend shoreside electrical connections for berthed vessels to every ferry, cruise ship and repair quay within the Marseille eastern harbour

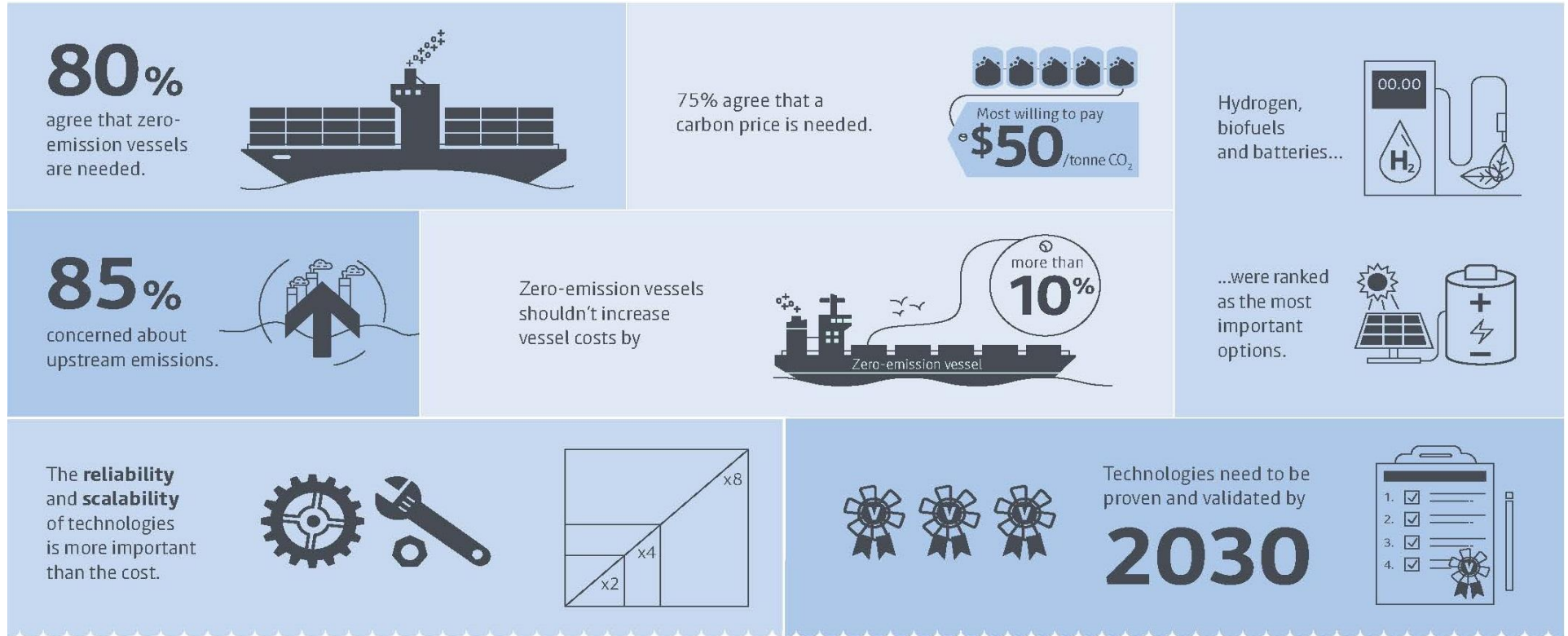
## UK Chamber of Shipping: Hybrid ferries crucial for a greener economy

The UK Chamber of Shipping highlights the importance of dealing with the climate change through green and more sustainable means in the maritime sector supporting the development of more hydrogen ferries in the sector to achieve a green economy.

## P&O Ferries orders world's largest double-enders for Dover-Calais service

**FERRY** The Chinese Guangzhou Shipyard International (GSI) sees its order intake for ro-pax ferries further increase following a long-awaited double order from P&O Ferries for a next-generation of Dover-Calais shuttle ferries.

# Electric water vehicles for emission-free future



# Going green using battery

## Prominent Examples from LR Experience



Scandlines Prins Richard  
2.6MWh



Teso Texelsroom  
900kWh

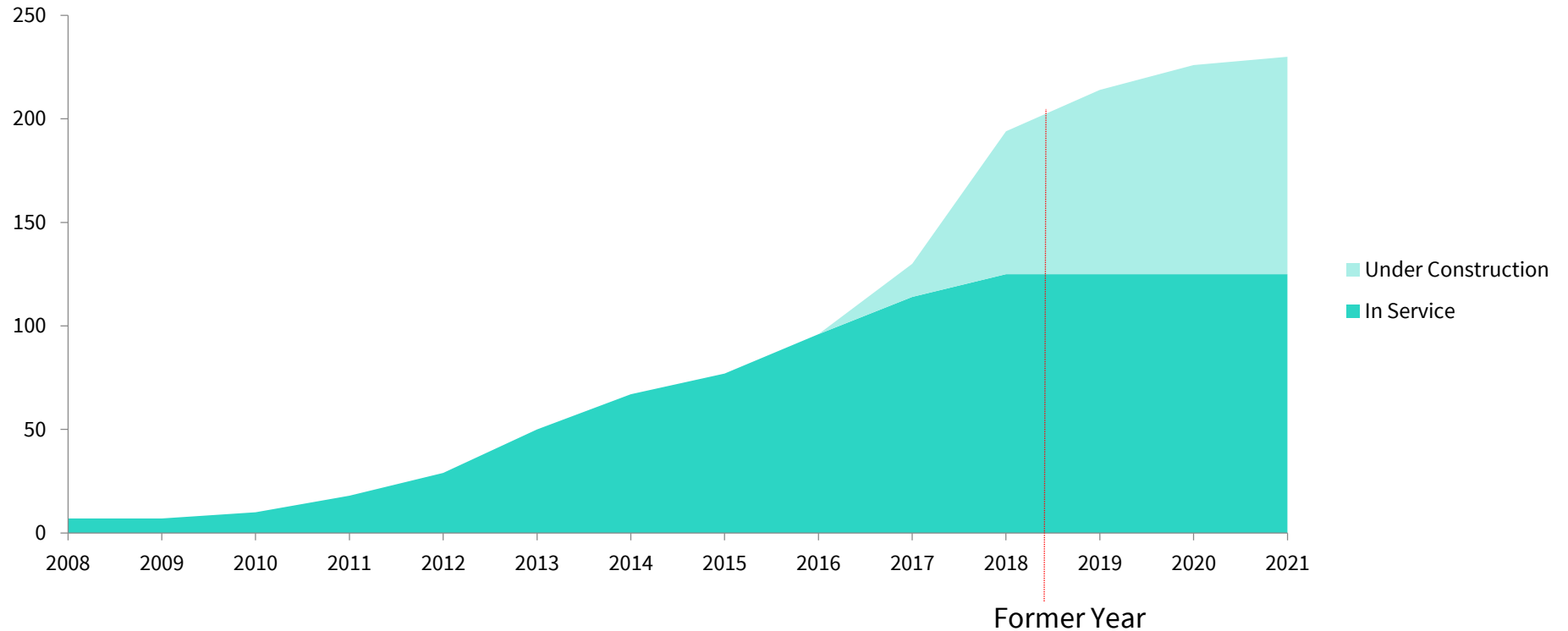


Victoria of Wight  
1.0MWh



CalMac Hallaig  
500 kWh

# Global State of Play in Hybrid Vessels



Source: Maritime Battery Forum, 2018

# Paving the way to zero-emission ports

## Highly Electrified + More Automated Processes – Noise – Emissions

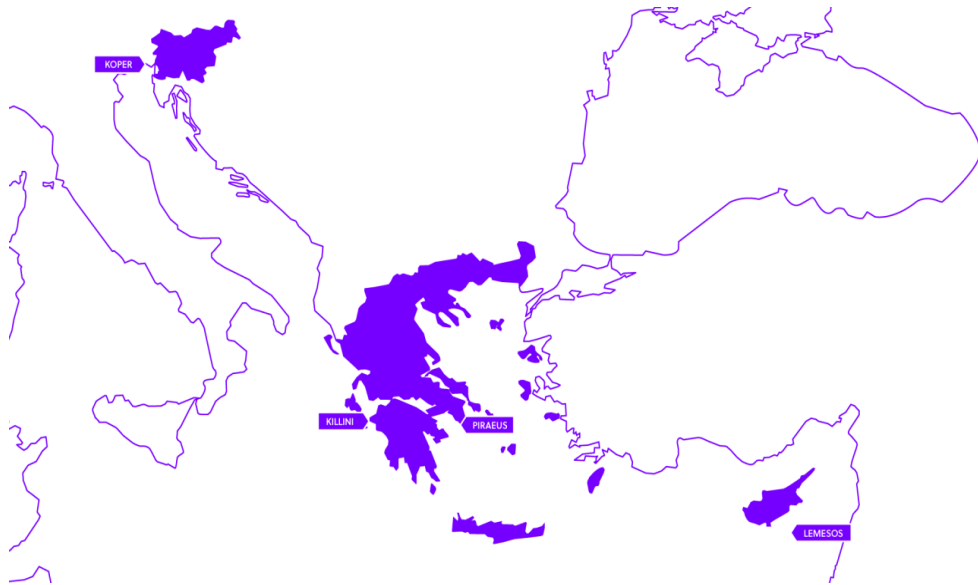


- Cold Ironing for ships while in berth
- Automated electric transportation within the port
- Electric charging facilities for vehicles
- Renewables integration
- Logistics management with block chain technology

# The Eleded Project

1<sup>st</sup> Cohesion Fund Project for Sea Motorways

*eleded*



## 3 Member States & collaborative Ports:

- Greece: Piraeus-Killini
- Cyprus: Lemesos
- Slovenia: Koper

- ✓ Cross-EU maritime network & **macro-regional strategies** for Adriatic-Ionian Seas

## Front End Engineering Designs

Piraeus, Limassol, Koper

## Shipyard Preparedness assessment

Electric/hybrid works

## Risk Assessment Studies

Cold-ironing, hybrid ships  
Safety, Operation & Compliance  
& Training Requirements

## Techno-economic assessment

Factors Analysis

## Regulatory Analysis

Proposal for Port & Ship  
Electrification

## Emission reduction report

port emissions, renewable  
integration & smart grid  
deployment

## Zero-emission reality

1st Cold Ironing  
Pilot installation  
in the EastMed  
Region

## Innovation uptake

All-electric  
RoPax vessel  
design  
projecting the  
biggest battery  
onboard



# The Piraeus Case

## Facts & Stats

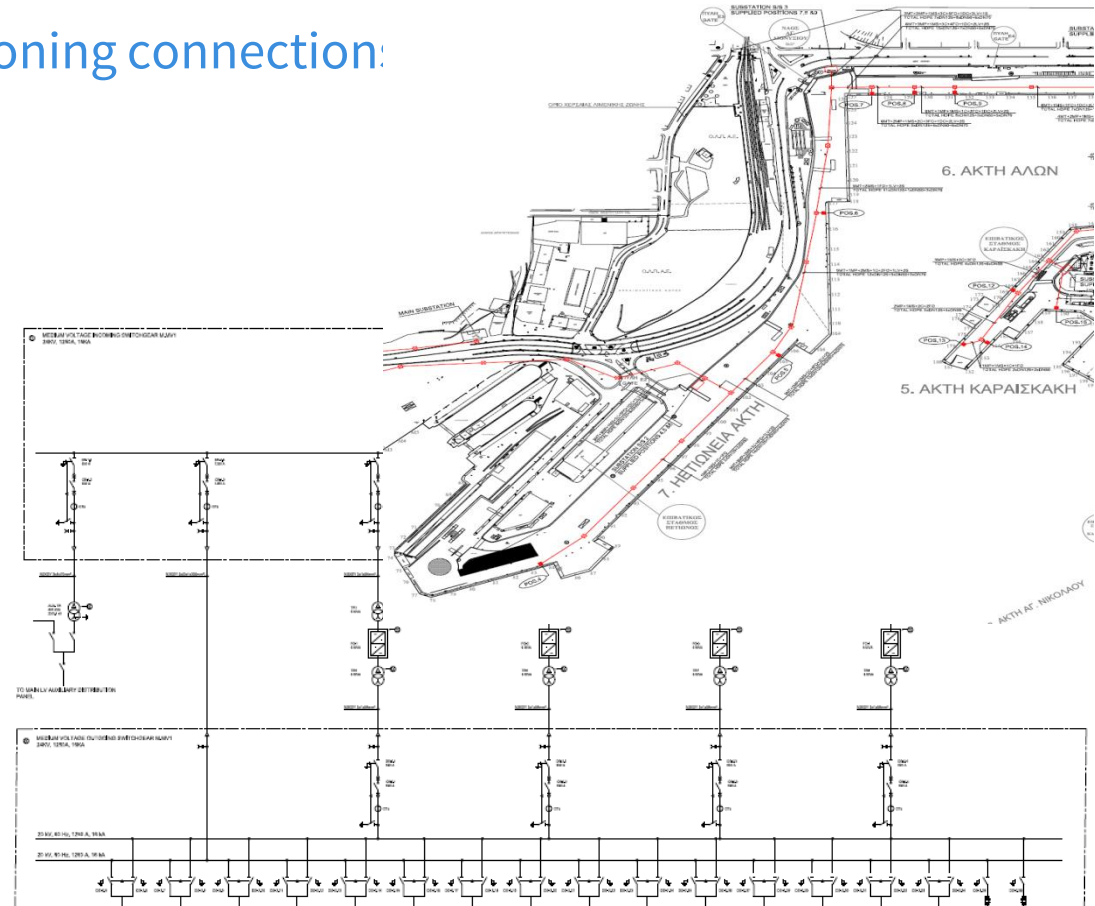
- ~600 Cruise ship arrivals last year
  - ~1200 Berthdays
  - At 8 MW load per ship and 10 cents /KWh saving
  - 230 GWh/ year, 23 million Euro in savings
- 
- Port lacks electrical infrastructure critical to growth
  - Significant electric bunkering potential in short sea connections and support vessels (e.g. tugs)



# A possible solution

## Port masterplan with proposed cold ironing connection:

- **Front End Engineering Design for:**
  - ✓ 15 Shore Connection Points covering the whole passenger terminal
  - ✓ 1 Electric Bunkering berthing position
- **Holistic approach for an eco-smart port:**
  - ✓ Electric buses within terminals
  - ✓ Energy Storage Installation as buffer
  - ✓ Deployment of Renewables in free spaces
- **Financing and funding schemes investigated**



## Transforming Killini port to the 1<sup>st</sup> all-electric port in East Med

- Serving the Zakynthos & Kefalonia Islands
- Port Installation for 2-4 Shore Connections Projected
- Real life application – crash test for similar smooth port works
- Record time permitting process

***Pilot installation: 1 berth supplying one Ro-Pax vessel with approx. 500kVA needs during port stay***



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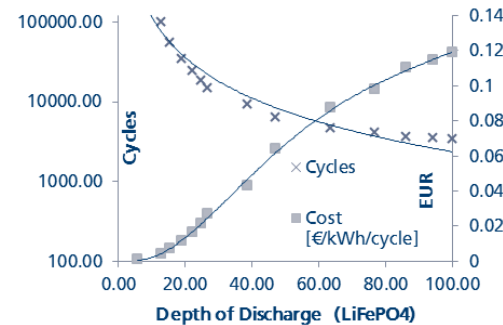
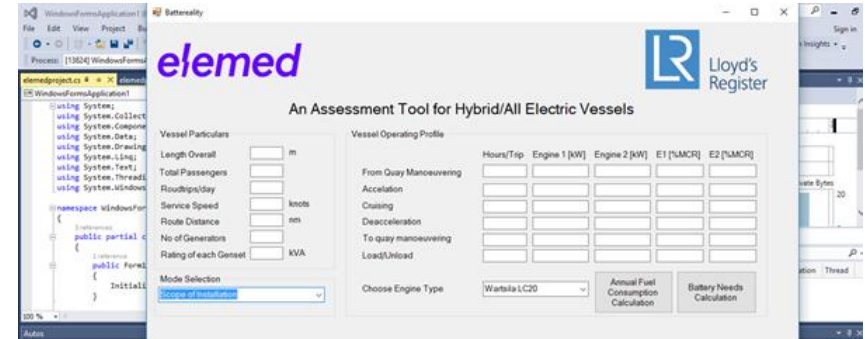
1 November 2017



# Development of a techno-economic assessment tool

## Factors considered in deployment phase

- Cell Chemistry
- Energy Storage Capacity
- Battery Sizing
- Cost Estimation
- Lifecycle Analysis
- Feasibility of Investment



## Elemed 3-Pillar proposal as basis

### Policy recommendations

- Electricity supply for cold-ironing services
- Renewable energy integration
- Permit procedure simplification

### Recommendations on Funding/Financing

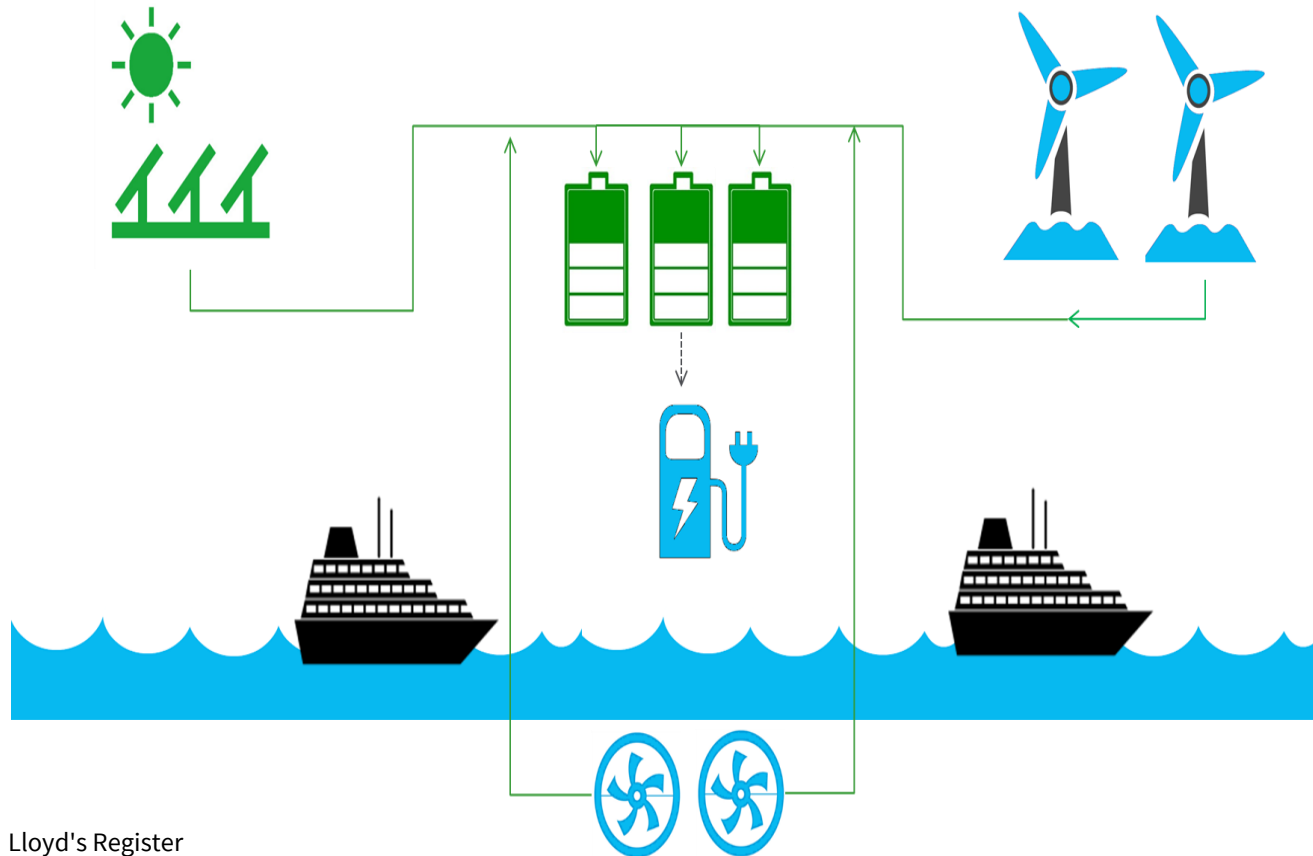
- Electric power as **marine fuel** & special taxation measures
- Sustainable provision of Public Private Partnerships (PPPs), involving local insular communities
- Equivalent funding environment attracting investments in hybrid shipping for isolated insular routes



- Task force with key stakeholders
- Guidelines development for shore side electricity in port
- Requirements for GR Flagged hybrid ships

# Wind & Sun to Propeller:

Shaping a sustainable future



- Potential for the islands to meet more of their own energy demands
- Enhanced Electro-mobility
- Drastic improvement in power availability and Grid Reliability
- Improved environmental conditions and GHG reduction
- Direct financial benefits in an emissions and noise free environment

# Thank you

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