



Closing Workshop

TA 6610 Marine Aquaculture, Reefs, Renewable Energy, and Ecotourism for Ecosystem Services (MARES)

20 November 2023



Introduction of MARES Concept

Nick Lambert
Founder, NLA International

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MARES Closing Workshop

20 November 2023



NLA INTERNATIONAL

TA 6619 MARES Closing Workshop

The New Ocean Economy

Asian Development Bank, 20 November 2023



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

MARES = the environmental, social & economic benefits of:

- Marine renewable energy hubs
- 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...

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

Maritime Transport

Fisheries and Aquaculture

Offshore Marine Renewables

Marine and Maritime Innovation

Blue Carbon

Conserving the marine ecosystem

Our Services:

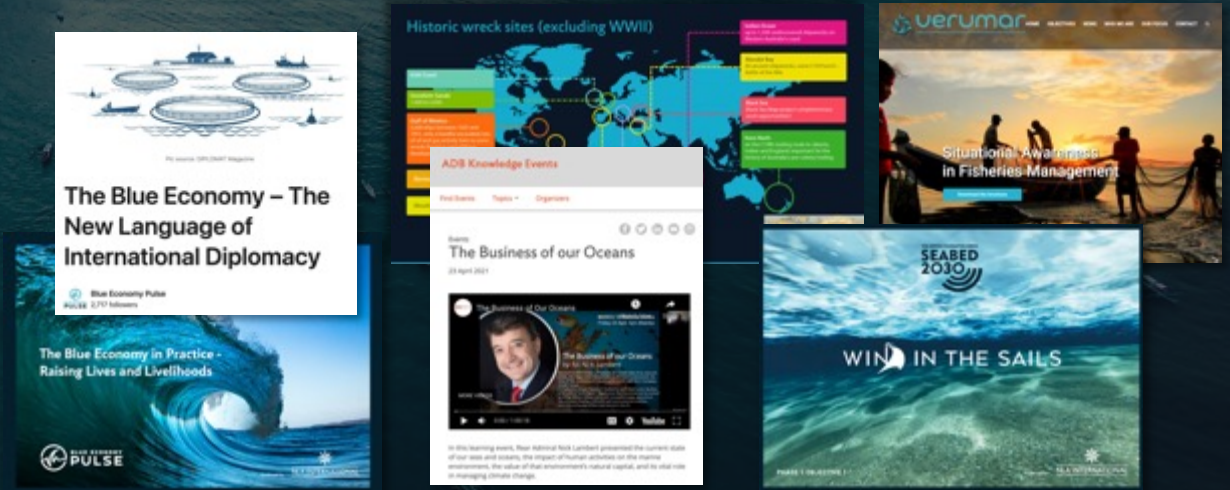
Research and analysis

Strategy, road-mapping and planning

Operational delivery

Capacity building

Strategic communications

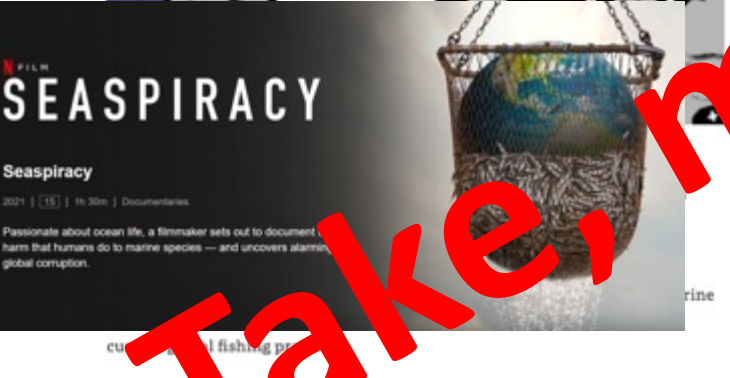


Oceans in crisis?



Overfishing drains oceans of its life

By Kim Pham Apr 12, 2021

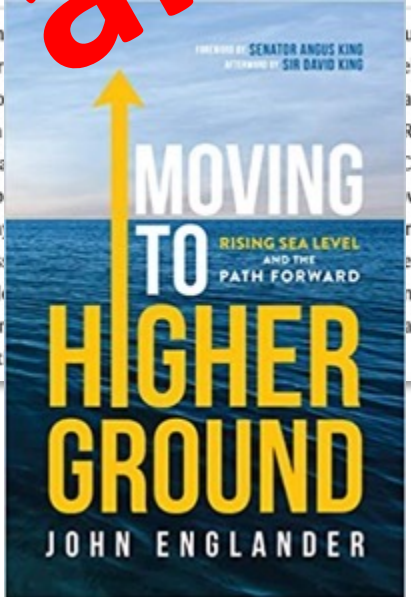


New elevation data triple estimates of global vulnerability to sea-level rise and coastal flooding

Scott A. Kulp & Benjamin H. Strauss
Nature Communications 10, Article number: 4844 (2019) | Cite this article
513k Accesses | 107 Citations | 6739 Altmetric | Metrics

An Author Correction to this article was published on 12 December 2019
This article has been updated

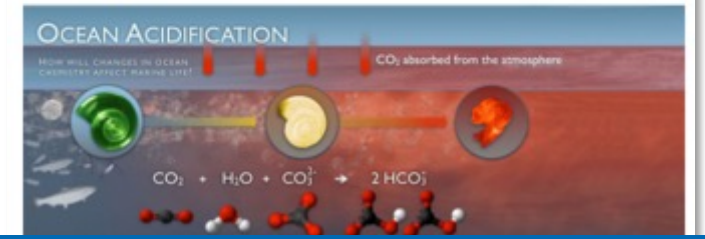
Abstract
Most estimates of global mean sea level rise are comparable to those based on satellite altimetry (DEM) and tide gauges. However, new elevation data from NASA's SeaWiFS Coastal Color and Temperature (CCT) satellite show that sea level rise is accelerating, with global land below projected annual flooding increasing from 110 M today to 250 M at present values. Under high emissions, land below projected annual flooding will increase to 250 M at present values. Under high emissions, land below projected annual flooding will increase to 250 M at present values.



Ocean acidification

Educational resources on ocean acidification education

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

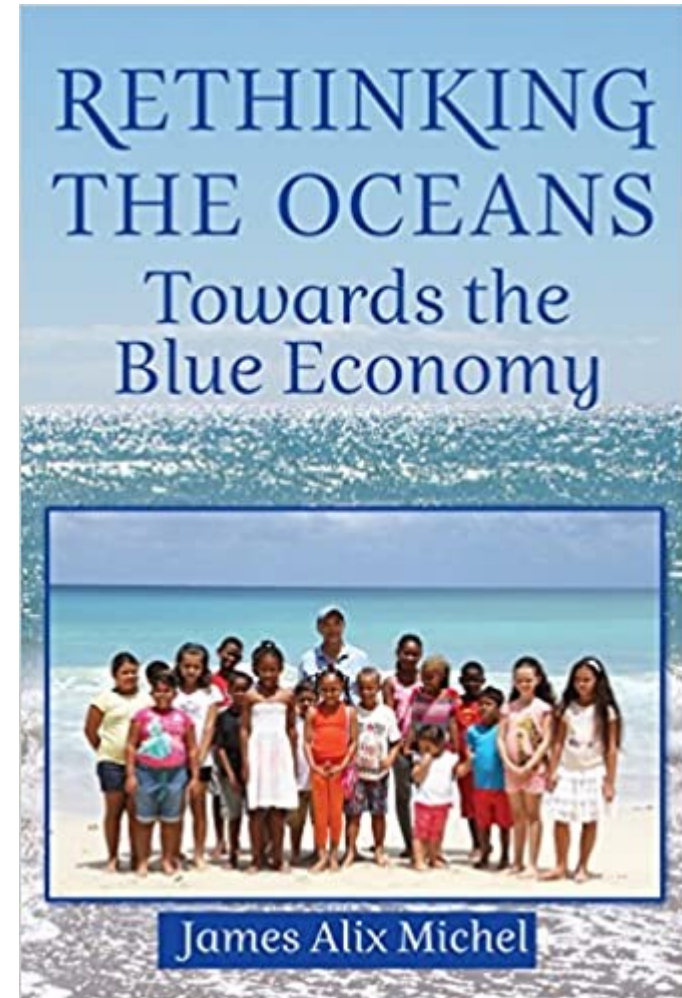
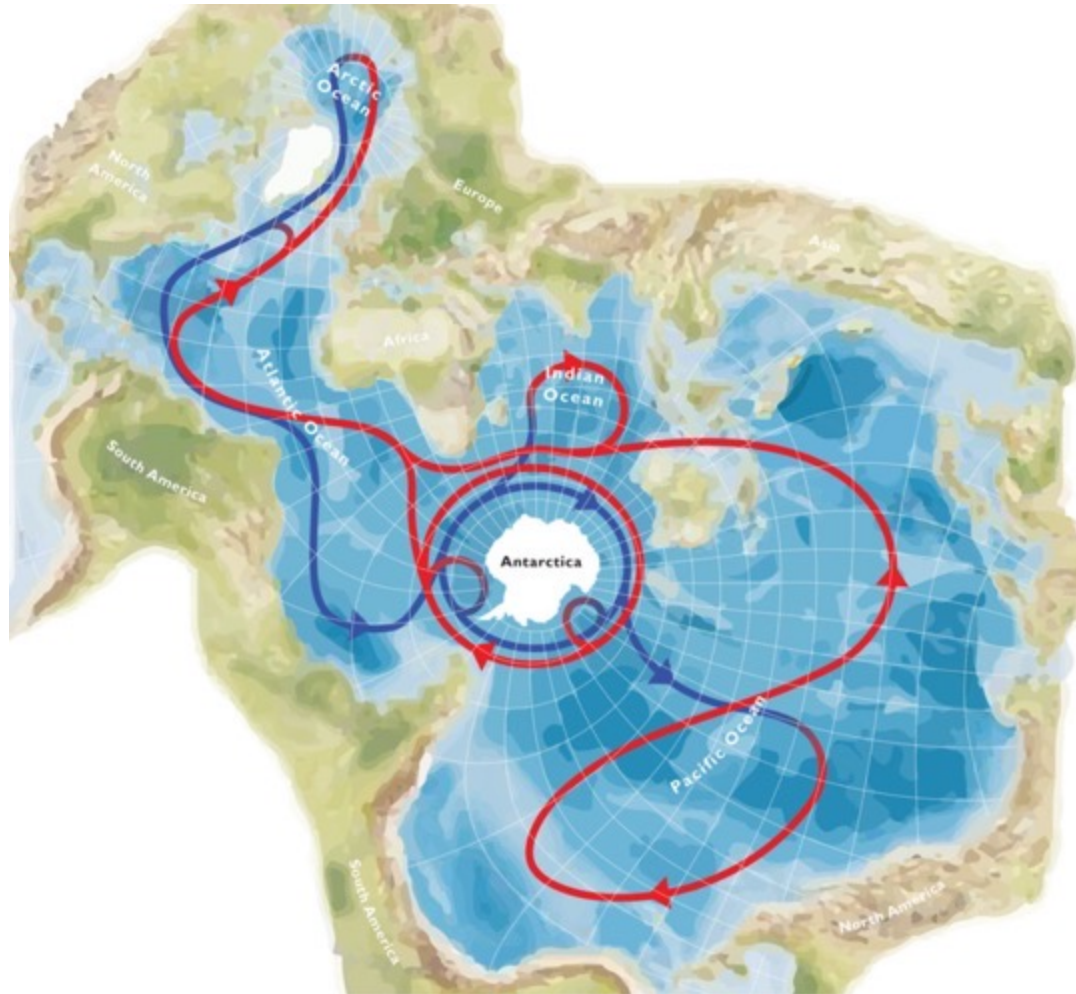
Ocean Acidification – the threat and its status

Dr Kirsten Isensee, Programme Specialist, IOC-UNESCO

Take, make and dispose...

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.’

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.



The Blue Economy – it's happening!



June 9, 2022

'Blue economy' contributed \$361 billion to GDP in 2020, Department of Commerce says

in Government, News, Bluewater

Guest Author: NOAA

“These numbers are stark proof of just how tied the blue economy is to the prosperity of the rest of our nation.”

US Government spokeswoman

SH



African BE sectors and components:

Date	USD	Jobs
2019	296b	49m
2030	405b	57m
2063	576b	78m

Africa Blue Economy Strategy

Republic of the Philippines
HOUSE OF REPRESENTATIVES
Quezon City

NINETEENTH CONGRESS
First Regular Session

HOUSE BILL NO. 69



Introduced by REP. JOSE FRANCISCO "KIKO" B. BENITEZ, Ph.D.

EXPLANATORY NOTE

In his *Last* description r dedicated hi colonial repr and heritage books that to example, Ri colonial repr

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The Philippi archipelagic a total area o essentially a percent of ou are coasta¹. ancestors to

“This bill consolidates all interventions in a single framework that promotes a whole-of-nation approach to sustainably develop, manage, protect and preserve our marine and coastal resources.”

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¹ Fisheries Statistics of the Philippines 2018-2020. Philippine Statistics Authority.

² Legal and Jurisdictional Guidebook for Coastal Resource Management in the Philippines. Department of Environment and Natural Resources, Department of Interior and Local Government, Department of Agriculture, Bureau of Fisheries and Aquatic Resources, and the Coastal Resource Management Project. 1997.

The Blue Economy – it's happening!

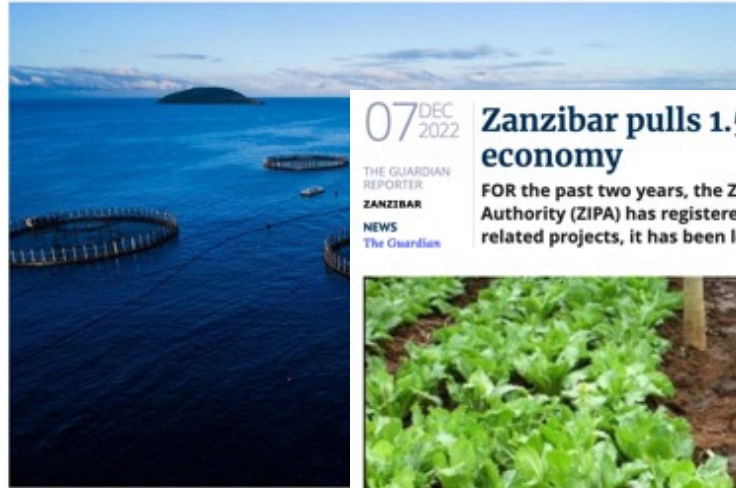


International \$567 million! IMF to support Zanzibar's blue economy

Seetao 2022-06-30 14:33

Zanzibar president calls for legal system to drive blue economy

In order to achieve the goal of economic growth and create more employment opportunities for the people, Zanzibar must take the sea as the land and vigorously develop the blue economy



Zanzibar hosted a webinar on developing government is committed to developing benefit from the blue economy. The blue enterprises and private enterprises to projects.

Zanzibar's blue economy set to provide 9000 jobs with over 180 projects

CHINEDU OKAFOR | December 4, 2022 8:45 AM



07 DEC 2022 Zanzibar pulls 1.5 trillion to blue economy

THE GUARDIAN REPORTER
ZANZIBAR NEWS
The Guardian

FOR the past two years, the Zanzibar Investment Promotion Authority (ZIPA) has registered a total of 39 blue economy-related projects, it has been learned.



Shida Makame, the ZIPA director of facilitation and services, told journalists here that there are 30 hotel projects of \$213.16m in value, nine agricultural and fishing projects pegged at \$18.26m and investments on 17 islands taking up \$414.5m, adding up to \$645.92m (over 1.5trn/-).

The Urban West Region leads in the number of investments as seven islands are located within its administrative area, namely Bawe geared for \$30m investments, Changuu (\$26m), Kibandiko/Snake (\$10m) and Kwale (\$68m).

Other targeted islands are Pamunda 'A' (\$15m), Pamunda 'B' (\$15m) and Chapwani (\$20m), she stated.

31 AUG 2023 Project to enhance marine ecologies protection in mainland, Zanzibar

THE GUARDIAN REPORTER
ZANZIBAR NEWS
The Guardian

THE US government through its agency for international development (USAID) is supporting the 'Heshimu Bahari' project that aims to strengthen marine ecological resilience and its resources.



The project is implemented in Tanga, Mtwara, Lindi, Dar es Salaam and Coast regions within mainland as well as Unguja and Pemba in Zanzibar. The project will cost \$25 million upon completion.

Marine and coastal ecosystems are home to a wide variety of coral reefs, seagrasses, open-ocean pelagic habitats, and mangroves.



\$54m project to create youth jobs in Zanzibar's blue economy

NEWS · 12 JUNE 2023



International Development Bank Group and the Republic of Tanzania have launched the Skills Development for Youth Employability in Blue Economy project. This is a project that will enable Zanzibari youth to find new maritime and other blue economy jobs.

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...”



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MARES – The New Ocean Economy



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

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A compelling economic solution for climate change...

MARES – principles in action

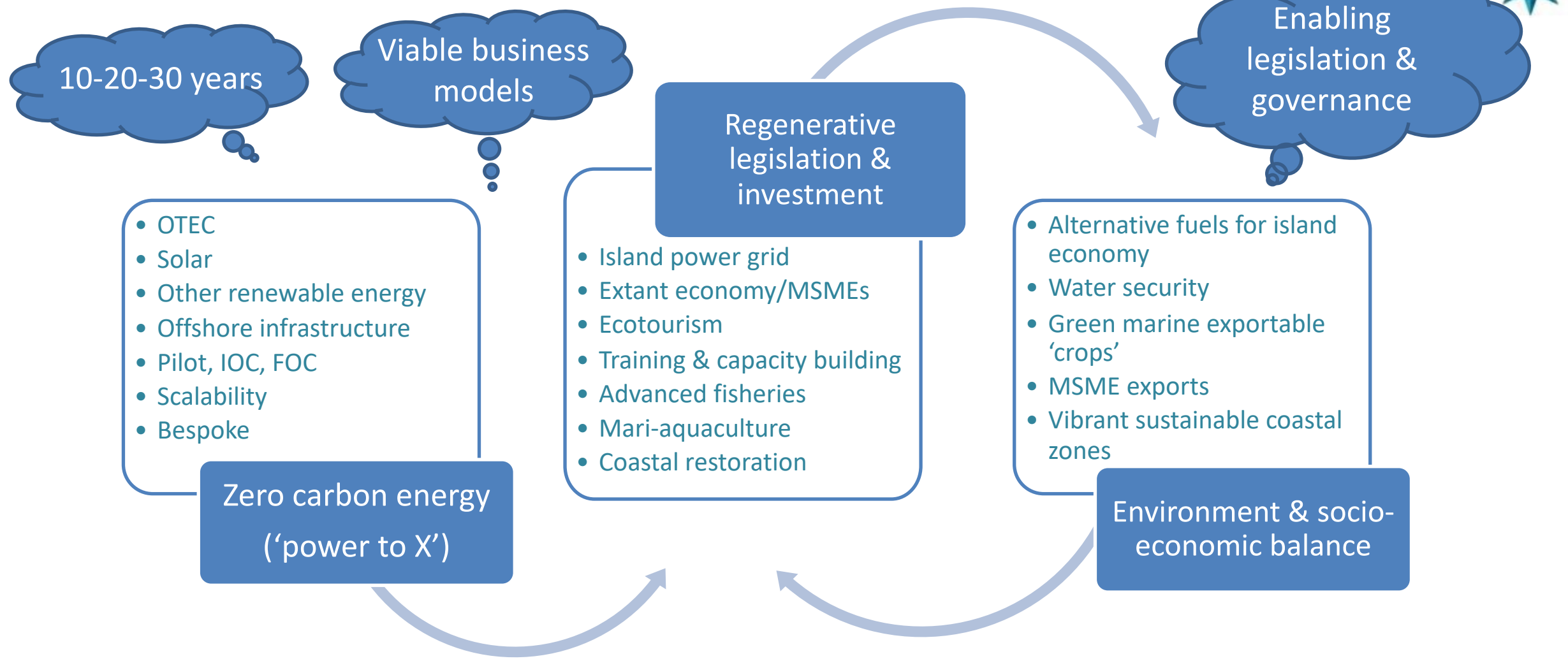


- Harnessing marine renewable energy
 - Ocean thermal energy conversion
 - Floating solar renewable energy
- Using MRE to regenerate coral reefs
- Next generation marine aquaculture
- Green marine hydrogen
- Rigs to reefs for ocean regeneration

[ADB Data Room - MARES](#)

MARES starts with marine renewable energy...

A long-term Blue Economy programme



Linear, extractive & unsustainable **Scalable, circular, regenerative**

Marine Renewable Energy is the catalyst



Harnessing the Power of the Ocean Can Help Save the Planet, According to UK Research Group

Wednesday, 22 December 2021

Our oceans have become overrun by the climate crisis.



Sea levels are rising, coral reefs are bleaching dramatically and overfishing is rampant, jeopardizing marine life and ocean health. Our oceans are a materials provider and have the capability to reduce our dependence on fossil fuels for energy. They are the world's largest untapped source of renewable energy, can store heat and regulate the Earth's climate. In time for post-COP26 conversations on climate targets, **UK Research and Innovation (UKRI)** has produced an 'Oceans For Good' infographic illustrating the many benefits of our blue planet.



Pixabay

- 50-60% of the economic benefit of wave energy is expected to be generated in coastal areas, providing jobs and growth for coastal communities
- 15% of the UK's current electricity demand could be delivered by wave energy
- 30GW of offshore wind capacity could be installed in the UK by 2030

• 3.5 billion people depend on the ocean as their primary source of food



WORLD
ECONOMIC
FORUM

Join us

Wave energy: can ocean power solve the global energy crisis?

Mar 22, 2022



Wave energy might help meet the increasing global electricity demand.
Image: Polina Kuzovkova/Unsplash

Ocean Water Energy can Change the World

 Justyna Matuszak
January 13, 2022

People are looking for diverse sources of renewable energy to reduce air pollution, greenhouse gas emissions, and fossil fuel use. Sun and wind energy are getting more popular, but has anyone heard of sea-produced energy?

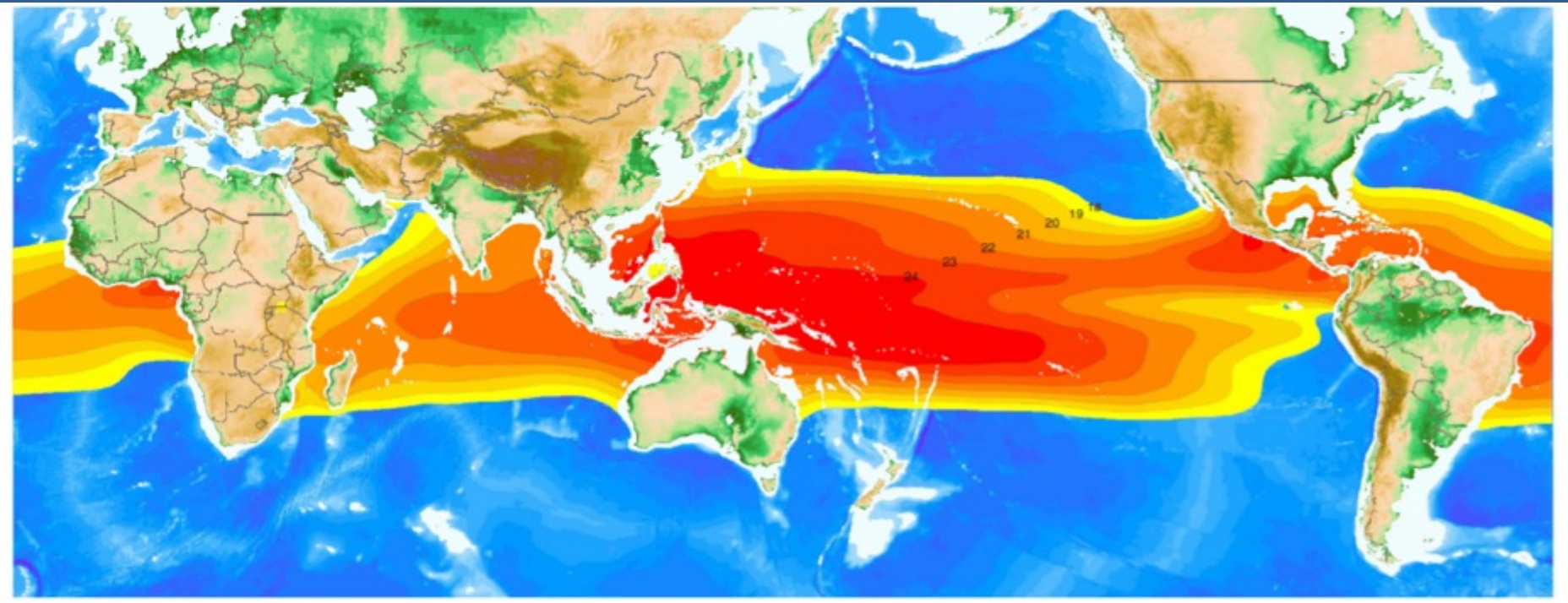
Often the term 'renewable energy' brings to mind solar panels, wind turbines or even geothermal heat. But, they have several drawbacks and are not always as efficient as the ocean can be. The sun, for example, only shines during the day, and even the greatest wind turbine cannot function without wind. With these sources, it is practically impossible to save energy for later. There are only a few areas in the world where the wind produces electricity all the time.

The solution is the ocean, which covers 70% of the earth's surface. It is one of the most abundant renewable energy sources on the planet. Single wave's energy can power an electric vehicle for hundreds of kilometres and the ocean has the potential to power the entire world twice over.

'If it were to reach its peak potential, offshore wind production could generate more than 120,000 GW (11 times the world's estimated electricity demand in 2040).'



Potential offshore energy



Drawn using Data from World Ocean Atlas 2009 (WOA2009)

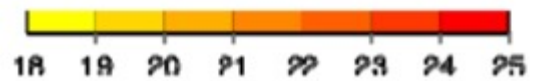


image: Hanwha Q Cells

We need to scale...

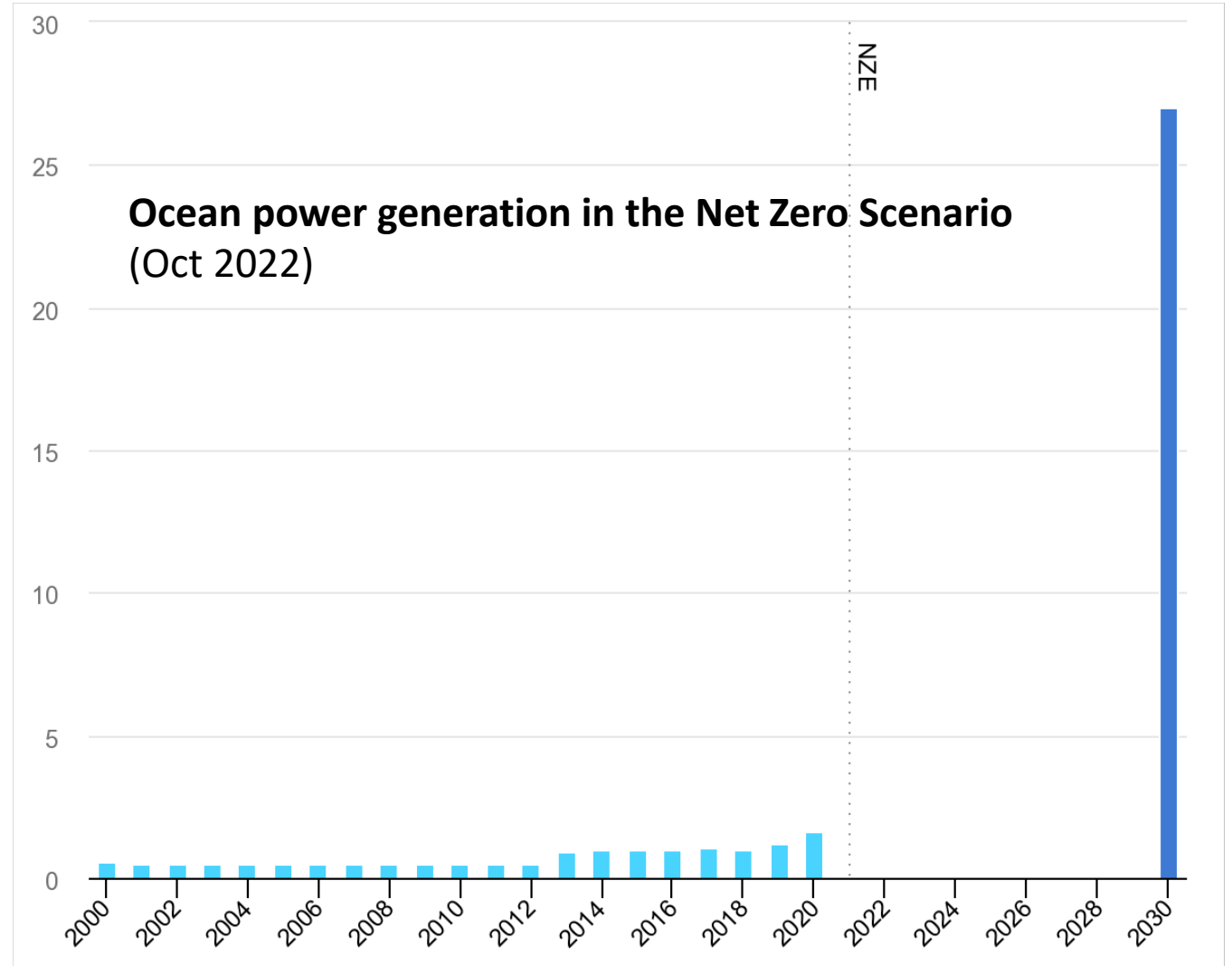


IRENA
International Renewable Energy Agency

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



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

MARES – integrated planning is key



Logos for 'planification de l'espace maritime global', 'marine spatial planning global', 'Supported by the' (with EU flag), and 'WESTMED blue economy initiative' are visible at the top.

MSP as a booster for Blue Economy

Ensuring a coherent planning across the Western Mediterranean region

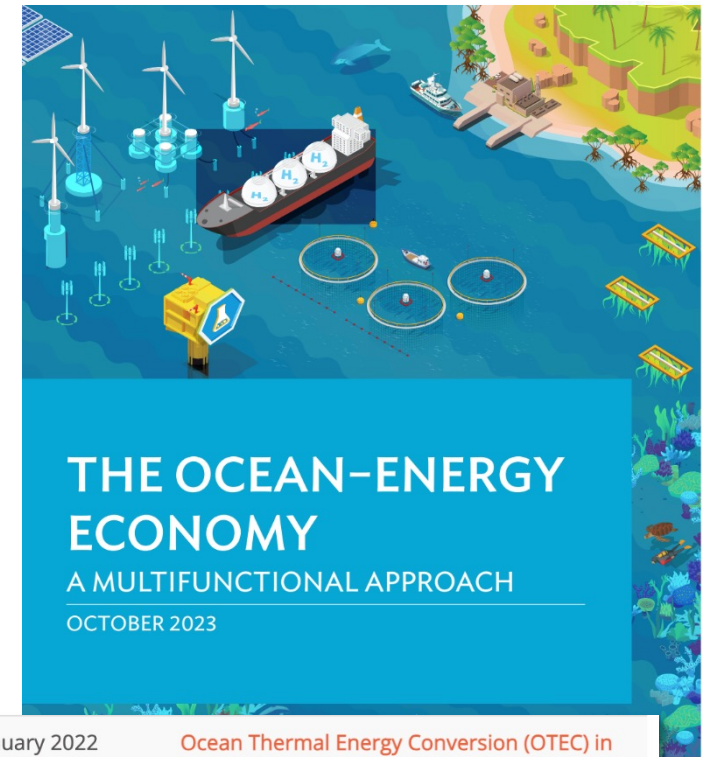
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TRINIDAD AND TOBAGO'S MARINE SPATIAL PLAN FOR THE BLUE ECONOMY

THE INSTITUTE OF MARINE AFFAIRS

MARES outputs

- The Ocean Energy Economy Handbook – a multifunctional approach
- The potential of renewable energy in Palau and RMI
- The feasibility of the MARES approach and MRE in the Philippines
- ADB Data Room - webinars and briefings
- High Level Investor Forum – KL, Feb 23



14 January 2022

Ocean Thermal Energy Conversion (OTEC) in Hawaii and Beyond

Richard Argall is an expert in ocean energy and marine renewables works on Ocean Thermal Energy Conversion (OTEC) projects for Makai Ocean Energy Division...

27 January 2022

Using Marine Renewable Energy for Just Transition to a Regenerative Blue Economy

Humanity is becoming increasingly aware of the challenges to the health of our Oceans. Ocean Acidification is being driven by excess carbon saturation...

6 May 2022

Paddling to Create Cultured Reefs for New Habitats and Coastal Protection

Dr. Will Bateman, CEO of CCell Renewable UK, presented the unique paddle technology to capture Marine Renewable energy to power coastal protection by ...

To recap

We must move from 'take, make and dispose' to regenerative, circular, multifunction Blue Economies built on renewable energy.

The technologies exist; they have been piloted and proven; they must be scaled to achieve the MARES vision.

This is possible with an ambitious approach to integrated planning and investment in our sea spaces.



With more than 130 participants,
28 experts
5 developing member countries
4 plenaries
18 countries
8 project pitches from 6 countries

I believe there will be various low carbon pathways.



Nick Lambert
Founder
NLA International Ltd.

Anything that we do at sea should be done in a regenerative way.

We don't have five oceans and seven seas.
We have one ocean and it's all interlinked.
We all share the same blue economy.

Nick Lambert
Founder
NLA International Ltd

MARES 2.0?



Eight project pitches were presented and received coaching and mentoring from experts.



Subic Blue was announced as the winner of the business plan competition.



ADB challenged the participants to bring forward the MARES approach to its developing member countries.

This means that the ideas, innovations,



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