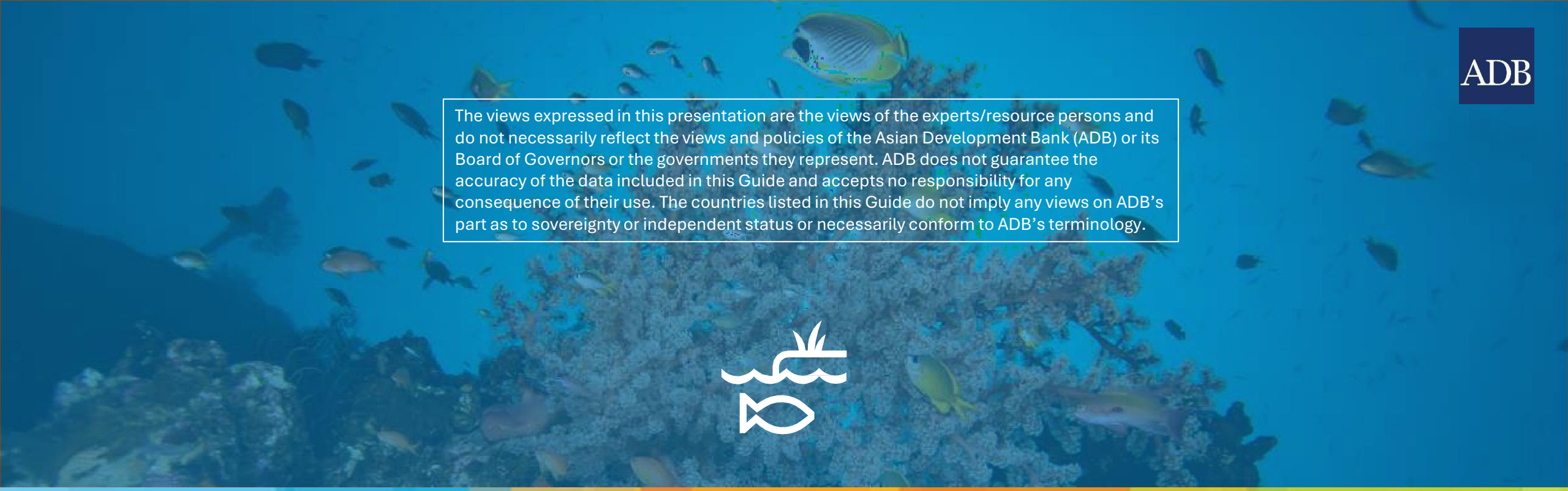

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Marine Aquaculture, Renewable Energy, Reefs & Ecotourism for Ecosystem Services (MAR^{2}E^{3}S)

Steve Peters, Senior Energy Specialist (Waste to Energy), Energy Sector Group,
Sustainable Development and Climate Change Department
Asian Development Bank

3 November 2022

Agenda

1. Introduction to the MARES concept

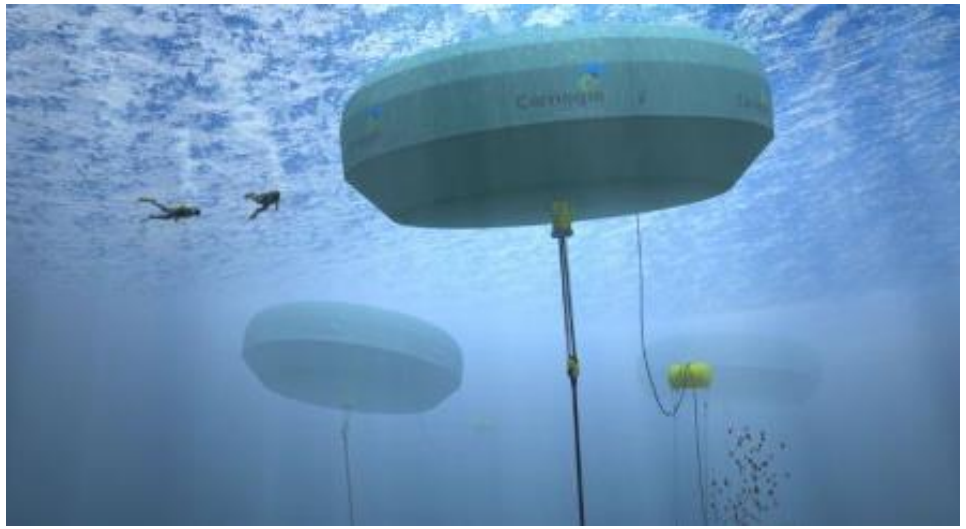
2. Marine Renewable Energy (MRE) Options for Palau

3. Potential projects and sites

4. Next steps

The MARES approach

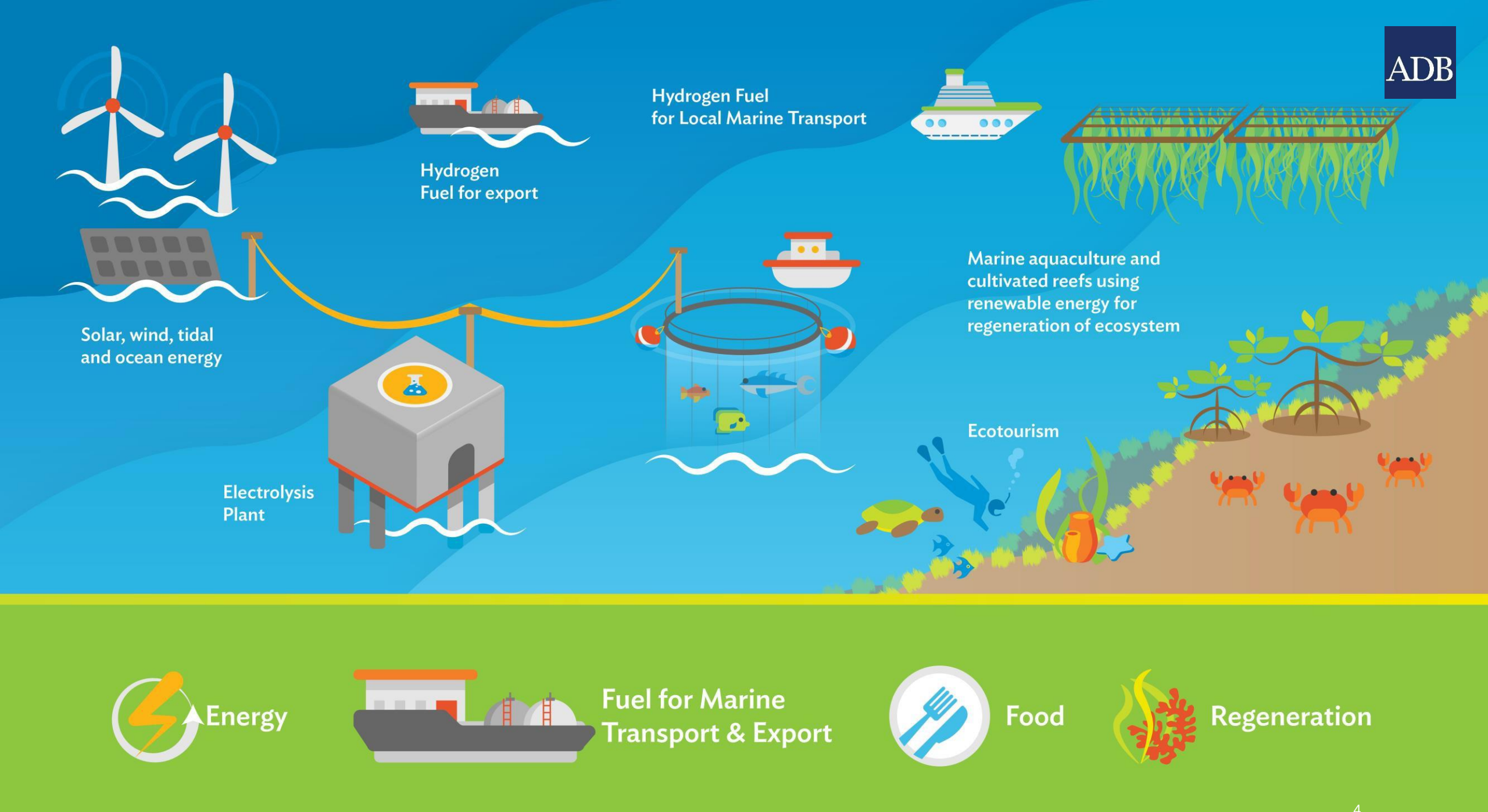
Marine Renewable Energy



Green Hydrogen

Multi-function projects

- Identify and support national aims and objectives.
- Multi-function, technically sound and scalable.
- Financial viability by collocating individual projects.
- Sensitivity to local conditions and stakeholders.
- Making Future-proof use of Exclusive Economic Zones


Hydrogen Fuel
for Local Marine Transport
Hydrogen
Fuel for export
Marine aquaculture and
cultivated reefs using
renewable energy for
regeneration of ecosystem
Solar, wind, tidal
and ocean energy
Ecotourism
Electrolysis
Plant
Energy
Fuel for Marine
Transport & Export
Food
Regeneration

Aligned with ADB Action Plan for HEALTHY OCEANS & BLUE ECONOMIES

ADB Commitment: $5 billion by 2024

Flagship Programs

Coastal Resilience

Marine Plastics

Ocean Finance and Blue Economy

Mainstreaming Oceans in Key Sectors

Ports and Shipping

Wastewater, Sanitation, Solid Waste Management

Agriculture and Water

MARES Components includes marine renewables, alternative fuels (H2), Marine aquaculture, cultivated reefs, rigs to reefs, coastal resilience and eco-tourism

The Palauan context

High likelihood of viability in Palau

Marine solar

Potentially viable in Palau

Wave energy

OTEC

Tidal flows and currents

Offshore wind

May be unviable in Palau

Marine bioenergy

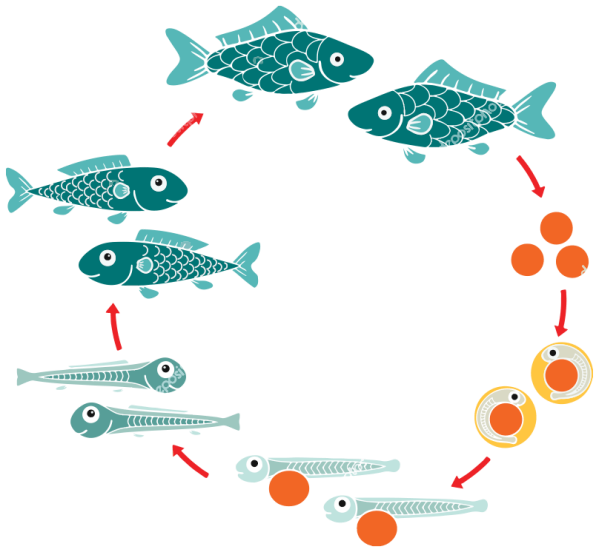
Salinity gradient

Palauan MRE options / indicative estimates

					Levelized Cost of Hydrogen [LCOH] ($/kg)	
Technology	**Range**	**Potential [Theoretical] Capacity (GW)**	**Capital Cost (Million ($/MW)**	**Levelized Cost of Energy (LCOE) ($/kWh)**	**LCOH (based on LCOE) ($/kg)**	**Reference LCOH by 2030 ($/kg)**
Marine Solar	LOW	17.26[(a)(b)(c)]	1.50	0.1339	11.16	2.5[(i)]
	HIGH	678.68[(a)(b)(c)]	1.88	0.0938	7.81	1.55[(i)]
Wave	LOW	0.1519[(a)(c)(d)]	2.70	0.8657	72.14	Not Available
	HIGH	0.3076[(a)(b)(c)©]	9.10	0.0656	5.46	Not Available
OTEC	LOW	0.10[(a)(b)(c)]	3.00	0.0890	7.42	9.51[(j)]
	HIGH	3.80 [(a)(b)(c)]	13.00	0.0205	1.71	6.79[(j)]
Offshore Wind	LOW	13.84[(a)(b)(c)]	3.00	0.1522	12.68	6.14[(k)(l)]
	HIGH	544.30[(a)(b)(c)]	4.00	0.1142	9.51	3.50[(k)(l)]
Marine Bioenergy	LOW	0.04[(a)(b)(c)]	3.50	0.0514	4.28	Not Available
	HIGH	1.51[(a)(b)(c)]	4.50	0.0400	3.33	Not Available
Tidal/Current	LOW	5.07[(a)(b)(c)]	3.30	0.8524	71.03	Not Available
	HIGH	50.74[(a)(b)(c)]	5.60	0.2511	20.93	Not Available
Salinity Gradient[(m)]	LOW	No data	27.50	No data	No data	No data
	HIGH	No data	35.00	No data	No data	No data

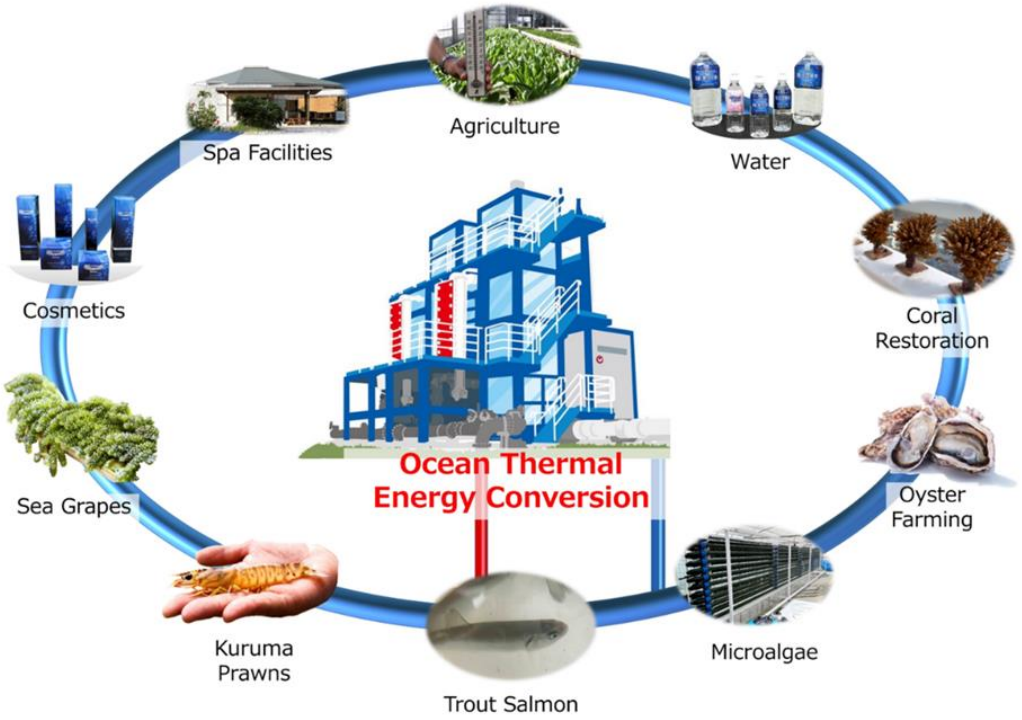
Current shortlisted projects

Oceanic Nursery



Palau Nature Resort

OTEC

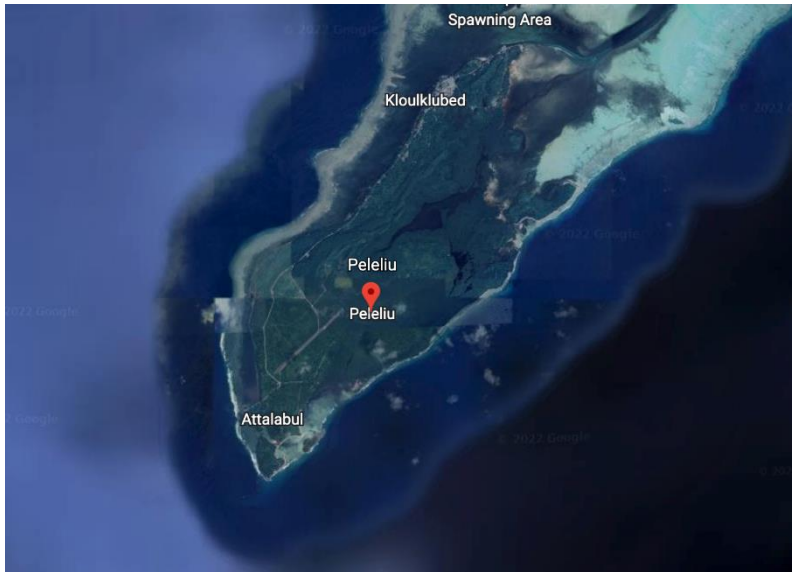


Potential sites

Melekeok

Koror

Peleliu Island



Next steps

Continue to analyze potential projects to arrive at a more targeted shortlist.

Shortlisted projects to take part in a High-Level Investor Forum on 7 February 2023.

Progress towards prefeasibility of each viable multi-function project.

In parallel develop a plan for multi-function marine projects with focus on marine renewable energy generation, green hydrogen production, alternative hydrogen derived fuels, use in regenerative aquaculture, use in integrated coastal protection, use in seafood production/logistics, and use in tourism. This plan to be co-developed with the Government of Palau for local conditions.

Thank You

Our data room has more information at:
https://events.development.asia/learning-events/adb-data-_room-marine-aquaculture-reefs-renewable-energy-and-ecotourism-ecosystem

speters@adb.org