



NLA INTERNATIONAL

Zero emissions & decarbonisation – at the heart of the Blue Economy

ETA Sustainable Conference 2023

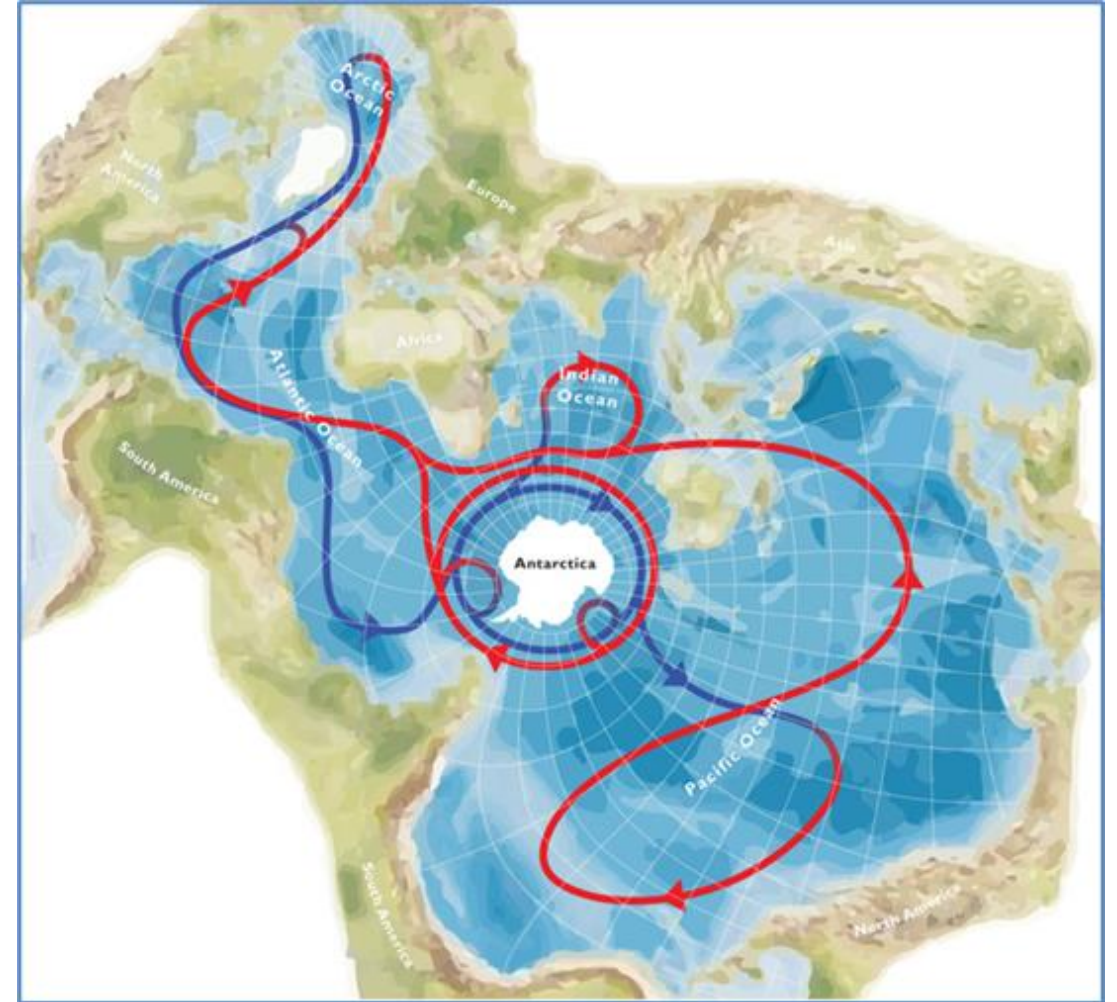
9 November 2023



A health warning...



Technology = data = information = sea vision...



Oceans in crisis?

Overfishing drains oceans of its life

By Kim Pham · Apr 12, 2021 · 0



SEASPIRACY

Seaspiracy

2021 | 15 | 1h 30m | Documentaries

Passionate about ocean life, a filmmaker sets out to document the harm that humans do to marine species — and uncovers alarming global corruption.

current global fishing practices.

Article | [Open Access](#) | Published: 29 October 2019

New elevation data triple estimates of global vulnerability to sea-level rise and coastal flooding

Scott A. Kulp & Benjamin H. Strauss

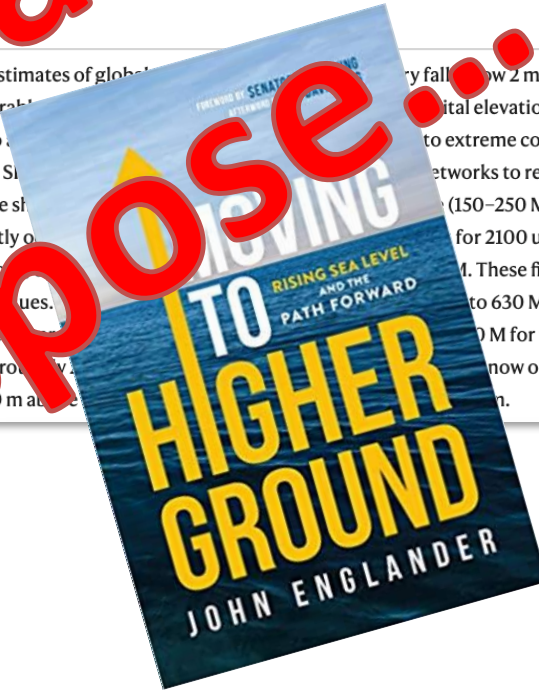
Nature Communications 10, Article number: 4844 (2019) | [View this article](#)

513k Accesses | 107 Citations | 29 Altmetrics

An Author Correction to this article was published on 12 December 2019

The article has been updated

Most estimates of global vulnerability to sea-level rise are based on a digital elevation model (DEM) used to estimate coastal water levels, NASA's Shuttle Radar Topographic Mission (SRTM). Here we show that the use of a new DEM (150–250 M, 90% CI) for 2100 under low carbon emissions (1.1°C) increases the number of people exposed to 630 M people live on land below 10 m for mid-century, and 1.1 billion people live on land less than 10 m above sea level by 2100.

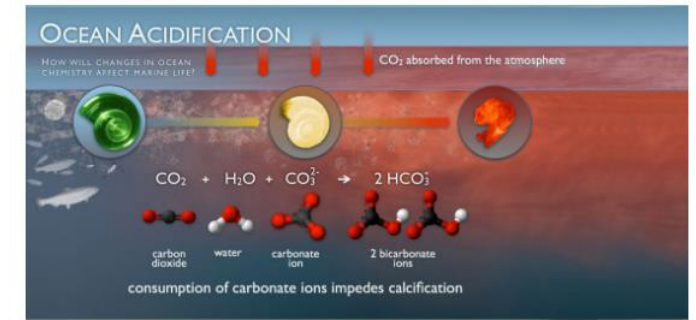


Ocean acidification

Education | [ocean acidification education](#)

+ Share This

In the 200-plus years since the industrial revolution began, the concentration of carbon dioxide (CO₂) in the atmosphere has increased due to human actions. During this time, the pH of surface ocean waters has fallen by 0.1 pH units. This might not sound like much, but the pH scale is logarithmic, so this change represents approximately a 30 percent increase in acidity.



unesco
Intergovernmental
Oceanographic
Commission

Ocean Acidification –
the threat and its
status

Dr Kirsten Isensee, Programme Specialist, IOC-UNESCO





2023



1982



'GRIPPING AND SHOCKING... WITH THE PACE OF A THRILLER'
THE TIMES

THE

OUTLAW OCEAN

IAN URBINA

CRIME & SURVIVAL IN THE
LAST UNTAMED FRONTIER

'JUST INCREDIBLE'
NAOMI KLEIN



Blue Machine

HOW THE OCEAN
SHAPES OUR WORLD



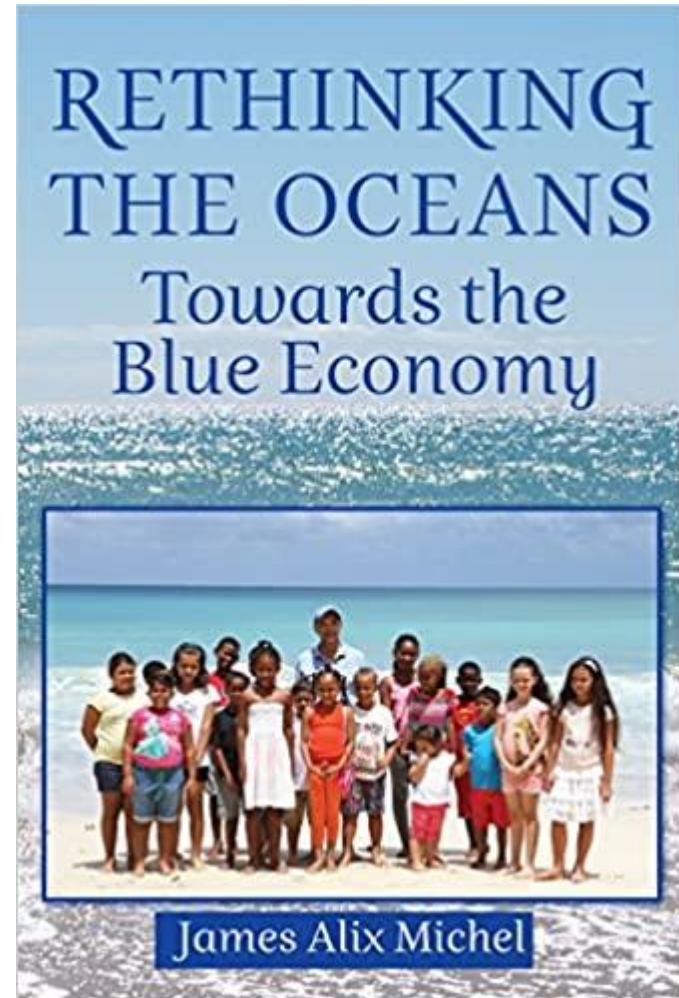
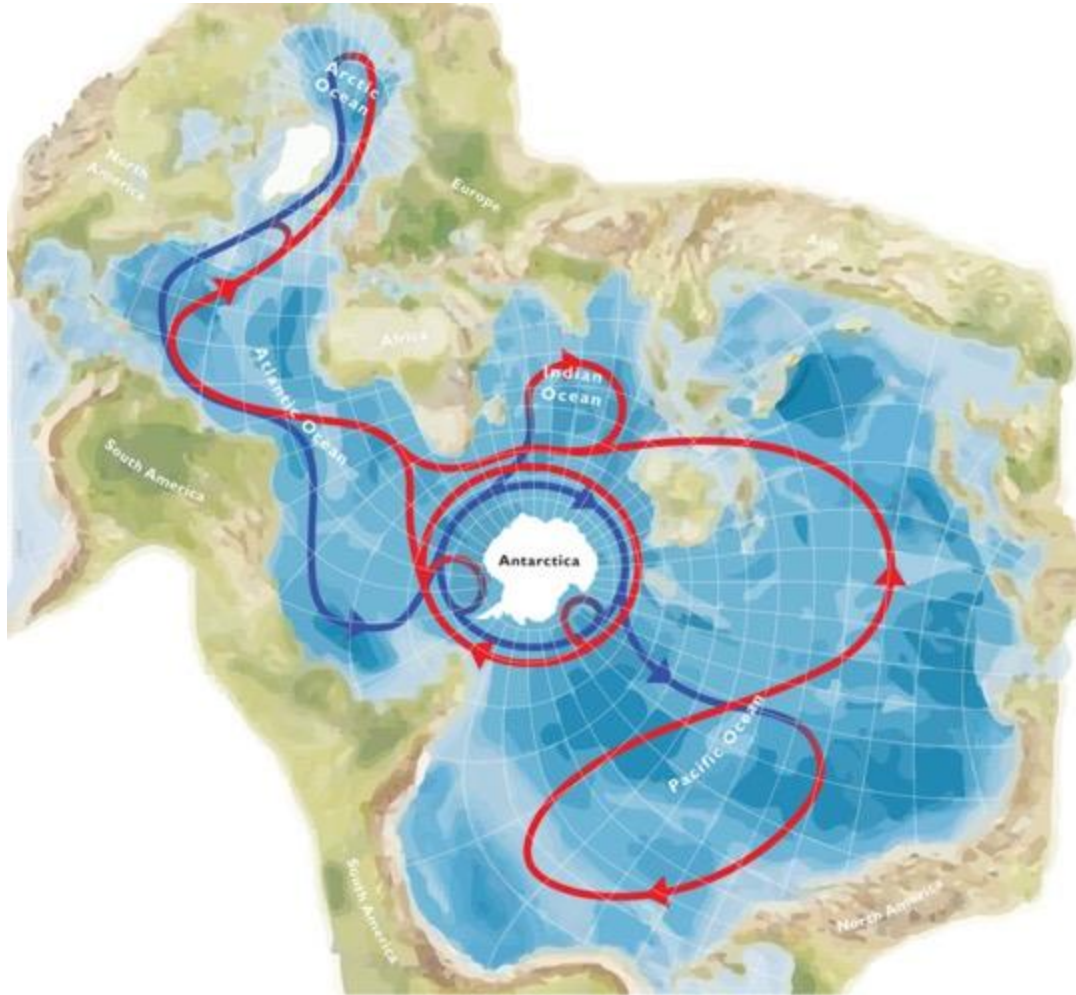
'I was entranced.'
ALICE ROBERTS

'Czerski brings the oceans alive.'
GAIA VINCE

HELEN CZERSKI

We are all islanders now...

‘A Blue Economy not only empowers island states, it can empower us all.’ *President James Michel*



‘We believe that island societies are the flag bearers for human development.’

The Blue Economy

The Blue/Marine Economy is defined as the “sustainable use of ocean resources for economic growth, improved livelihoods, and jobs while preserving the health of the ocean ecosystem.” World Bank, 2017

WHAT IS THE BLUE ECONOMY?

All economic activities related to oceans, seas and coasts. Blue economy covers a wide range of interlinked established and emerging sectors.

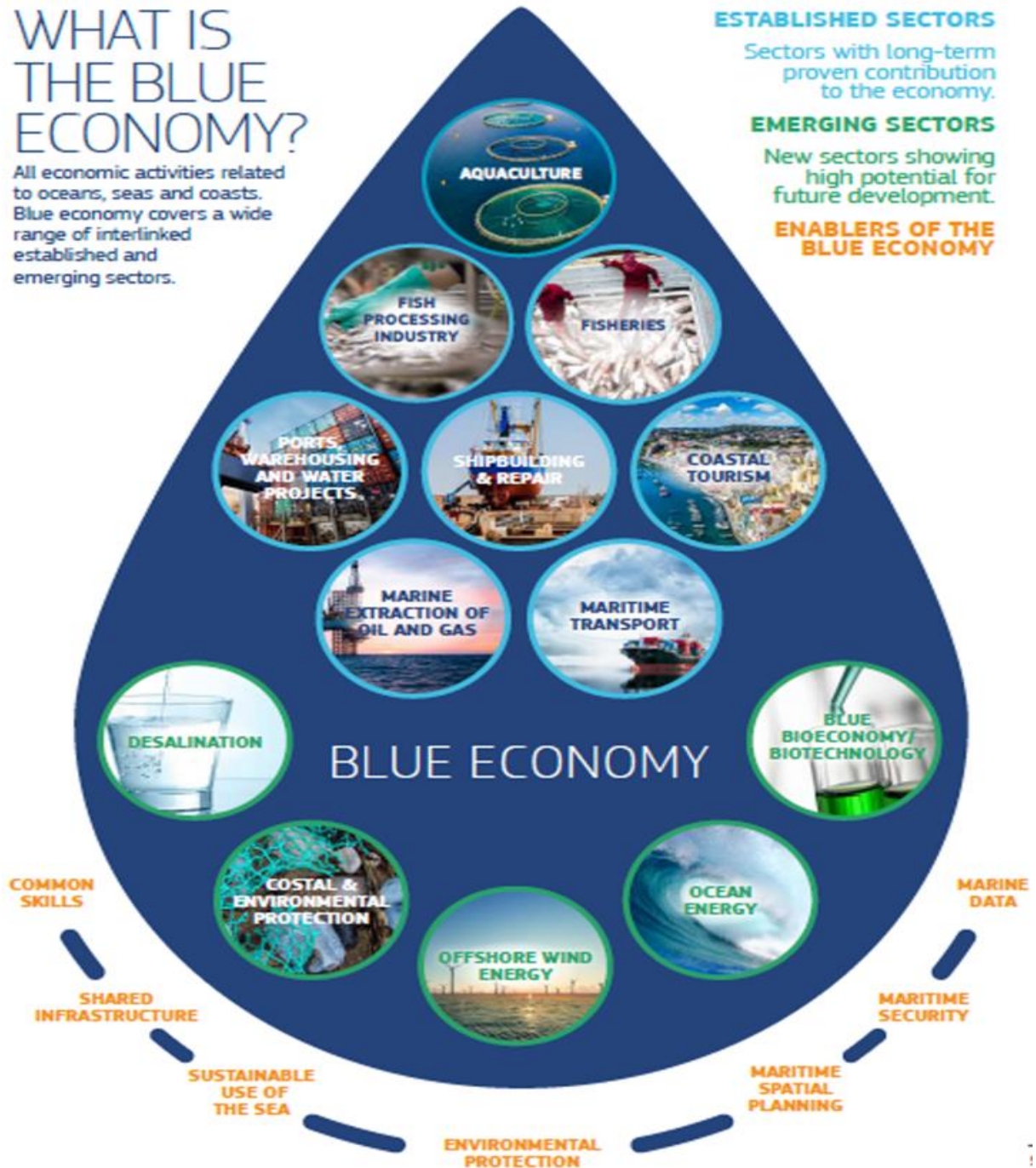
ESTABLISHED SECTORS

Sectors with long-term proven contribution to the economy.

EMERGING SECTORS

New sectors showing high potential for future development.

ENABLERS OF THE BLUE ECONOMY



Value of the Blue Economy

US "blue economy" contributed nearly USD 400 billion to GDP in 2019

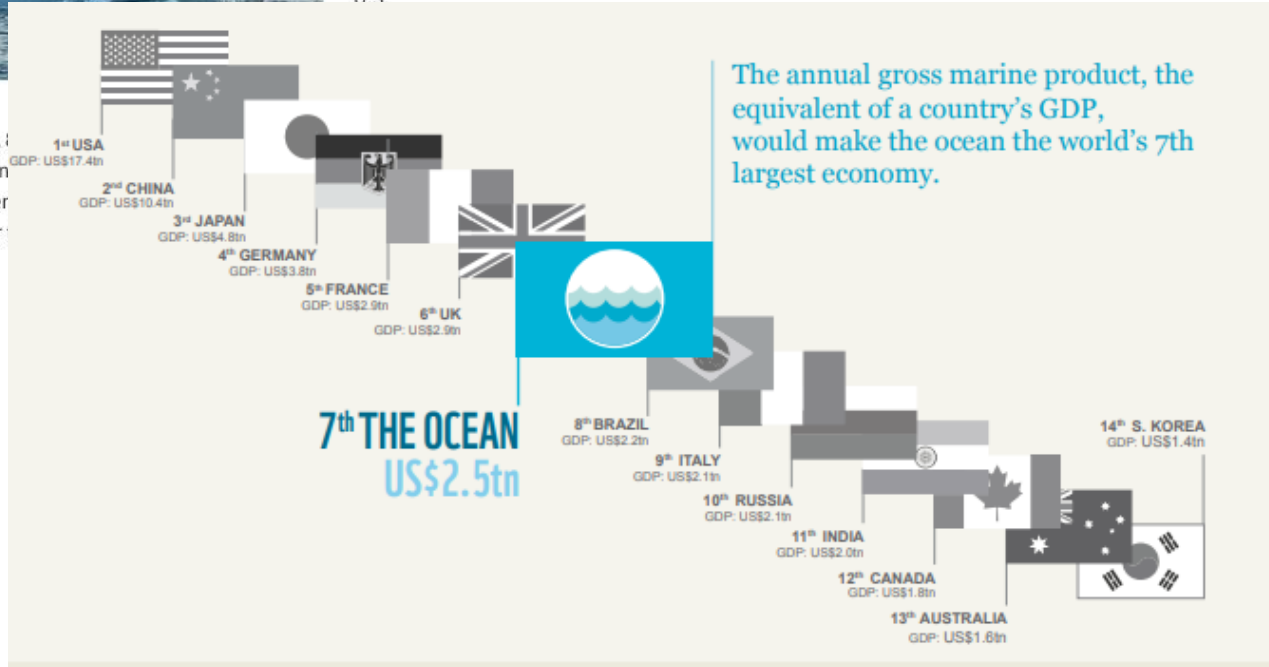
By Steve Bittenbender
June 8, 2021

SHARE [f](#) [t](#) [in](#) [✉](#)



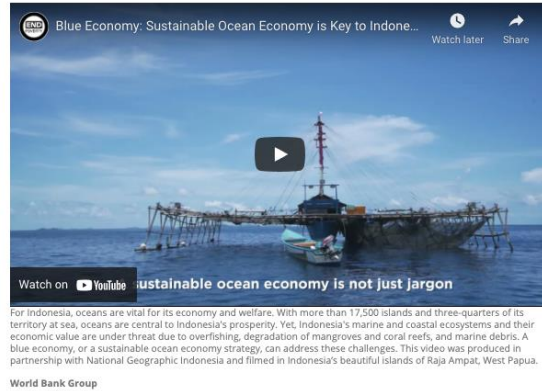
America's maritime economy is firmly in the black, according to the first-ever "blue economy" report from the U.S.

report, released Tuesday, (EUR 326 billion) to the Un sector grew at a 4.2 percer country's entire GDP over



A Sustainable Ocean Economy is Key to Indonesia's Prosperity

[f](#) [t](#) [in](#) [✉](#)



BY 2030, THE OCEAN ECONOMY IS PROJECTED TO BE WORTH OVER 3 TRILLION AND PROVIDE 40 MILLION JOBS

WORLD OCEANS DAY 2021
WWW.OCEANDAY.ORG

PM seeks US investment in ICT, renewable energy, blue economy

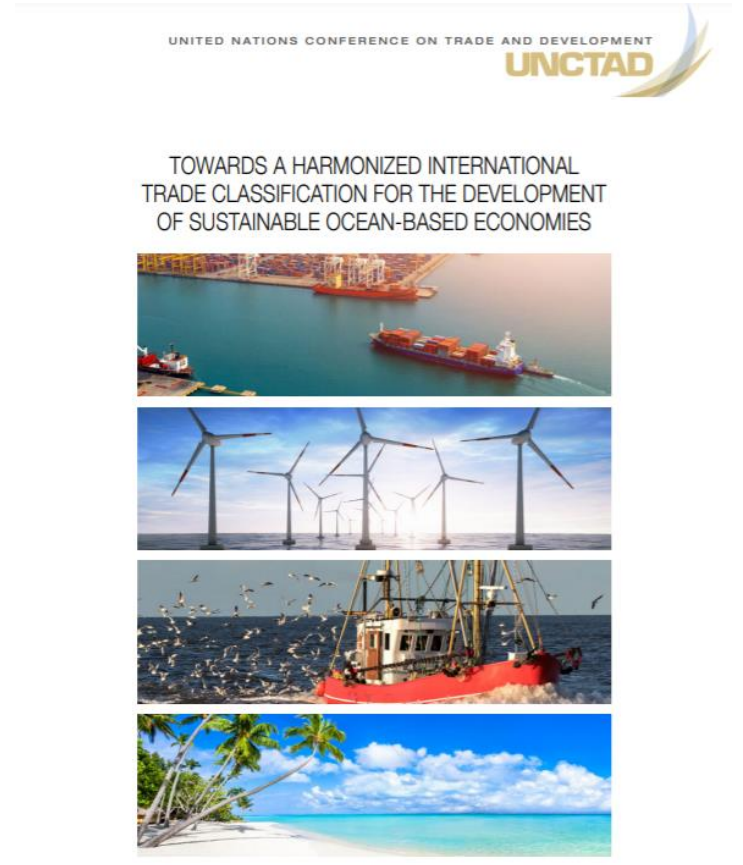
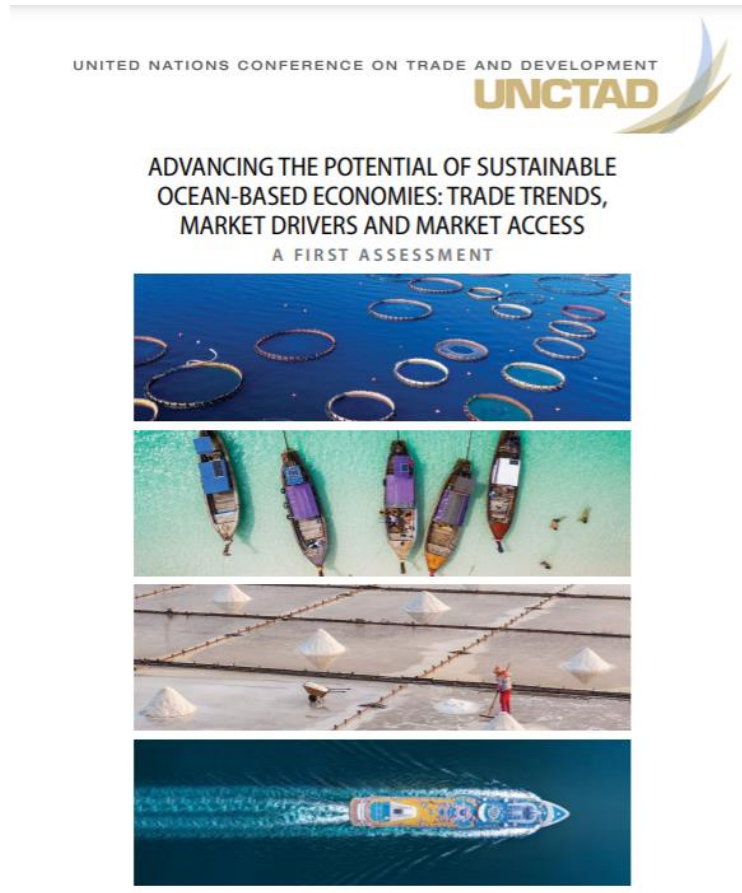
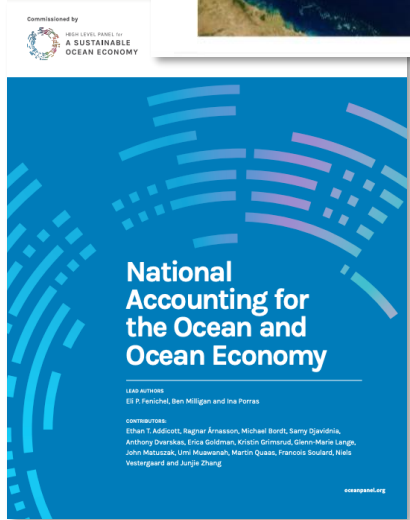
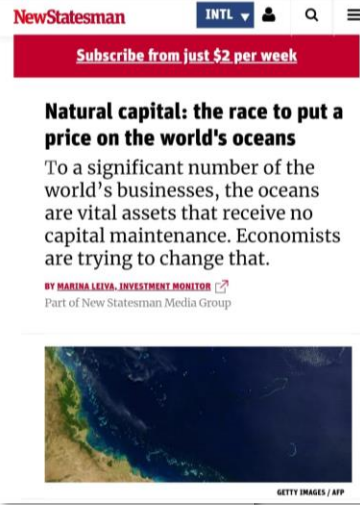
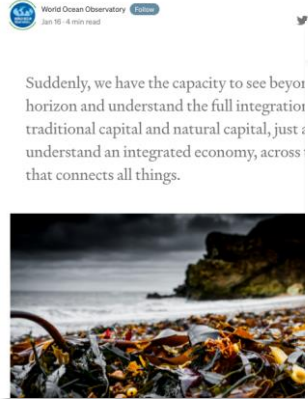
Riv news | 22 Sep 2021, 19:09



A capital opportunity



The Ocean As Natural Capital



Sustainable Blue Economies



The Blue Economy Is More Than Resources: It Has To Focus on Social Equity and Governance

The future of an equitable and sustainable global ocean, or "Blue Economy," depends on more than the resources available for technological advancement and industry expansion. A recent study led by the University of British Columbia found that socioeconomic and governance conditions such as national stability, corruption, and human rights greatly affect the ability to achieve a Blue Economy.

April 13, 2021 By ECO Magazine
HSE Now



April 12, 2021

What Canada's Blue Economy means to fisheries and seafood farmers

Tweet

A video series to highlight the benefits of the Blue Economy featuring 10 Canadian voices from the seafood industry.

by SeaWestNews

The Fisheries Council of Canada and the Canadian Aquaculture Industry Alliance have created a video series to highlight the benefits of the Blue Economy featuring 10 Canadian voices from the seafood industry.

PM eyes blue economy, says Coast Guard to be strengthened

The PM asked the Bangladesh Coast Guard members to discharge their responsibilities with patriotism, honesty and fairness.



Prime Minister Sheikh Hasina. Photo: PMO

FM Qureshi: Pakistan agree to cooperate with friendly nations to promote blue economy

"We are ready to cooperate and collaborate with other friendly nations and partners around the world, to realize this goal for mutual benefit of the entire humanity," FM Qureshi said.

News Desk | 15 February 2021



Foreign Minister Shah Mahmood Qureshi on Monday said recognizing the importance of world's oceans as global public commodity, Pakistan was committed to promote the prudent use of marine resources for socio-economic development, while ensuring environmental sustainability.

Holistic, regenerative & a just transition...

Definitions

Sectoral alignment

Strategies / policies

Bi-laterals

A SUSTAINABLE BLUE ECONOMY:

Restores, protects and maintains the diversity, productivity, resilience, core functions, and intrinsic value of marine ecosystems — the natural capital upon which its prosperity depends.

Is based on clean technologies, renewable energy, and circular material flows to secure economic and social stability over time, while keeping within the limits of one planet.

Provides social and economic benefits for current and future generations by contributing to food security, poverty eradication, livelihoods, income, employment, health, safety, equity, and political stability.



Blue economy can only thrive with joined-up action, say experts

08 September 2020 News

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Countrywide policies that cut across all sectors are critical for the success of ocean-based economies in the Commonwealth.

Countrywide policies that cut across all sectors are critical for the success of ocean-based economies in the Commonwealth.

“Sustainable blue economy requires bringing together various sub-sectors to work in an integrated way in order to achieve effectiveness and efficiency in delivery of service to the people...”

NLA International

Our Mission:

To champion the implementation of Blue Economies in order to create sustainable ocean environments for the people and economies that depend upon them.

The Blue Economy

Maritime Domain Awareness

Offshore
Marine
Renewables

Maritime
Transport

Fisheries and
Aquaculture

Climate
Change
Mitigation

Marine and
Maritime
Innovation

Blue
Carbon

Regenerating the marine ecosystem

Our Services:

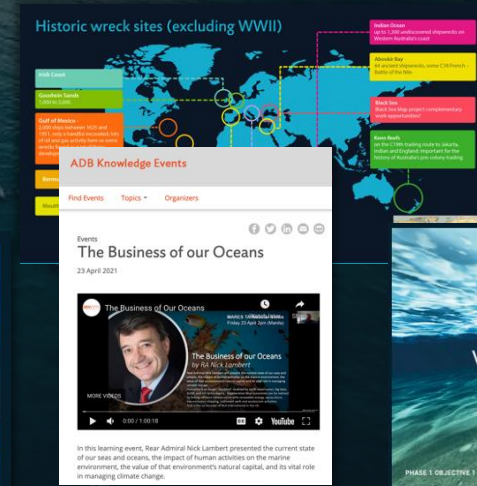
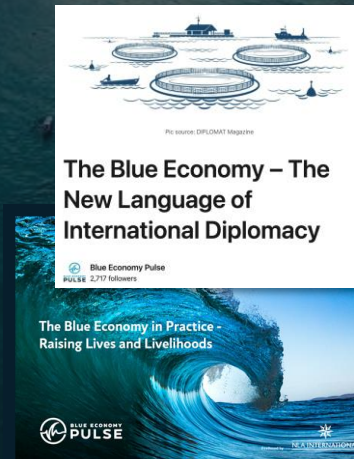
Research and
analysis

Strategy, road-mapping
and planning

Operational
delivery

Capacity building

Strategic communications



WE MUST set out to **RAISE** the quality of the marine environment; ocean and human life; and livelihoods.



.....

REGENERATIVE in conserving and restoring the vitality of the ocean environment

.....

ADAPTIVE to a changing climate, new knowledge and new ways of working

.....

INCLUSIVE of all stakeholders, especially those who depend the most on marine resources

.....

SUSTAINABLE environmentally, socially and economically

.....

EVIDENCE-LED based on a holistic range of knowledge and data sources

.....



NLA INTERNATIONAL

MARES – The New Ocean Economy



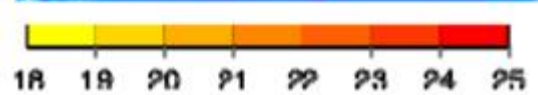
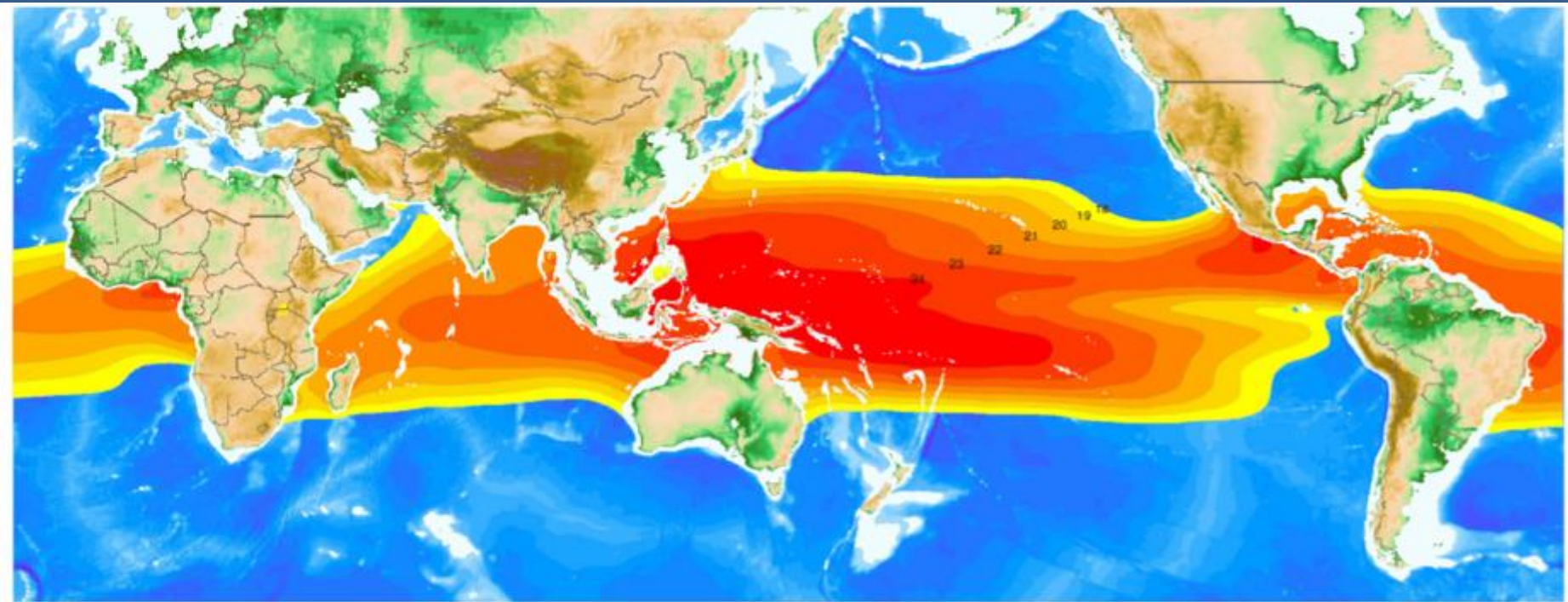
Marine Aquaculture, Reefs, Renewable Energy, and Ecotourism for Ecosystem Services

MARES = the environmental, social & economic benefits of:

- Marine renewable energy hubs, decarbonisation & zero emissions
- Power-to-X (H₂ and multiple economic sectors)
- Investible, scalable, regenerative and long-term plans
- Circular, multi-function Blue Economy (including environment restoration and ecotourism)

A compelling economic solution for climate change...

Potential offshore energy



Drawn using Data from World Ocean Atlas 2009 (WOA2009)



image: Hanwha Q Cells



MRE options/indicative estimates

Technology	Potential [Theoretical] Capacity (GW)	Capital Cost (Million \$/MW)	Levelized Cost of Energy (\$/kWh)	LCOH (based on LCOE) (\$/kg)
Marine Solar	2,290.77 – 22,907.66 ^{(a)(b)(c)}	\$1.50 - \$1.88	\$0.094 - \$0.134	7.81 - 11.16
Wave	0.037 – 0.605 ^{(a)(b)(c)(d)(e)}	\$2.7 - \$9.1	\$0.066 - \$0.866	5.46 - 72.14
OTEC	12.83 – 128.28 ^{(a)(b)(c)}	\$3.00* - \$13.00	\$0.021 - \$0.091	1.75 - 7.58
Offshore Wind	4,982.03 – 49,820.27 ^{(a)(b)(c)}	\$3.00 - \$4.00	\$0.069 - \$0.091	5.71 - 7.61
Marine Bioenergy	4.58 – 45.76 ^{(a)(b)(c)}	\$3.50 - \$4.50	\$0.040 - \$0.051	3.33 - 4.28
Tidal/Current	67.35 – 673.49 ^{(a)(b)(c)}	\$3.30 - \$5.60	\$0.377 - \$1.279	31.39 - 106.54
Salinity Gradient ^(j)	No data	\$27.50 - \$35.00	No data	No data

* Low CapEx for 50MW Floating OTEC . May not be representative but captured for reference, from:

Stratman et al., A new hybrid ocean thermal energy conversion-Offshore solar pond (OTEC-OSP) design: a cost optimization approach. Sol Energy 2008

A long-term Blue Economy programme

10-20-30 years

Viable business models

Enabling legislation & governance

- OTEC
- Solar
- Other renewable energy
- Offshore infrastructure
- Pilot, IOC, FOC
- Scalability
- Bespoke

Zero carbon energy ('power to X')

Regenerative legislation & investment

- Island power grid
- Extant economy/MSMEs
- Ecotourism
- Training & capacity building
- Advanced fisheries
- Mari-aquaculture
- Coastal restoration

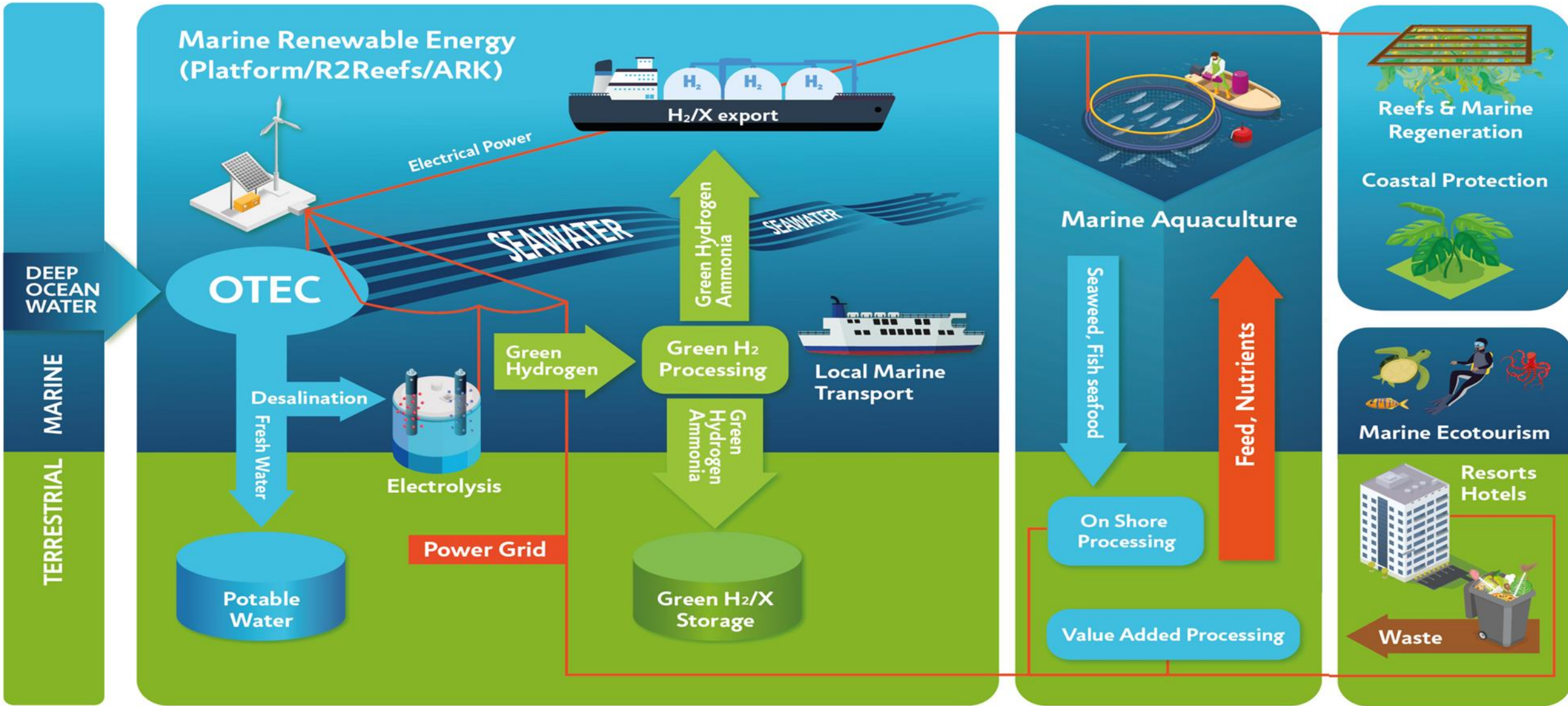
- Alternative fuels for island economy
- Water security
- Green marine exportable 'crops'
- MSME exports
- Vibrant sustainable coastal zones

Environment & socio-economic balance



Linear, extractive & unsustainable

Scalable, circular, regenerative



We need to scale...

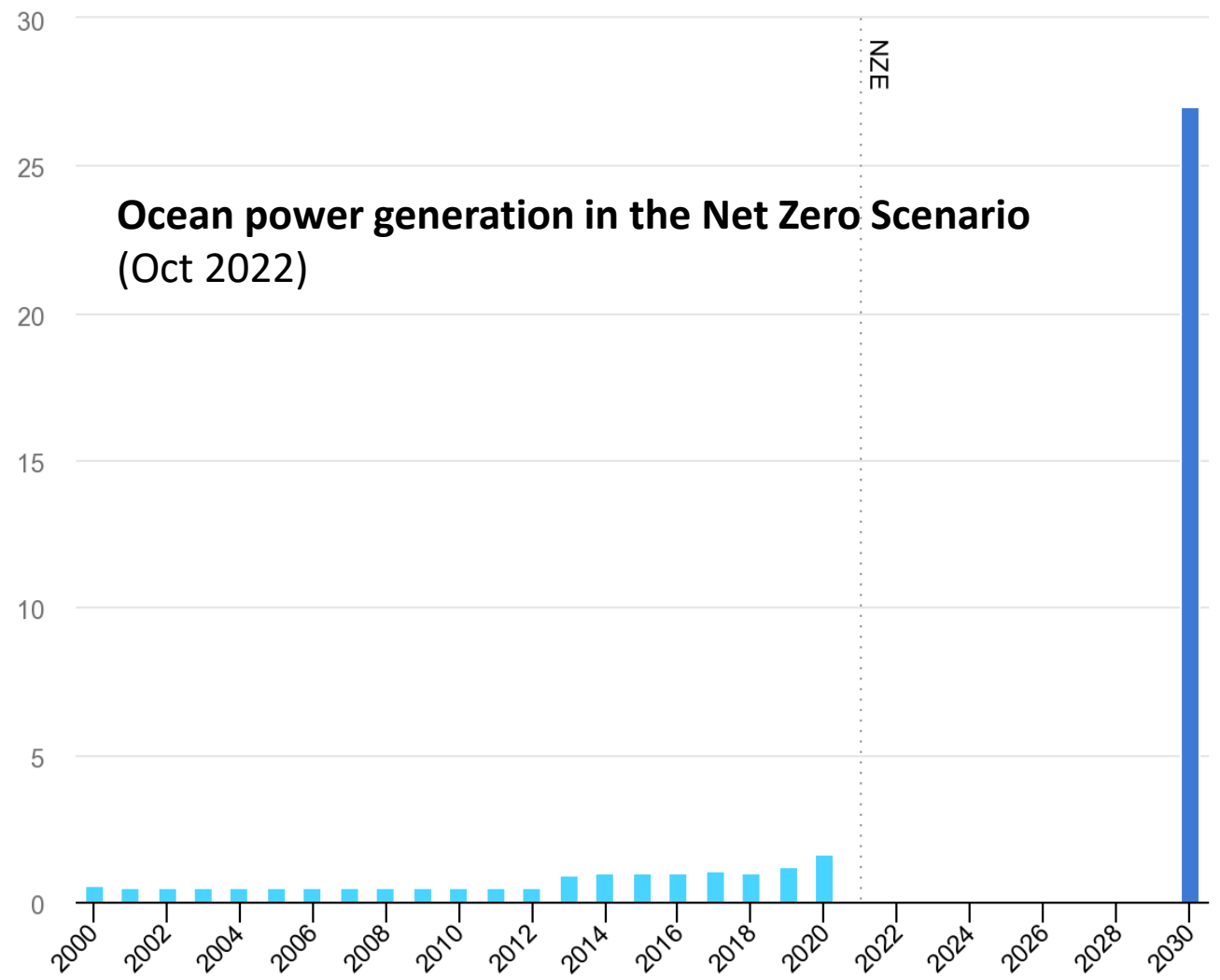


IRENA
International Renewable Energy Agency

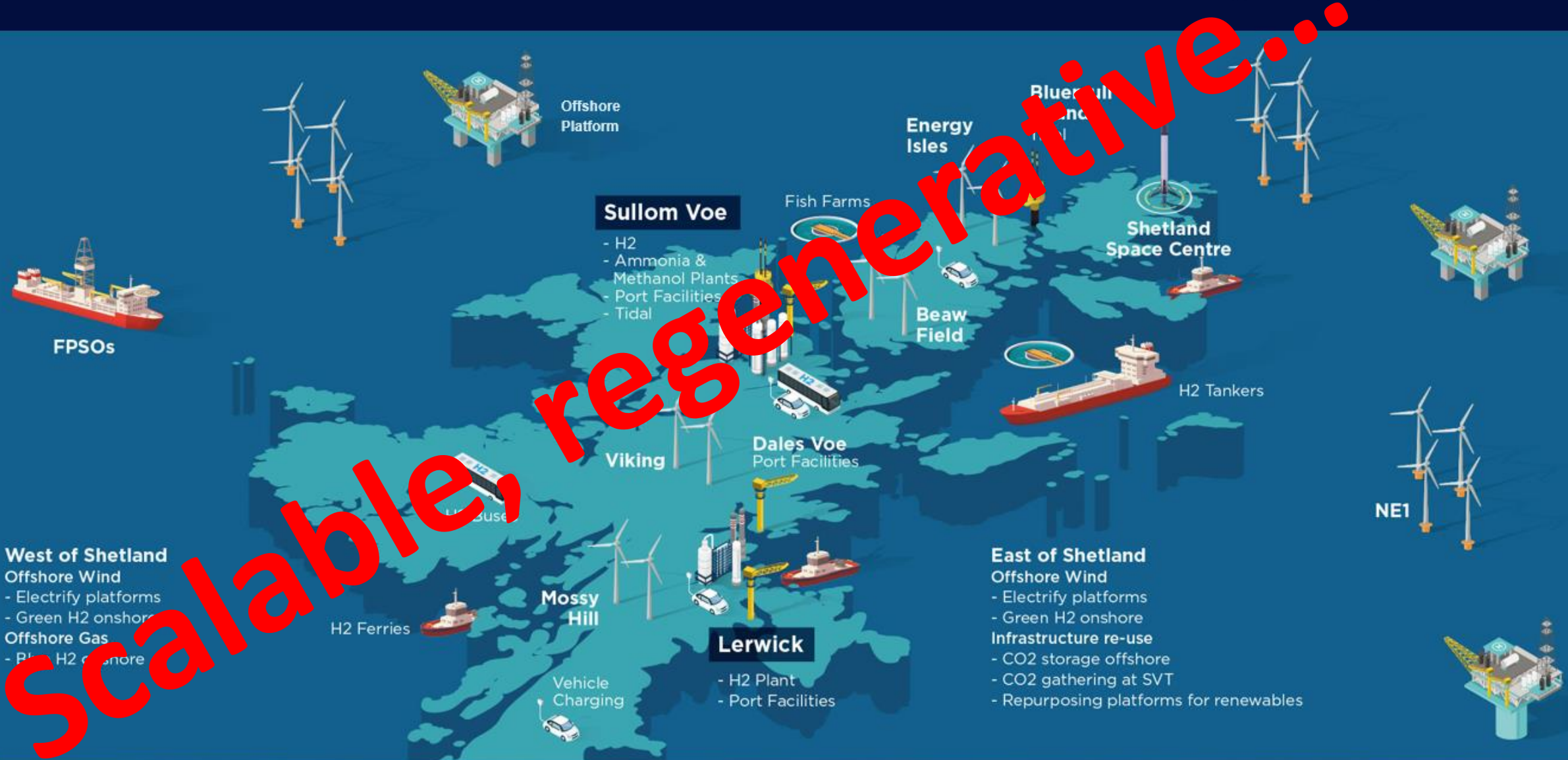
INNOVATION
OUTLOOK
**OCEAN
ENERGY
TECHNOLOGIES**

“Oceans contain vast renewable energy potential, theoretically equivalent to more than double the world’s current electricity demand.”

International Renewable Energy Agency, 2020

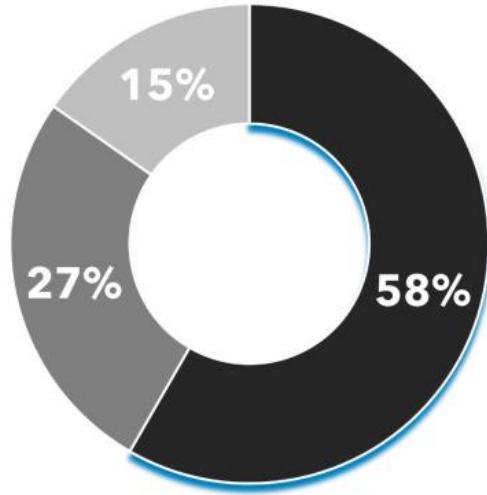


Source: International Energy Agency Ocean Power report, Oct 2022



CO₂ & AIR POLLUTANTS EMISSION RATES IN PORTS

SAMPLE 1



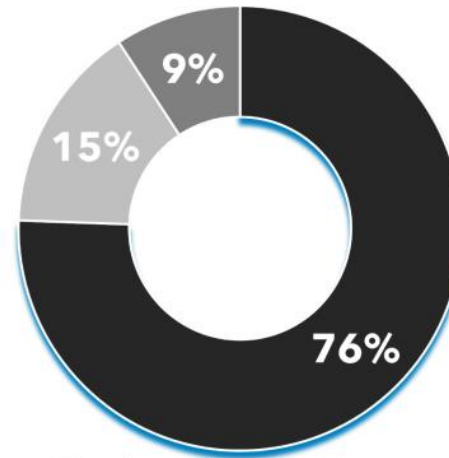
- Harbour Craft
- Drayage
- CHE

Source:
National Port Strategy Assessment: Reducing Air Pollution and Greenhouse Gases at U.S. Ports, Office of Transportation Air Quality, EPA-420-420-S-16-002, September 2016.



CO₂ & AIR POLLUTANTS EMISSION RATES IN PORTS

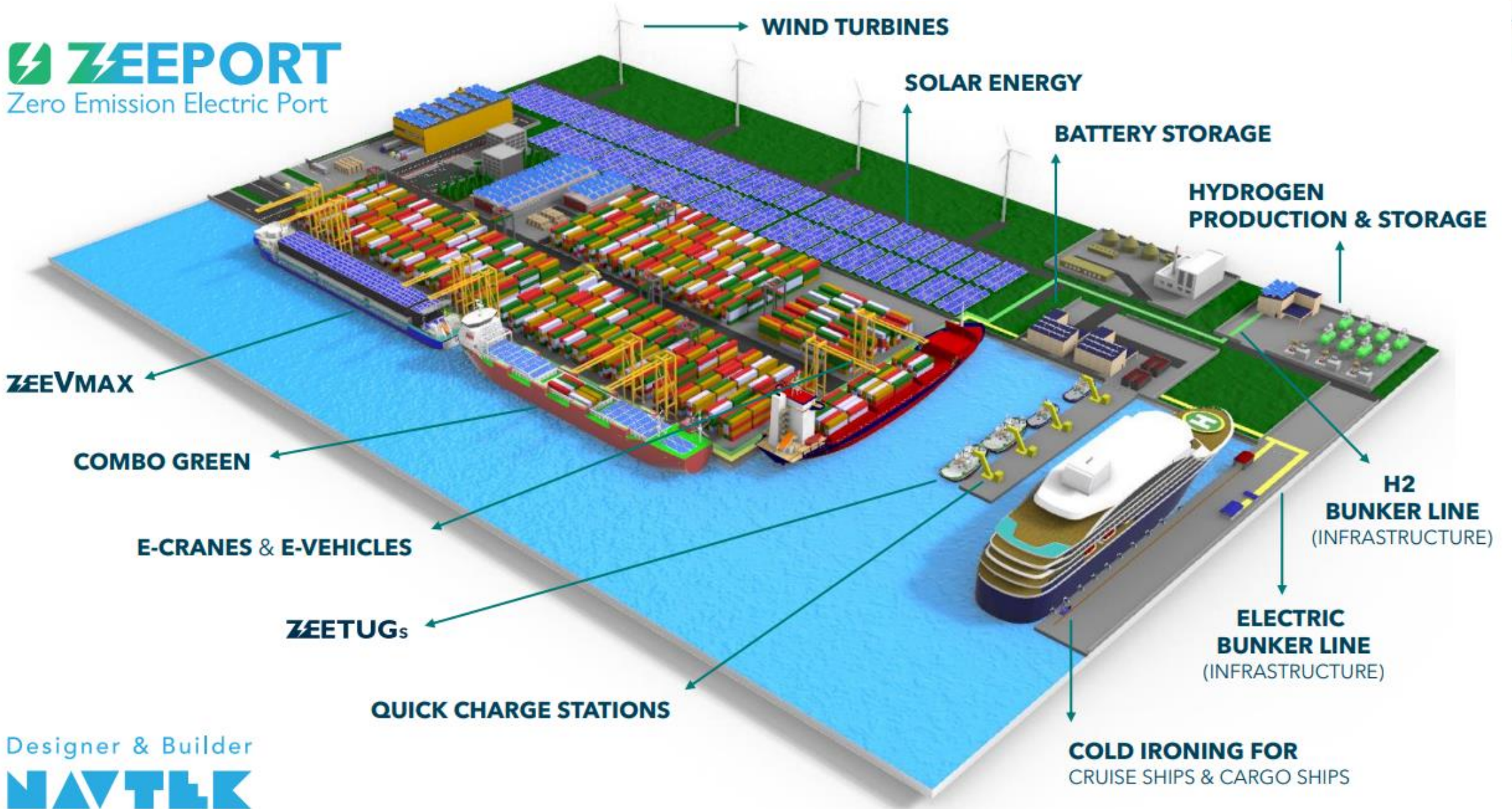
SAMPLE 2



- Tugboats
- Trucks and other vehicles
- Heavy equipment

Source:
GISAŞ Emission Report, 2021





To recap

We must move from 'take, make and dispose' to regenerative, circular, multifunction blue economies built on clean, renewable energy.

The technologies exist; they have been piloted and proven; they must be scaled to achieve effective blue economies.

The barriers are culture, investment and risk. We need an ambitious integrated planning and investment in our sea spaces. We need to do it!



≡ TIME

CLIMATE • LEADERSHIP REPORT

The World Already Has Its Climate Solutions. Now Is the Time to Deploy Them



Builders transfer wind turbine blades to a hoisting site at the construction site of a 49.5-megawatt wind farm project in Zhangye, China on March 27. CFOTO/Future Publishing via Getty Images



BY JUSTIN WORLAND  SEPTEMBER 28, 2023 3:47 PM EDT



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Questions