



Arab Academy

for Science , Technology and Maritime Transport



The International Maritime Transport
and Logistics Conference

“MARLOG 13”

Towards _____
**Smart Green Blue
Infrastructure**

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No Miracles Required!

How the Blue Economy can decarbonize
without disrupting our everyday's lives



71%

THE SURFACE OF THE
PLANET COVERED BY
WATER

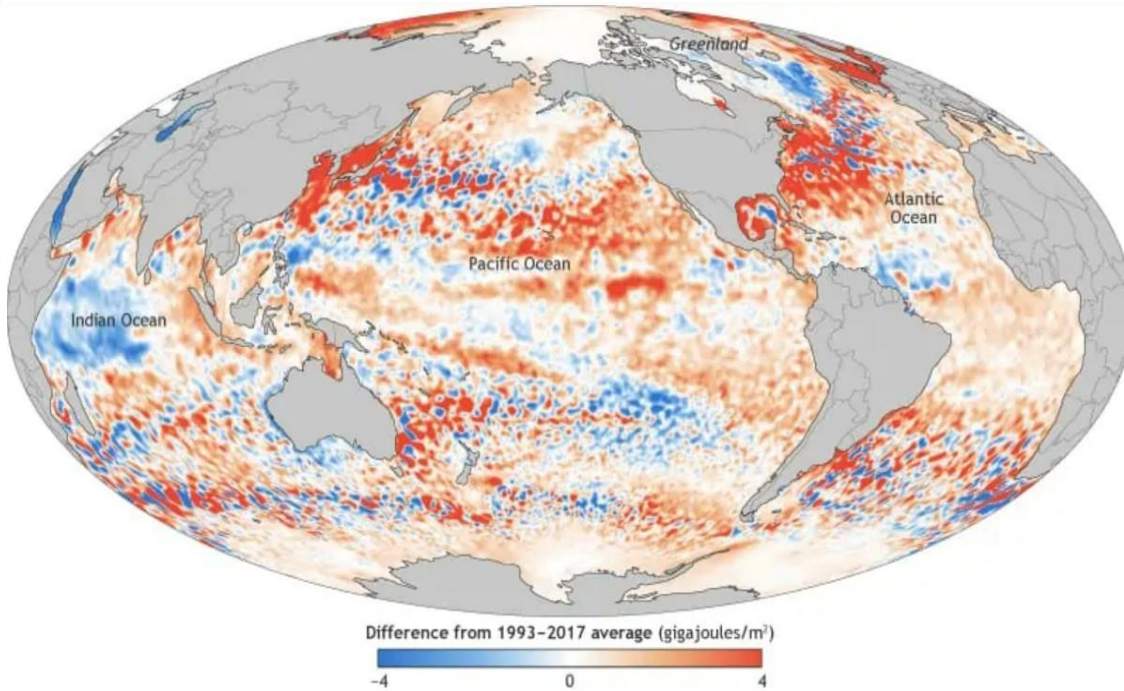


96.5%

THE AMOUNT OF
WATER ON THE
PLANET
REPRESENTED BY
OCEANS



Actually,
Oceans are
absorbing
roughly
30%
of the total
CO₂
man-made
emissions



Map of the ocean heat content in the upper ocean (from the sea surface to a depth of 700 meters, or 2,300 feet) for 2017 relative to the 1993–2017 baseline.

Source: [NASA](#).

As the oceans heat up, they become more acidic, which causes them to lose their ability to hold oxygen.

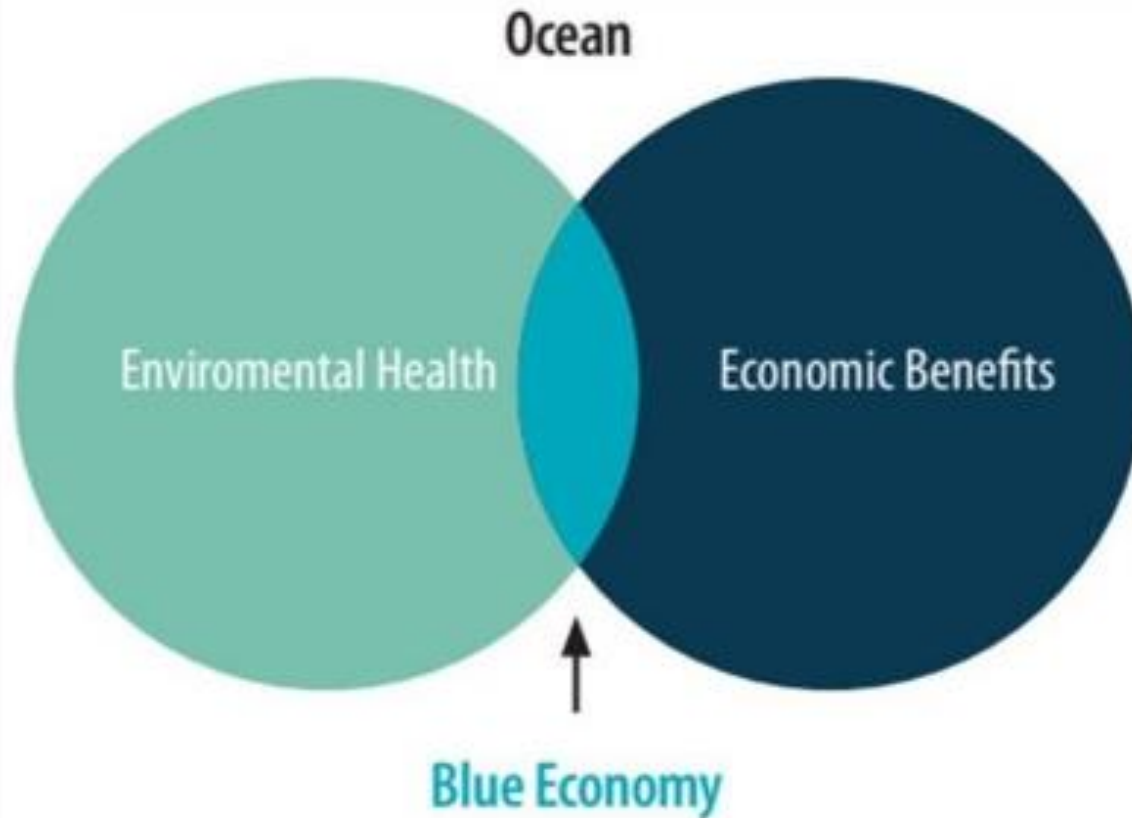
Without adequate oxygen, marine plants and animals must adapt and survive or die

As the global climate heats up, glaciers and the Arctic ice sheets that cover our most northern climates are melting rapidly

This causes sea levels to rise and make low lying places, like islands and coastlines, incredibly vulnerable to the encroaching tides

The UN have established a set of goals that have to be reached by 2030 in order to avoid disastrous consequences by 2050






A sustainable Ocean economy emerges when economic activity is in balance with the long-term capacity of ocean ecosystems to support this activity and remain resilient and healthy.

The Blue economy concept is a lens by which viewing and developing policy agendas that simultaneously enhance ocean health and economic growth, in a manner consistent with principles of social equity and inclusion




The whole Blue Economy is considered to cause around 5% of the total of GHG emissions per annum while namely Shipping totals a staggering almost 3% of it (so more than 50% of the total of whole human activities that take place on oceans or waters)






1. Transition to Sustainable Fuels: One of the most crucial steps towards decarbonizing the shipping and transportation sector is the transition from traditional fossil fuels to sustainable alternatives. In the next 20 years, we can expect to see a significant increase in the use of biofuels, hydrogen, and ammonia as viable alternatives to traditional fuels. Biofuels derived from organic matter can significantly reduce emissions and have the potential to be carbon-neutral. Hydrogen fuel cells offer a clean energy solution for vehicles and ships, while ammonia is seen as a promising alternative for marine vessels.

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topics






2. Electric Vehicles and Ships: The electrification of vehicles and ships is another promising avenue for decarbonization. Electric vehicles have gained popularity in the automotive industry, and we can expect to see a similar trend in the transportation sector. With advancements in battery technology and charging infrastructure, electric trucks, buses, and even ships can become viable alternatives to traditional fossil fuel vehicles. Additionally, the development of electric ferries and smaller ships for short-distance travel can help reduce emissions in coastal and inland waters.

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3. Adoption of Sustainable Practices: Beyond fuel alternatives, the shipping and transportation industry can decarbonize by adopting sustainable practices such as route optimization, efficient logistics, and eco-friendly packaging. Utilizing data analytics and AI technology, companies can optimize routes to minimize fuel consumption and emissions. Additionally, the use of sustainable materials for packaging and containers can further reduce the environmental impact of shipping and transportation.

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4. Investment in Infrastructure: In the next 20 years, we can expect to see substantial investment in green infrastructure to support the decarbonization of the shipping and transportation sector. This includes the development of clean energy ports, efficient charging stations for electric vehicles, and sustainable transport hubs. By investing in green infrastructure, companies can create a more sustainable and resilient transportation network that supports decarbonization efforts.

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5. Research and Development: Foreseeable discoveries in the next 20 years, such as advancements in renewable energy technology, carbon capture and storage, and innovative propulsion systems, will further accelerate the decarbonization of the shipping and transportation industry. Research institutions, governments, and industry stakeholders will continue to collaborate on developing cutting-edge technologies that reduce emissions and promote sustainability.

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Overall, decarbonizing the shipping and transportation industry is essential for contrasting climate change, protecting the environment while at the same time preserving the quality of life of individuals and Nations alike.

By embracing sustainable fuels, electrification, sustainable practices, infrastructure investment, and research and development, the industry can achieve significant reductions in emissions without disrupting our everyday lives. It will require collaboration among stakeholders, regulatory support, and a commitment to innovation and sustainability. With the right strategies and technologies, the shipping and transportation sector can pave the way for a greener and more sustainable future.

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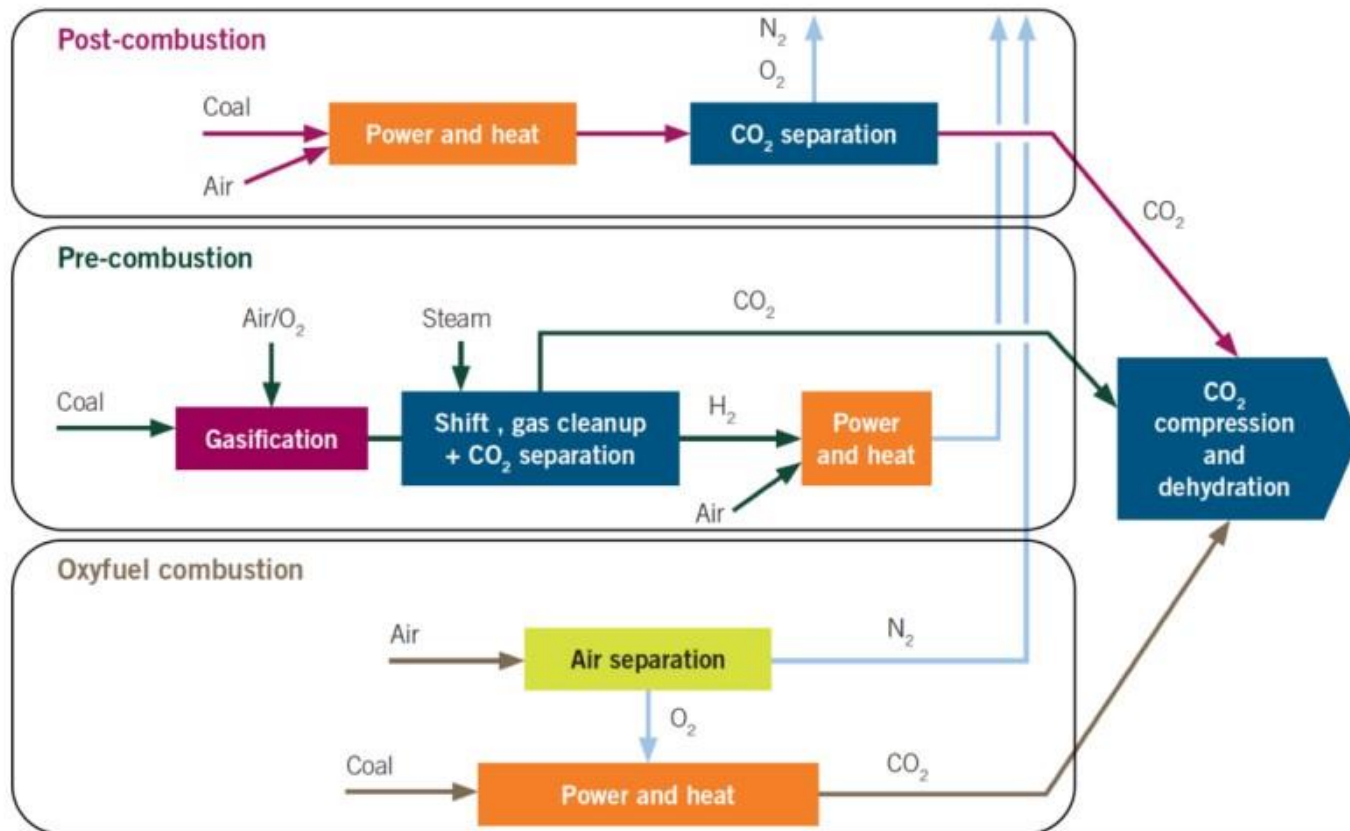
1. Carbon Capture and Storage (CCS) on Ships:

- Technology: One innovative technology that holds promise for carbon capture and storage in the shipping industry is onboard carbon capture systems. These systems are designed to capture CO₂ emissions directly from the exhaust gases of ships before they are released into the atmosphere.

- How It Works: The onboard carbon capture system utilizes solvent-based absorption technology to capture CO₂. The exhaust gases from the ship's engines are passed through a scrubber system where the CO₂ is absorbed by a solvent. The captured CO₂ is then stored onboard in tanks or containers until it can be offloaded at a port for storage or utilization.

- Benefits: Implementing onboard carbon capture systems on ships can significantly reduce emissions from the shipping industry, which is a major contributor to global CO₂ emissions. By capturing and storing CO₂ onboard, ships can operate more sustainably and contribute to overall decarbonization efforts.







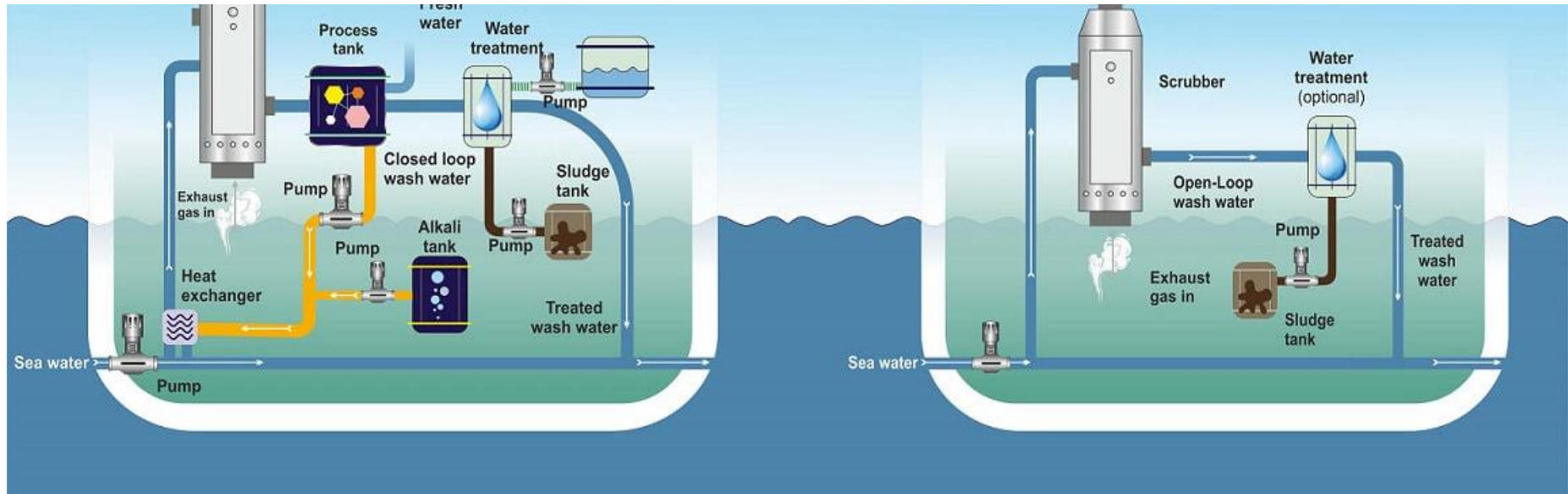
2. Renewable Energy-Powered Ships with CCS:

- **Technology:** Another promising technology involves the integration of renewable energy sources, such as wind and solar power, on ships along with carbon capture and storage systems.

- **How It Works:** Renewable energy-powered ships use wind turbines, solar panels, or a combination of both to generate clean electricity for propulsion and onboard operations. In addition to renewable energy sources, these ships are equipped with CCS systems to capture and store CO2 emissions from their engines.

- **Benefits:** By combining renewable energy sources with CCS technology, ships can significantly reduce their carbon footprint and operate in a more environmentally friendly manner. These hybrid ships not only reduce emissions but also showcase the potential for sustainable shipping practices that prioritize environmental protection.





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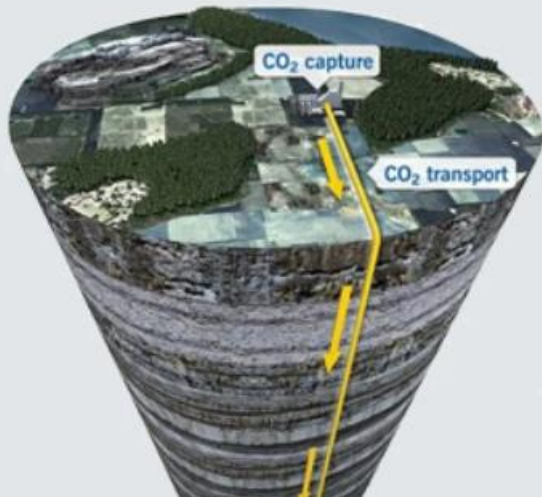
3. Port-Based Carbon Capture and Storage Infrastructure:

- Technology: Port-based CCS infrastructure involves the installation of carbon capture and storage systems at key ports and terminals to capture emissions from ships during loading and unloading processes.

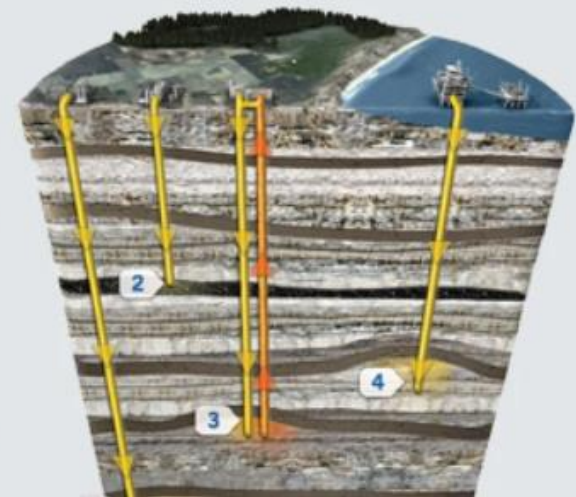
- How It Works: Carbon capture systems are installed at port facilities to capture CO₂ emissions from ships while they are docked. As ships release emissions during loading and unloading operations, the CCS system captures the CO₂ and stores it in underground geological formations or utilizes it for other purposes.

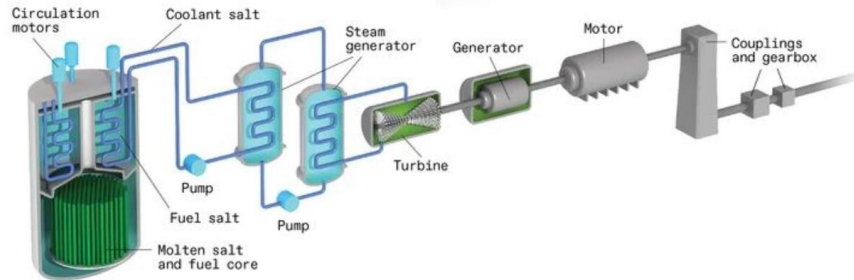
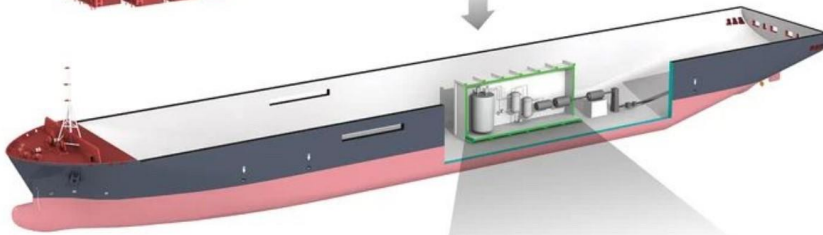
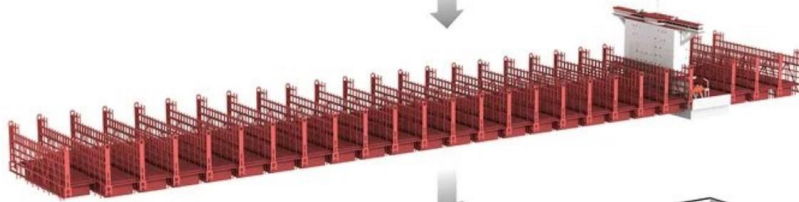
- Benefits: Implementing port-based CCS infrastructure can help reduce emissions from ships at critical points in their operations. By capturing emissions at ports, where ships spend a significant amount of time, the shipping industry can make meaningful progress towards decarbonization while minimizing disruptions to everyday operations.





- 1 Saline formations
- 2 Injection into deep unmineable coal seams or ECBM
- 3 Use of CO2 in enhanced oil recovery
- 4 Depleted oil and gas reservoirs





And if the priority of all priorities is to cut GHG emissions...

Nuclear powered vessels, anyone?

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Thank You

