



ZESTAs.

Zero Emission Ship Technology Association

The tide of change

H2 Vessels launched in
2017



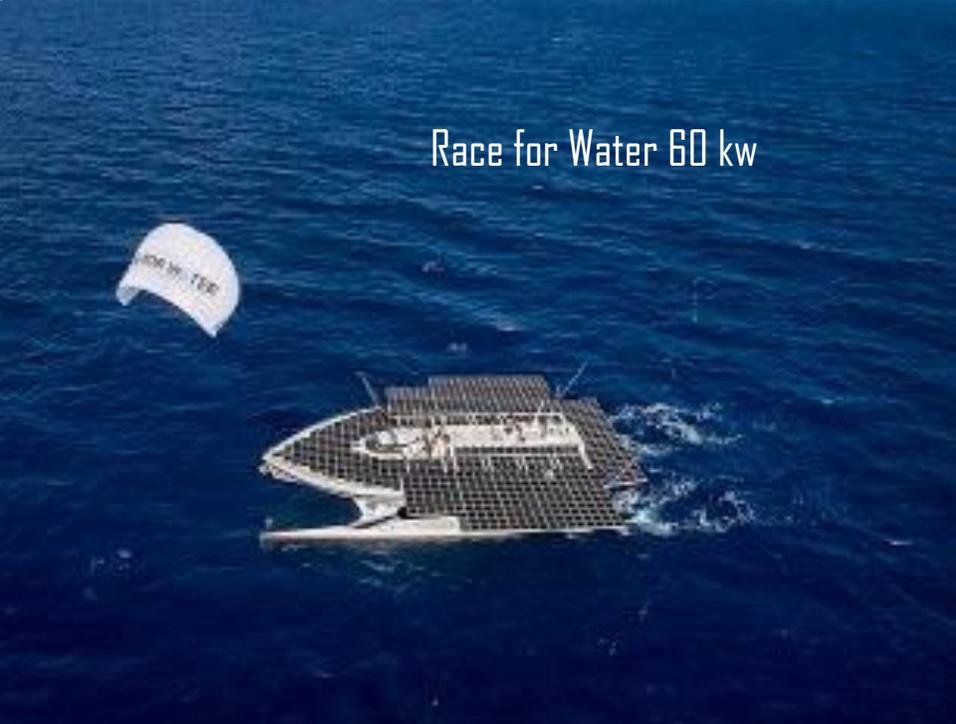
Maranda - 165kW APU



Hydroville 600 hp



Energy Observer 22 kw



Race for Water 60 kw

H2 vessels under construction



Water-Go-Round 360 kw 2020



HySeas III 700 kw 2021

Ferguson Marine Concept Hydrogen Ferry



CFT River pusher 300 kw 2020



Norled LH2 Ferry 600 kw 2021

H2 Examples of funded vessel projects 2020 2023



Sea Shuttle, Pilot E 2000 kw 2023

ZEFF, Pilot E 2022 2200 kw



Havila Kystruten 2022 3200 kw



Fiskerstrand Ferry



Moss H2 carrier

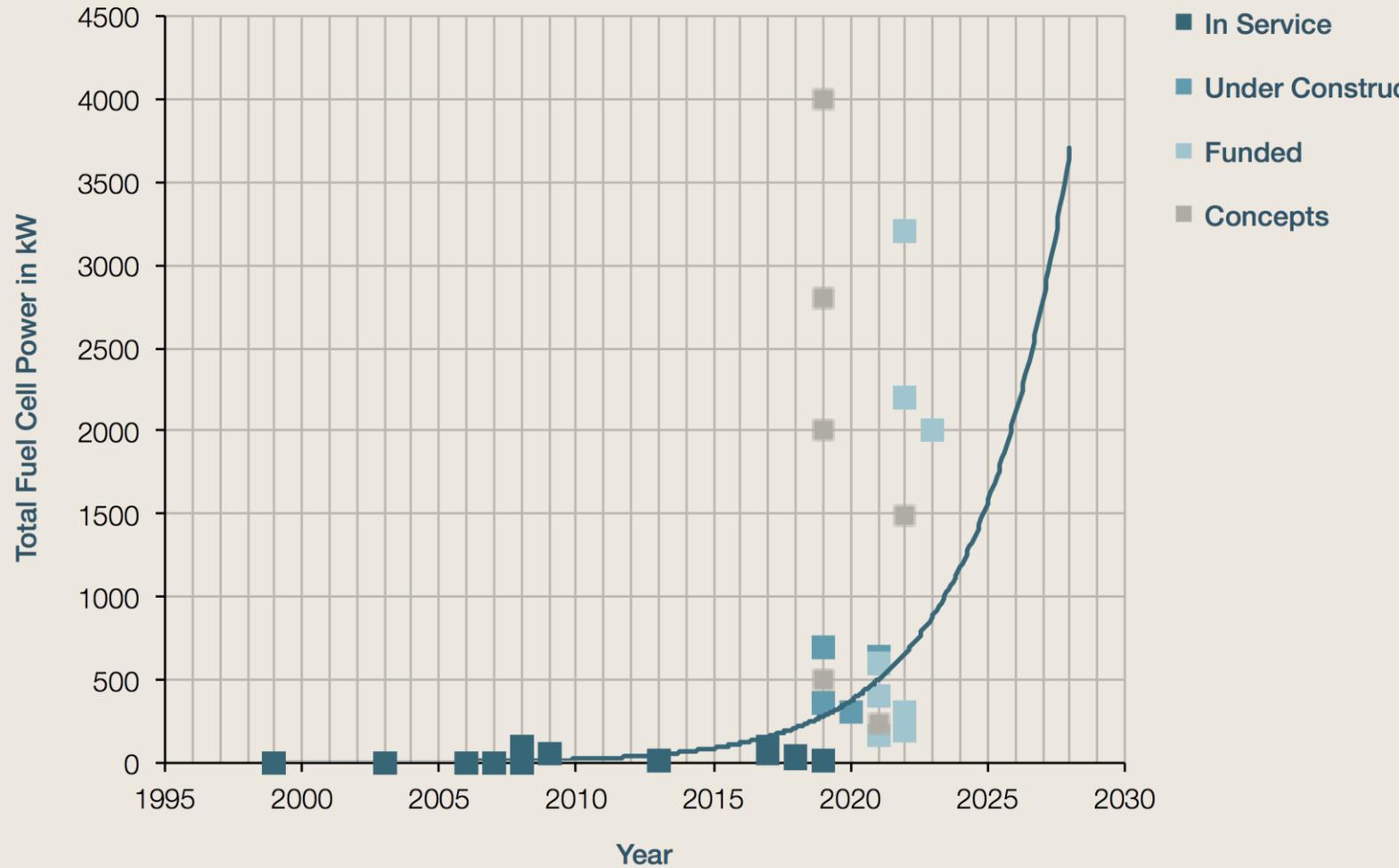


Kawasaki H2 carrier



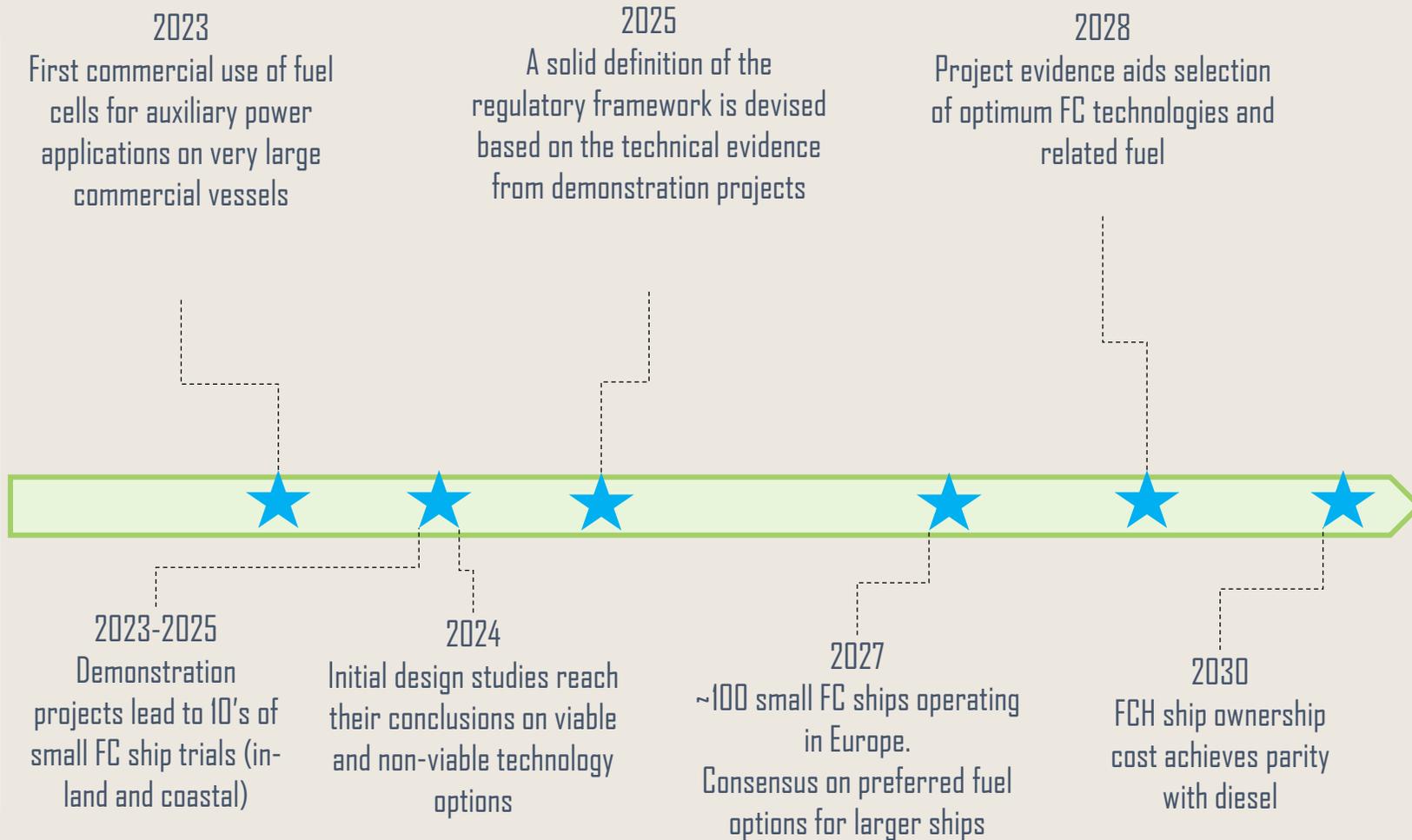
Hydrogen vessels exponential trend curve

Hydrogen Powered Vessels



2030 Vision

Current state of the art FCs and H₂ have been demonstrated in a number of small in-land and near coastal vessels, proving the viability of the technology.



2030 vision

FC passenger ships reach mass market acceptance for small in-land and coastal vessels, using hydrogen as a preferred fuel.

Larger vessels select FCs as a preferred zero emission propulsion solution, using a range of fuel types

Barriers

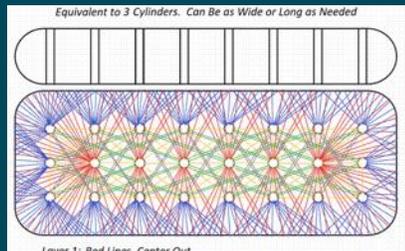
- Volume

- Availability

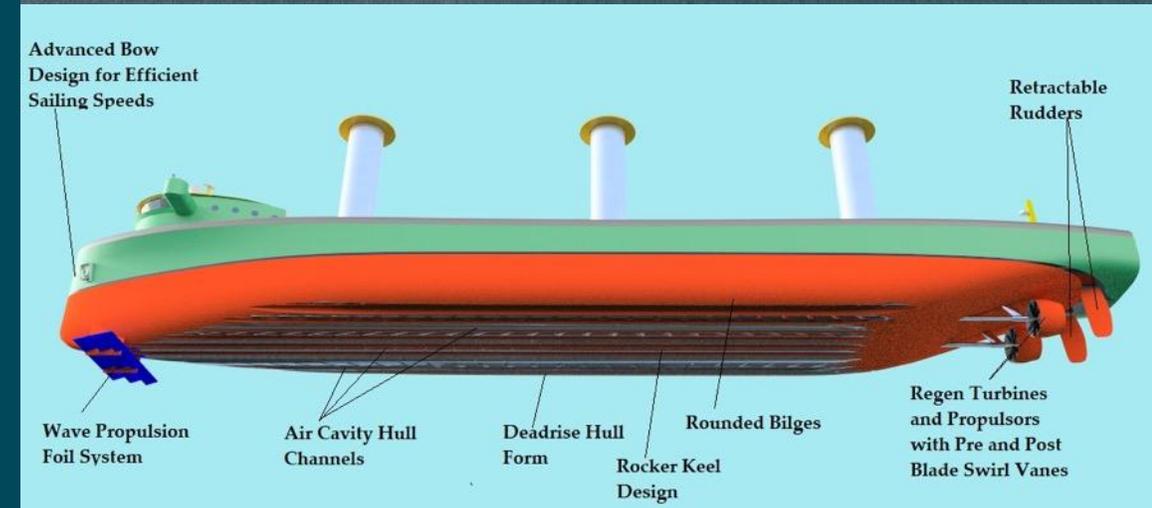
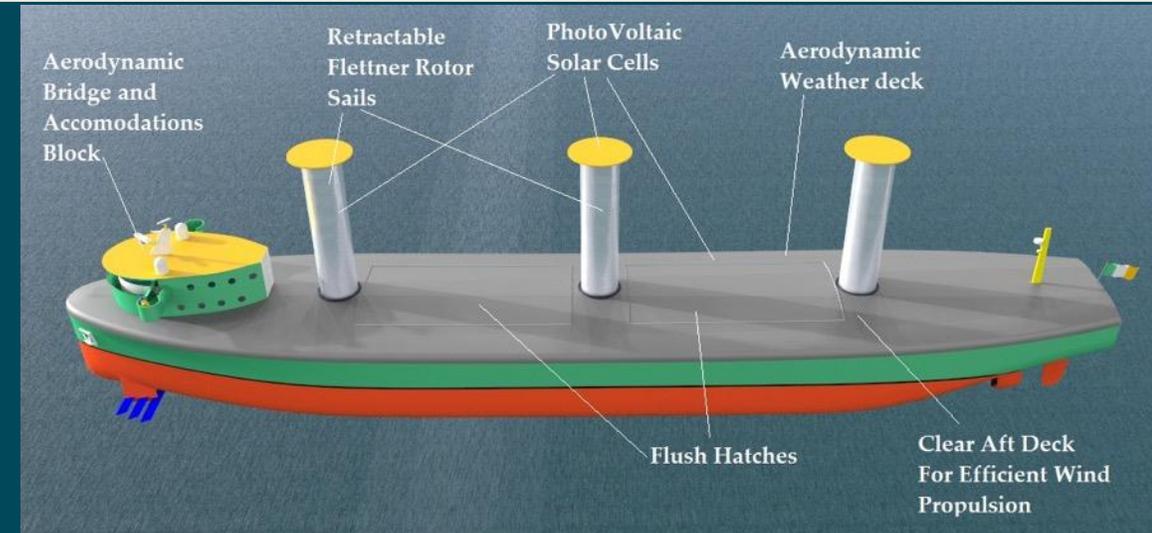
Solutions to Volume

LOHC's

- Ammonia
- Magnesium Hydroxide MgH_2
- Sodium Boro Hydride $NaBH_4$
- Dibenzyltoluene



Tank Shape



Wind Assist and Efficiency Measures

Solutions to Availability - Hydrogen Hubs



1,200kg/day



50kg/day



30kg/day



Sea Water
Electrolysis

60kg/day



8,000kg/day

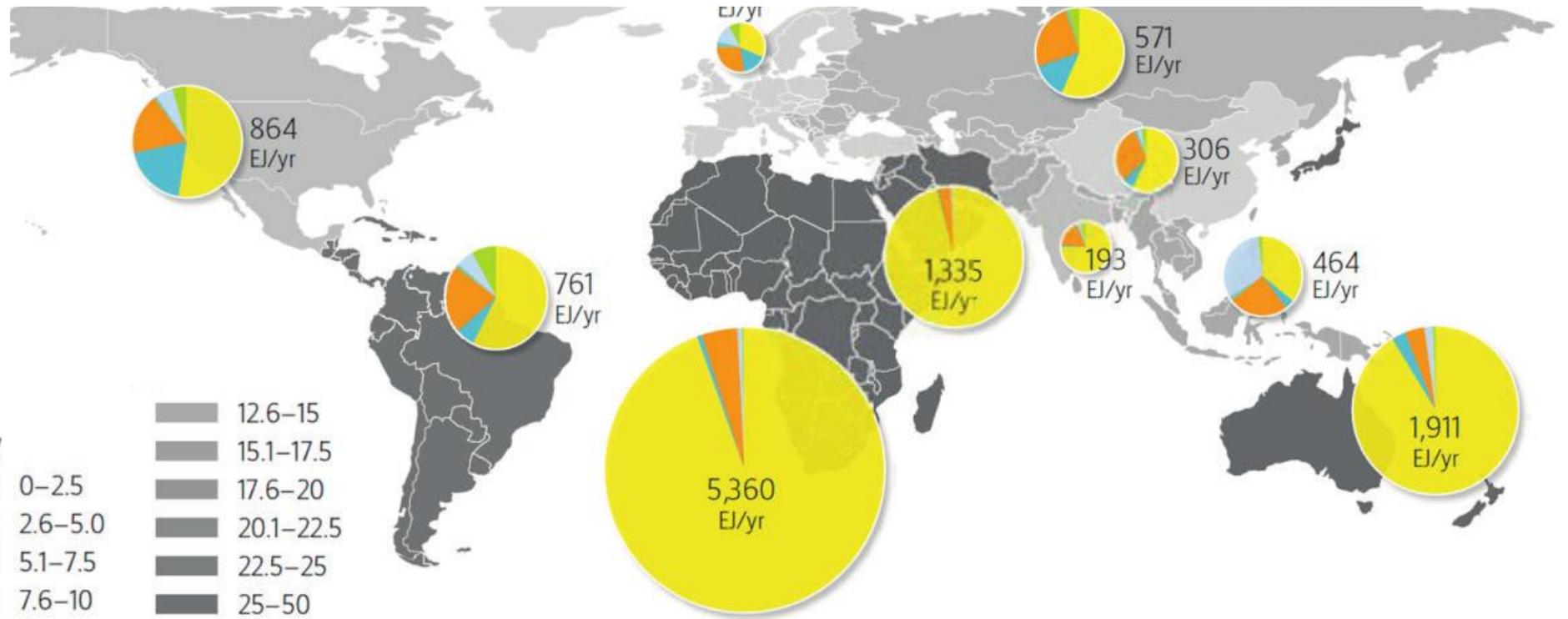
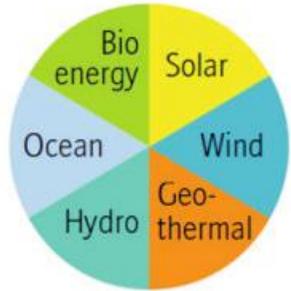


58,000kg/day

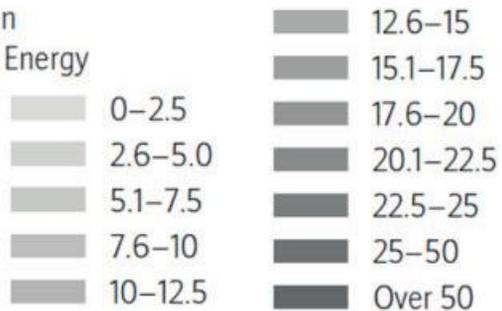


RE Island

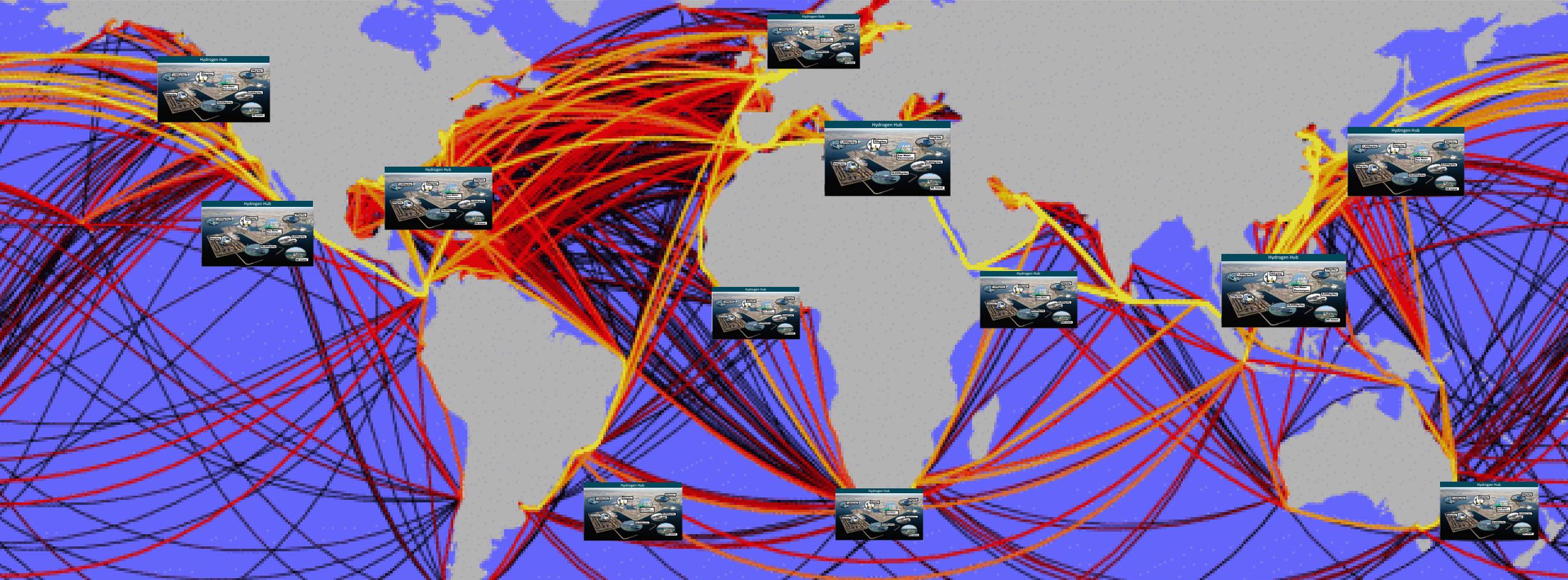
Global Renewable Energy



Technical RE Potential can supply the 2007 Primary Energy Demand by a Factor of:



Solutions to Availability



Decentralized Green Hydrogen Hubs

ZESTAs.

Navigating to a sustainable future together

HYON



PBES

evolve™



Nedstack

PEM FUEL CELLS

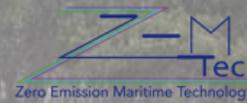
To be sure.



ENERGY OBSERVER



ARENA Ocean Hyway Cluster



North American Marine Environment Protection Association

NAMEPA



POWERCELL



Zero Emission Maritime Technology

ECONOWIND

HYSEAS ENERGY



HYSEAS Energy



Molnex Energy



PROPELWIND



Fair Winds Trust



