

Energy transition and sustainability in the dredging sector

Bernardete Castro

Manager R&D / Head of Sustainability

Royal  IHC

 
Central Dredging Association

Content

- CEDA
- Current situation
- Energy transition: sustainable equipment
- Sustainable dredging

CEDA

- an **independent**, international, membership-based professional network
- it **brings together** individuals and organisations from
 - dredging
 - construction and maintenance of water-based infrastructure
 - fluvial and offshore mining
- corporate and individual members from:
 - Africa
 - Europe
 - Middle East



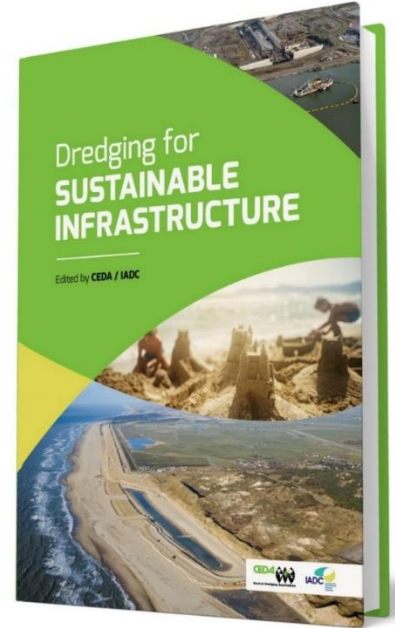
Our global network



Same aims and same values

In summary: CEDA ...

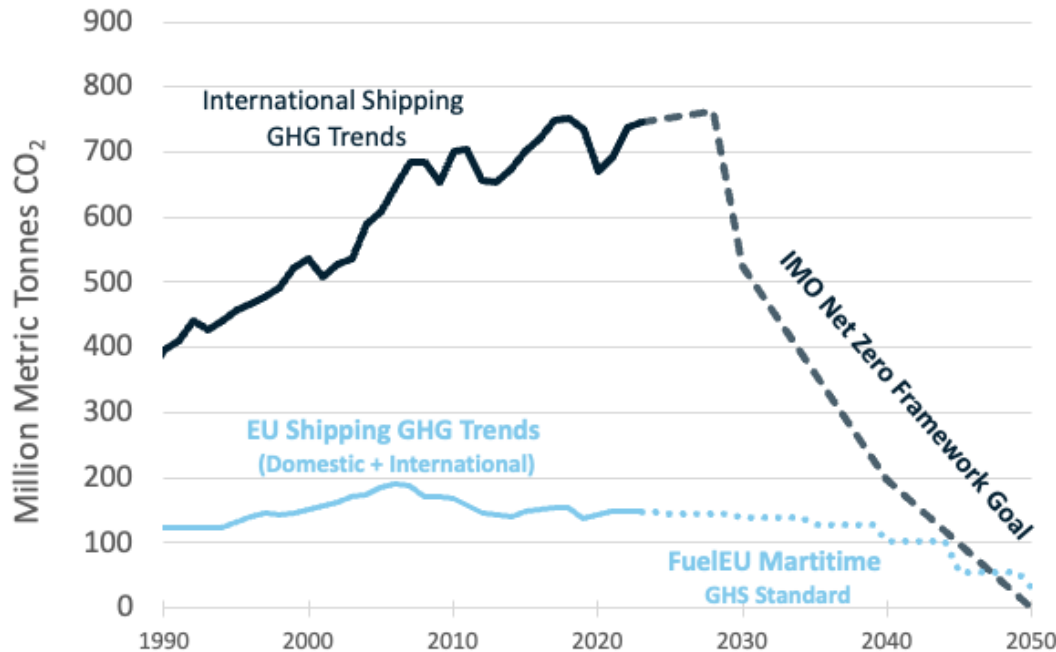
- is an **authoritative reference point** for objective knowledge
- has a **vital worldwide network** for the exchange of knowledge and information
- promotes dredging as a tool for **sustainable development**
- **champions** the dredging profession



Uncertain waters, fast change

- Fast developing climate regulations, geopolitical tensions
- Fierce competition from China on many fronts
- Dredging and Offshore sector being taken up in EU and IMO emission legislation
- Fuel EU: Upcoming carbon pricing *and* carbon cap
- Uncertainties in techno-economic aspects of fuels and prime movers
- Work vessels: Limited space onboard to accommodate alternative fuels

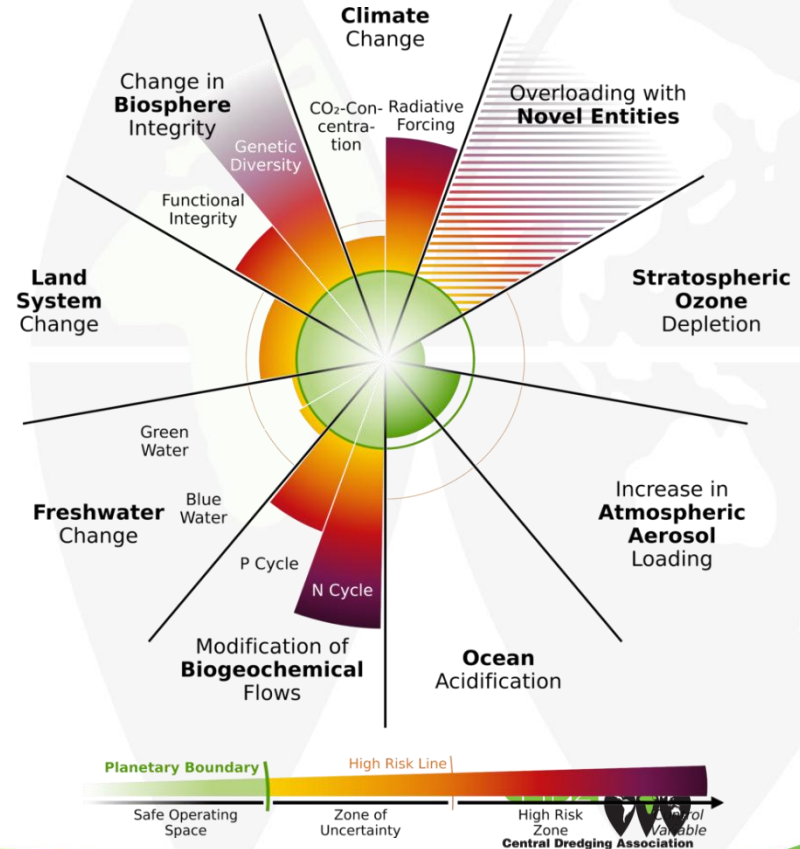
Zero emission paths EU and IMO



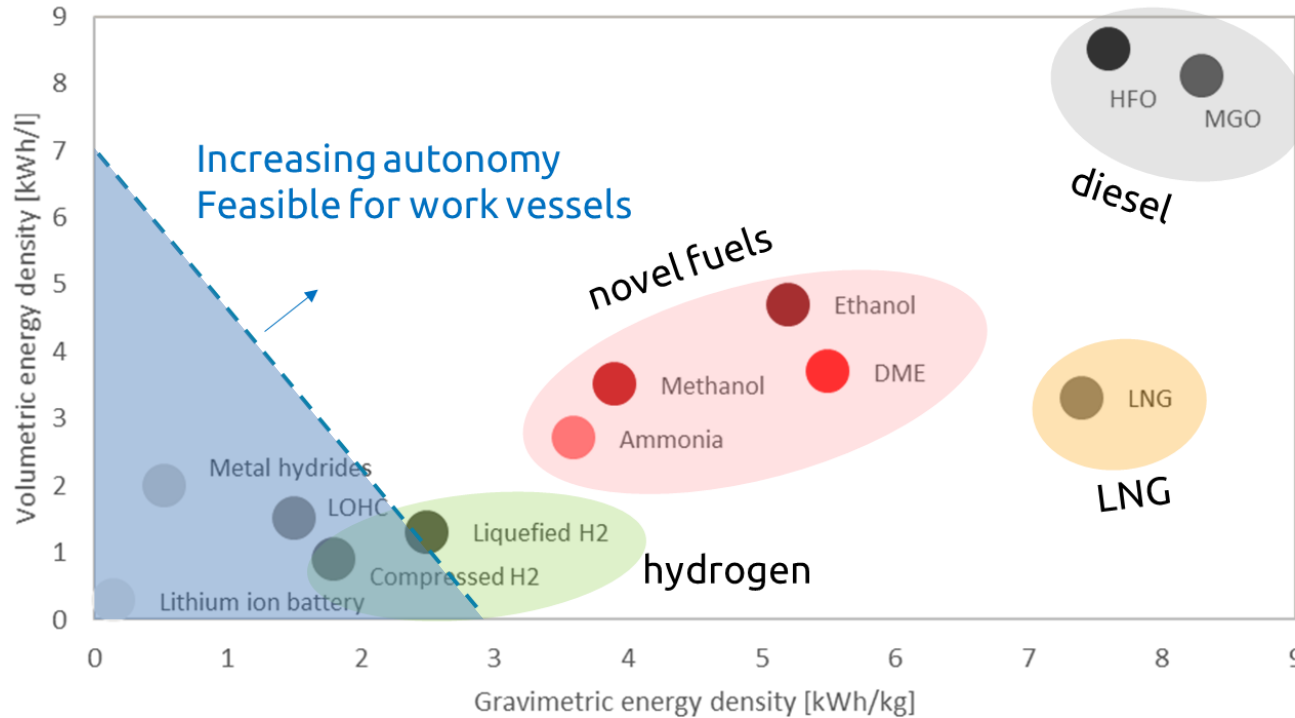
- IMO Net-Zero Framework postponed to 2026
- FuelEU Maritime implemented
- Steep decrease in GHG after 2030
- Sustainable fuels + CO₂ sequestration needed

Sustainability is more than Climate

- **Nine life support systems** of the planet (Röckstrom et al.)
- Climate change is not the furthest from balance
- Integral approach (Climate transition helps Biodiversity and Ocean acidification)
- Positive impact ~~(less negative impact)~~

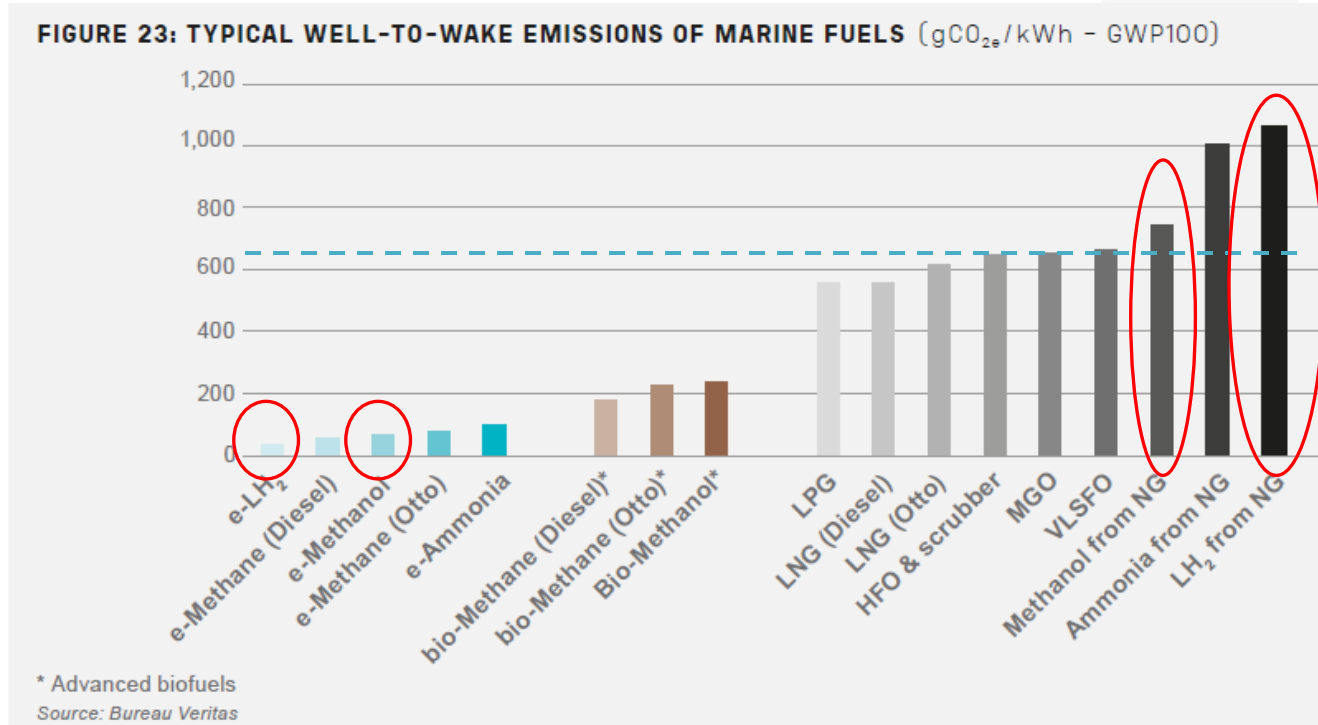


Sustainable Fuels: no silver bullet



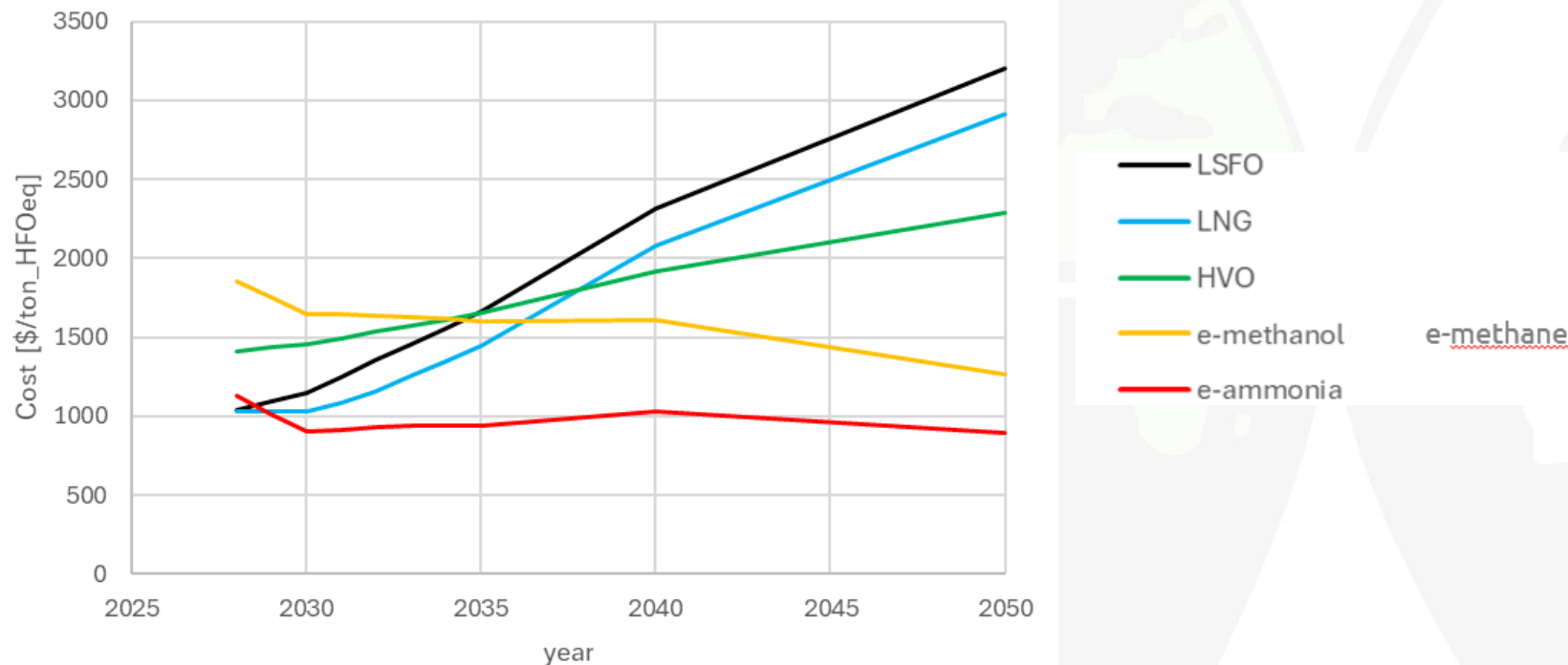
- Green LNG and green methanol best options (energy density)
- Hydrogen only for inland/coastal (limited autonomy)
- Batteries only assisting the main power supply
- Ammonia suited for work vessels?
- Price, availability, suitable engines?

Sustainable Fuels: production routes matter



- Well-To-Tank (WWT): fuel production
- Tank-To-Wake (TTW): fuel use onboard
- Well-To-Wake: fuel production + use

Fuels: prices forecast including GHG tax



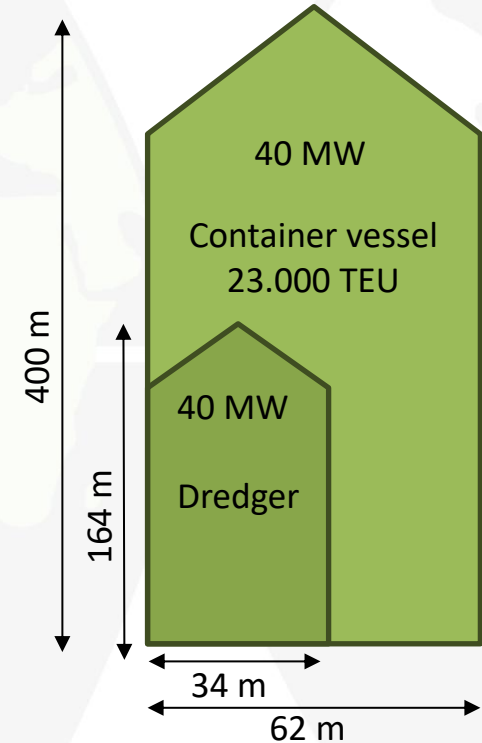
World merchant fleet readiness

Vessel Type	Metric	Renewable fuel capable	Percentage of fleet	All fleet
Containership	Vessels	507	65%	780
	DWTs (millions)	73.8	73%	93.4
	TEUs (millions)	6.78	79%	8.58
Vehicle Carrier	Vessels	182	83%	219
	DWTs (millions)	3.32	85%	3.9
Rest of Fleet	Vessels	396	8%	4887
	DWTs (millions)	34.89	13%	277

WSC report “Can the EU fuel shipping’s decarbonisation?”

Power supply: Efficiency!!!

- Small size/power footprint+ autonomy+ costly fuels:
Efficiency and minimal fuel requirement are the priority!
- Niche market: Novel engines (medium speed range) recently launched/still under development
- Fuel cells: LT PEM and HT PEM available or close to market
- Fuel Cells: SOFC needed for carbon-based fuels (ammonia?)
- Nuclear propulsion? (total costs, dual use aspect)



Power supply: Novel vessels



LNG



Methanol (- ready)



- pilots and up to 25% power supply
- H₂ as mobile power source
- vessel designs

Power supply: Novel vessels



All-Electric
Stationary

- Hybrid power supply with energy storage
- Waste Heat recovery, wind-assisted?
- Get ready for 2030!

Sustainable dredging: Ecoshape/BwN

What if we are so focused on
minimizing negative effects that
we miss opportunities to
maximize positive effects?

Ecoshape/ Building with Nature



www.ecoshape.org



[Sand Motor beach - Google Search](#)

Sustainable dredging: many cases



Sustainable dredging: enablers



Conculsion

- Energy transition and climate change bring huge challenges, but achievable
- Dredging fleet is particularly difficult to decarbonise
- But important steps and trials are ongoing
- Dredging sector has also immense potential to contribute to sustainability through knowledge built up and shared through BwN projects
- CEDA makes information available to all members