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# Energy Competence in the Service of Shipping

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ΕΛΛΗΝΙΚΗ ΔΗΜΟΚΡΑΤΙΑ  
ΥΠΟΥΡΓΕΙΟ  
ΑΝΑΠΤΥΞΗΣ ΚΑΙ ΕΠΕΝΔΥΣΕΩΝ  
ΕΙΔΙΚΗ ΓΡΑΜΜΑΤΕΙΑ ΔΙΑΧΕΙΡΙΣΗΣ  
ΠΡΟΓΡΑΜΜΑΤΩΝ ΕΤΠΑ & ΤΣ  
ΕΙΔΙΚΗ ΥΠΗΡΕΣΙΑ ΔΙΑΧΕΙΡΙΣΗΣ ΕΠΑΝΕΚ

ΓΓΕΚ  
ΓΕΝΙΚΗ ΓΡΑΜΜΑΤΕΙΑ  
ΕΡΕΥΝΑΣ ΚΑΙ ΚΑΙΝΟΤΟΜΙΑΣ

ΕΠΑΝΕΚ 2014-2020  
ΕΠΙΧΕΙΡΗΣΙΑΚΟ ΠΡΟΓΡΑΜΜΑ  
ΑΝΤΑΓΩΝΙΣΤΙΚΟΤΗΤΑ  
ΕΠΙΧΕΙΡΗΜΑΤΙΚΟΤΗΤΑ  
ΚΑΙΝΟΤΟΜΙΑ

ΕΣΠΑ  
2014-2020  
ανάπτυξη - εργασία - αλληλεγγύη

Με τη συγχρηματοδότηση της Ελλάδας και της Ευρωπαϊκής Ένωσης



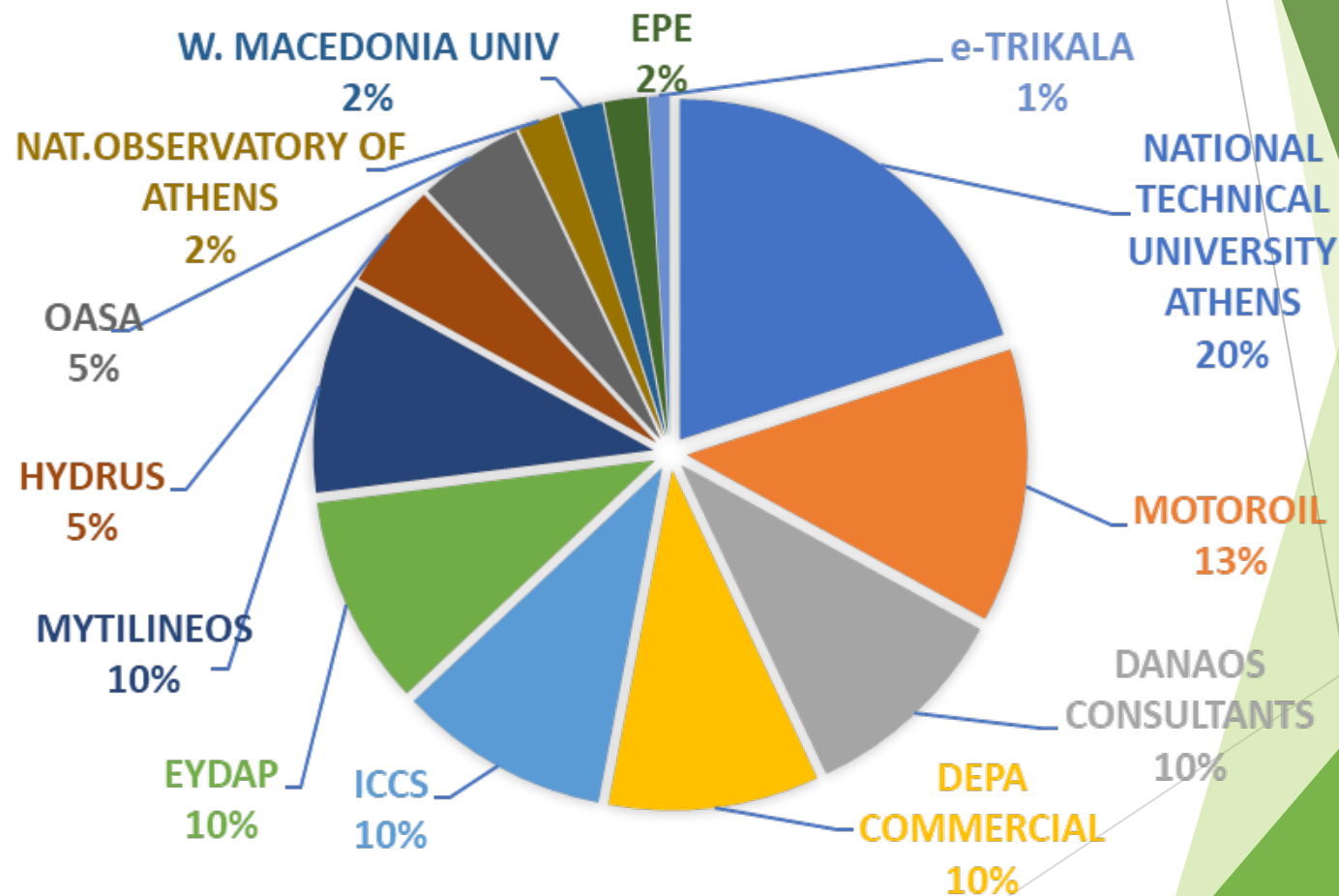
# Energy Competence Centre: Identity

- ▶ **Founded** in December 2021, from an NTUA initiative
- ▶ **Company Type:** Private Capital Company with 1,4 MEUR capital
- ▶ **Character:** **Spinoff** aimed at technology transfer and services provision in Energy matters
- ▶ **Partners:** **13 legal persons** from the Public and Private sectors (see end slide)
- ▶ **Commercial Offering:**
  - ▶ **Provision of services of technological content** among partners and to third parties
  - ▶ **Contribution in / coordination of co-funded projects of technological content**



# Energy Competence Centre: Multi-partner, Multi-sector

- ▶ 4 Research & Innovation
- ▶ 3 Energy
- ▶ 2 Shipping Services
- ▶ 1 Water & Wastewater
- ▶ 1 Environmental Protection
- ▶ 1 Public Transport
- ▶ 1 Local Authority Development



# Energy Efficiency First and (Carbon) Net-Zero: cornerstone targets, with uncharted journey

- ▶ Renewable Energy Sources have unlocked hitherto unthinkable options in energy provision by eliminating a major constraint: the cost of fuel
  - ▶ **Energy Efficiency First** is now being pursued with fresh momentum, albeit other constraints remain; notably, generation capacity and cost of energy storage
- ▶ Climatic Change abatement has prevailed in global public policy, driving the Net-Zero principle. In its extremity, Net-Zero means ultimate elimination of all waste in air, water, land of any human activity.
  - ▶ Economics are being re-invented to enable **Net-Zero**, by relaxing cost constraints as much as practically possible and formalising Life Cycle Assessment as a tool
- ▶ Yet, both **maximal efficiency** and **no waste** are noble **targets** (steady-state)
- ▶ The **journey** towards them must also be **as efficient as possible** and **allow us to survive it**.

PLEDGE  
TO NET  
ZERO

ENERGY  
EFFICIENCY  
FIRST



# Bunker fuel: a case in point

- ▶ IMO pushes for immediate reduction of air pollutants by ships.
- ▶ Assuming that goods need to continue to be moved by ships at the quantities and in the times they have been, there is a raft of solutions, of varying degrees of ‘goodness’:
  - ▶ Lowering fuel consumption by lowering friction against the sea
  - ▶ Scrubbing existing fuel flue gases
  - ▶ Adopting low-carbon fuels
  - ▶ Adopting no-carbon fuels
  - ▶ Adopting all-electric propulsion with on-board batteries and fully renewable source
  - ▶ Adopting wind and solar power to contribute to an all-electric propulsion
- ▶ In the quest for a practicable transition, the world may decide to **drop the assumption and/or allocate the transition cost involved to many stakeholders**



# The EU Green Deal contains initiatives to drive maritime air emissions down

Proposal include the following:

- ▶ Extending the EU Emissions Trading System (ETS) to maritime transport
  - ▶ Boosting demand for marine renewable and low-carbon fuels
  - ▶ Boosting alternative fuel infrastructures
  - ▶ Accelerating the supply of renewables in the EU
  - ▶ Revising the existing Energy Taxation Directive
- 
- ▶ In this set, a core of technical fuel-related proposals is flanked by two financial proposals, which seem to add cost in aid of the technical proposals.
  - ▶ The set includes promotion of low-carbon fuels, evidently as a **pragmatic interim step** towards no-carbon shipping.
  - ▶ LNG is a low-carbon fuel, albeit fossil.



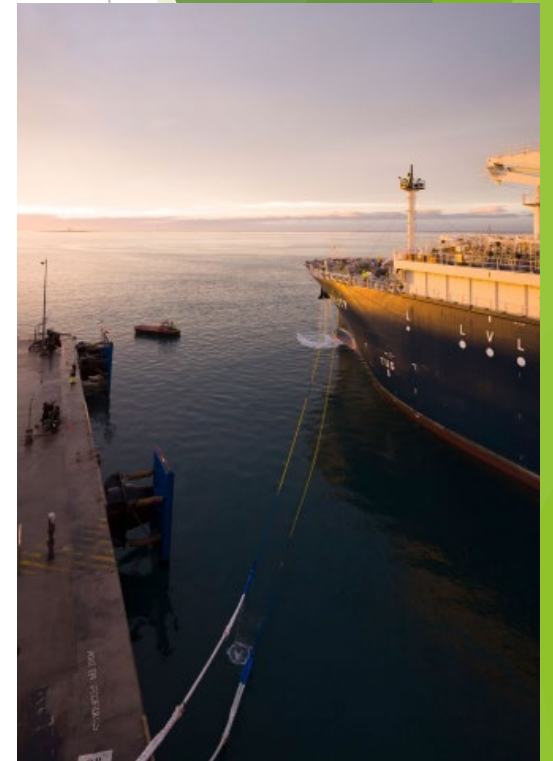
# LNG is here today for shipping, with known technology of production & distribution

## LNG in the world

- ▶ 19 exporting countries
- ▶ 44 importing markets
- ▶ 79 liquefaction plants
- ▶ 163 import terminals
- ▶ 462 MTPA liquefaction capacity
- ▶ 993 MTPA regasification capacity

## LNG in shipping

- ▶ 700 LNG tanker vessels, including
  - ▶ 31 LNG Bunkering Vessels
- ▶ 104 Mm3 total cargo capacity
- ▶ 196 vessels in orderbook, including
  - ▶ 22 LNG Bunkering vessels
- ▶ 26 bunkering facilities in LNG Terminals



# LNG is being increasingly adopted by major shipping companies

## World LNG-powered Fleet

- ▶ 295 operational vessels
- ▶ 510 vessels on order
- ▶ 229 LNG-ready (op'l + on order)

## 2021 Growth (operational)

- ▶ 65 Tankers
- ▶ 28 Container Ships
- ▶ 20 RoRo + RoPax
- ▶ 10 Bulk Carriers
- ▶ 7 Car Carriers
- ▶ 7 Cruisers

## Ports and Companies

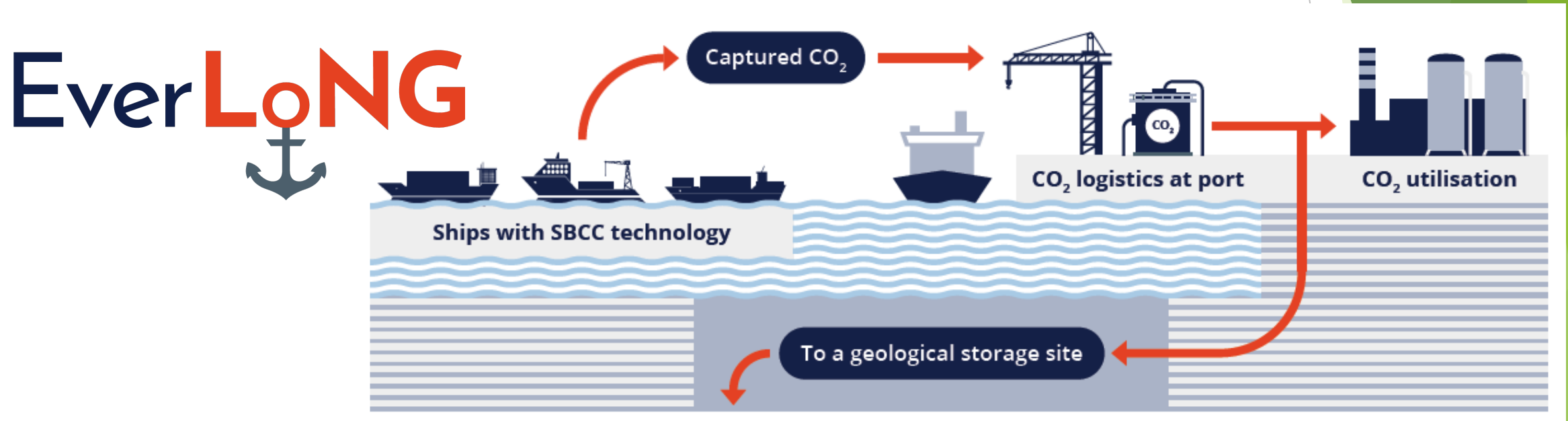
- ▶ 141 ports with LNG bunkering
  - ▶ La Spezia, Marseille, 5 Spanish, Tenerife, Le Havre, Zeebrugge, Antwerp, Rotterdam, Amsterdam, Emden, Hamburg, Świnoujście, Gdansk, Gdynia, Kłapeida, Stockholm, Hammerfest, Gothenburg, Kochi, Singapore, Incheon, Yokohama, Port Fourchon, Vancouver, etc.
- ▶ CMA-CGM, Hapag-Lloyd, Shell, NYK Line, TOTE/General Dynamics NASSCO, Carnival Corp., SeaRoad, Remøy Shipping, Erik Thun, Crowley, DSME, Royal IHC, Rederi, etc.

Sources: Sea-LNG, Marine Insight





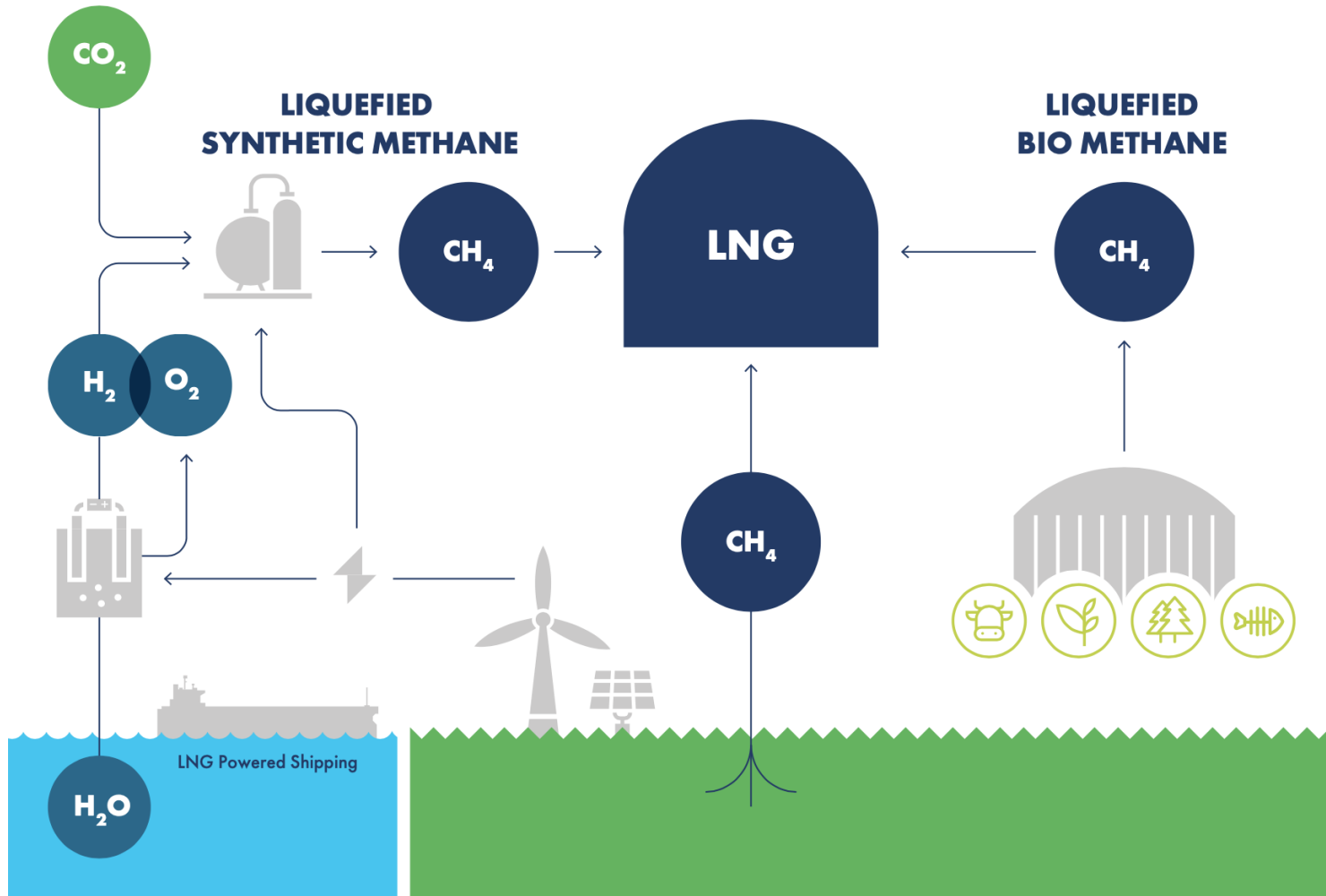
# Projects of mature innovation in Marine LNG decarbonisation already exist



The project will develop and demonstrate two bespoke vessel designs – a wind energy optimised bulk carrier and a hydrogen powered cruise ship – equipped with **an interdisciplinary combination of innovative technologies working in symbiosis** to reduce greenhouse gas emissions by 99% and achieve at least 50% energy savings.



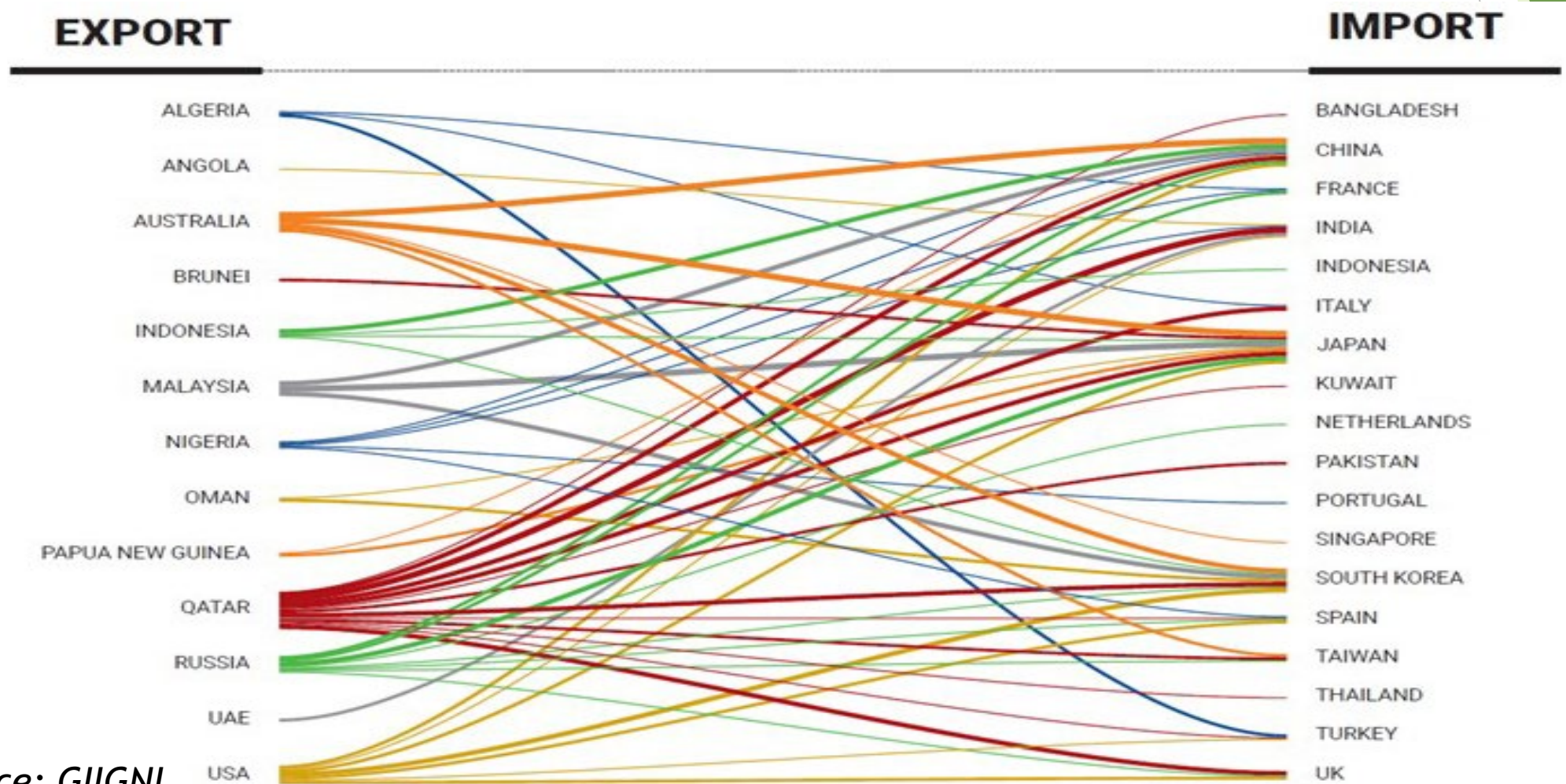
# MLNG's climatic profile may be improved through bio-LNG and co-use with renewable propulsion means



Source: Sea-LNG



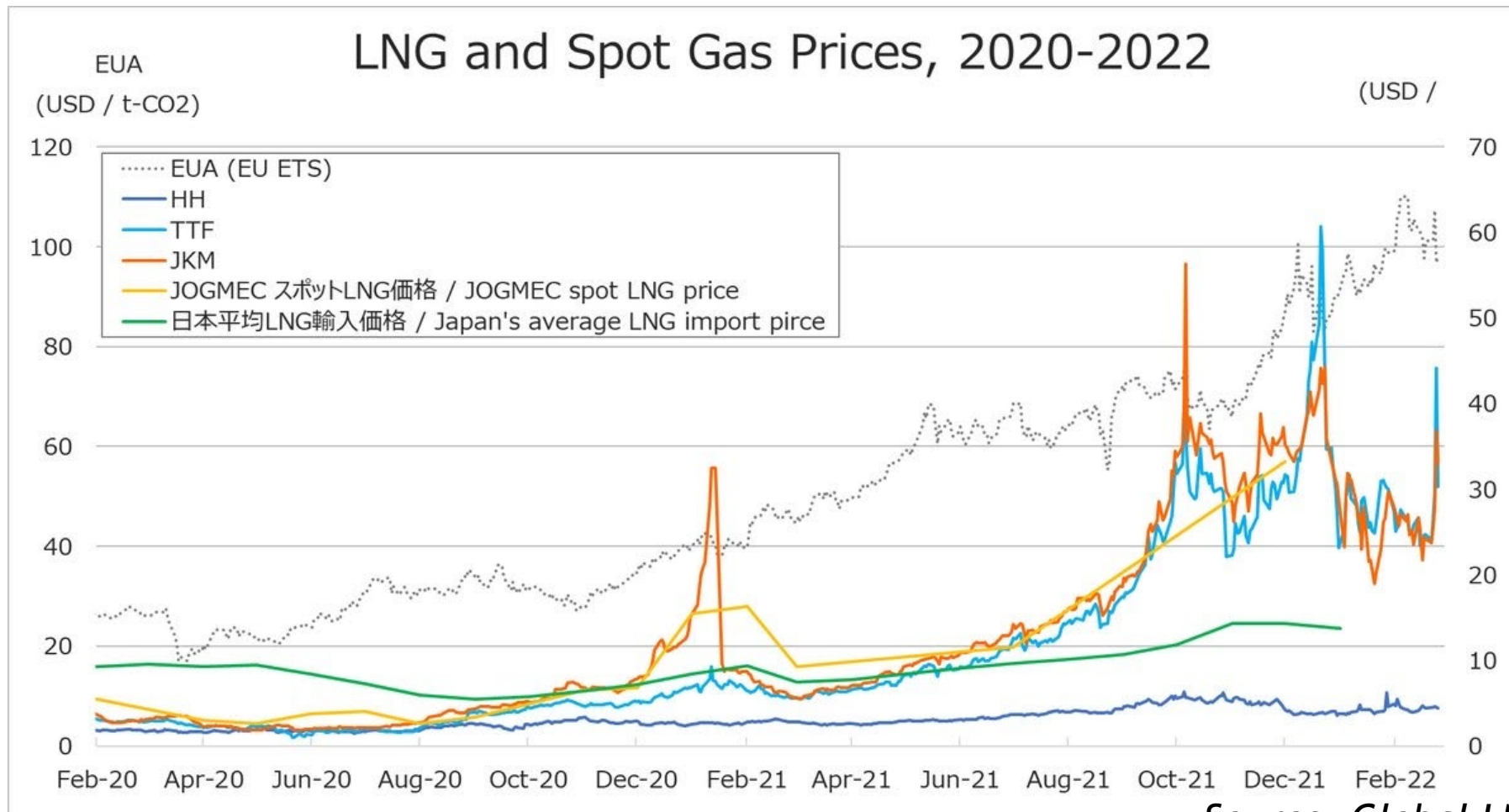
# LNG sources are scattered globally, creating increased security of supply



Source: GIIGNL



# Global LNG prices depend mainly on global supply and demand rather than local gas market



Source: Global LNG Hub



# Competition from e-MeOH, e-NH3 and ultimately e-H2 will take time to matter

## Ammonia



## Hydrogen



## Methanol



# Competition from bio-fuels seems to suffer from uncertainty and competing uses

Sustainable Shipping Initiative: Availability of Sustainable Biofuels report, June 2021

- ▶ There is still much **uncertainty** around whether sustainable biofuels are a mass market, scalable and long-term solution to decarbonise the shipping sector or if they will only have niche applications.
- ▶ Whilst the demand for energy by the shipping sector may perhaps, and theoretically, be met with biofuels, in reality, **the amount of biofuels available globally will need to be shared**, and competed for, with other industries such as aviation and bioplastics.



# The Energy Competence Centre may work up answers to a multitude of questions

- ▶ ECC shareholders promote LNG bunkering in Greece:
  - ▶ DEPA COMMERCIAL -> Poseidon Med II, Blue Hubs, CYNERGY, Alexandroupolis LNG
  - ▶ MOTOROIL -> DiorygaGas
  - ▶ NTUA -> Multitude of marine LNG transport / facilities projects
  - ▶ HYDRUS -> Participation in several marine LNG facilities designs
- ▶ But also Bio-CH<sub>4</sub> and Bio-Fuels research and development:
  - ▶ NTUA -> Advanced ICE research, advanced energy efficiency technology, HTL, biofuels prodn
  - ▶ DEPA COMMERCIAL -> biogas-to-biomethane implementation

Happy to contribute to realistic, sensible decarbonisation of shipping





# Energy Competence Centre P.C.

[www.hecc.gr](http://www.hecc.gr)



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e-trikala



συγκοινωνίες  
αθηνών  
ΟΑΣΑ Α.Ε.

