

Ocean Renewable Energy: powering the Blue Economy



MERIC
MARINE ENERGY RESEARCH & INNOVATION CENTER
by **ENERGIAMARINA** SpA®

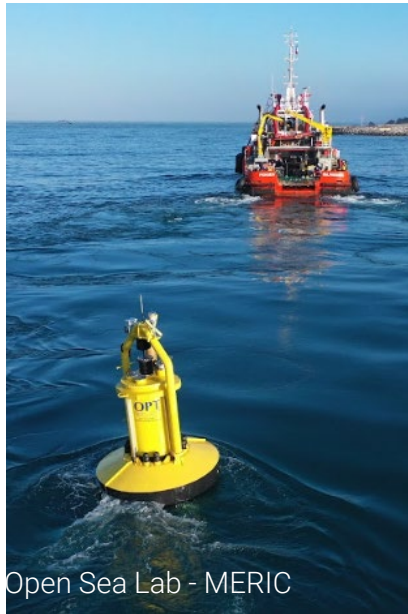


Ocean renewable energy



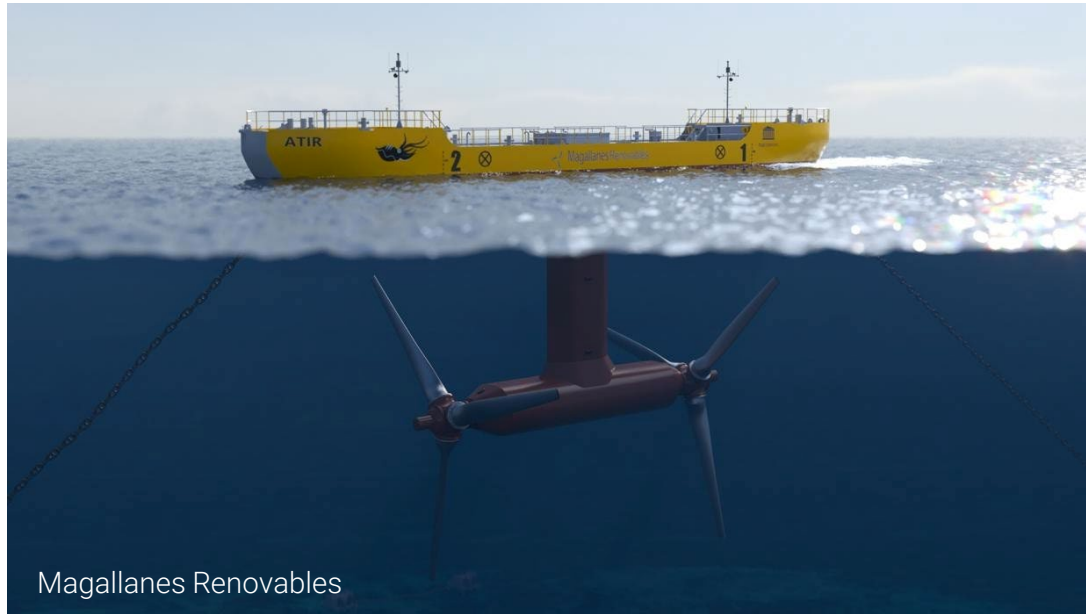
is a reality

Ocean Renewable Energy



Open Sea Lab - MERIC

Wave energy
25 MW
7 MW pipeline¹



Magallanes Renovables

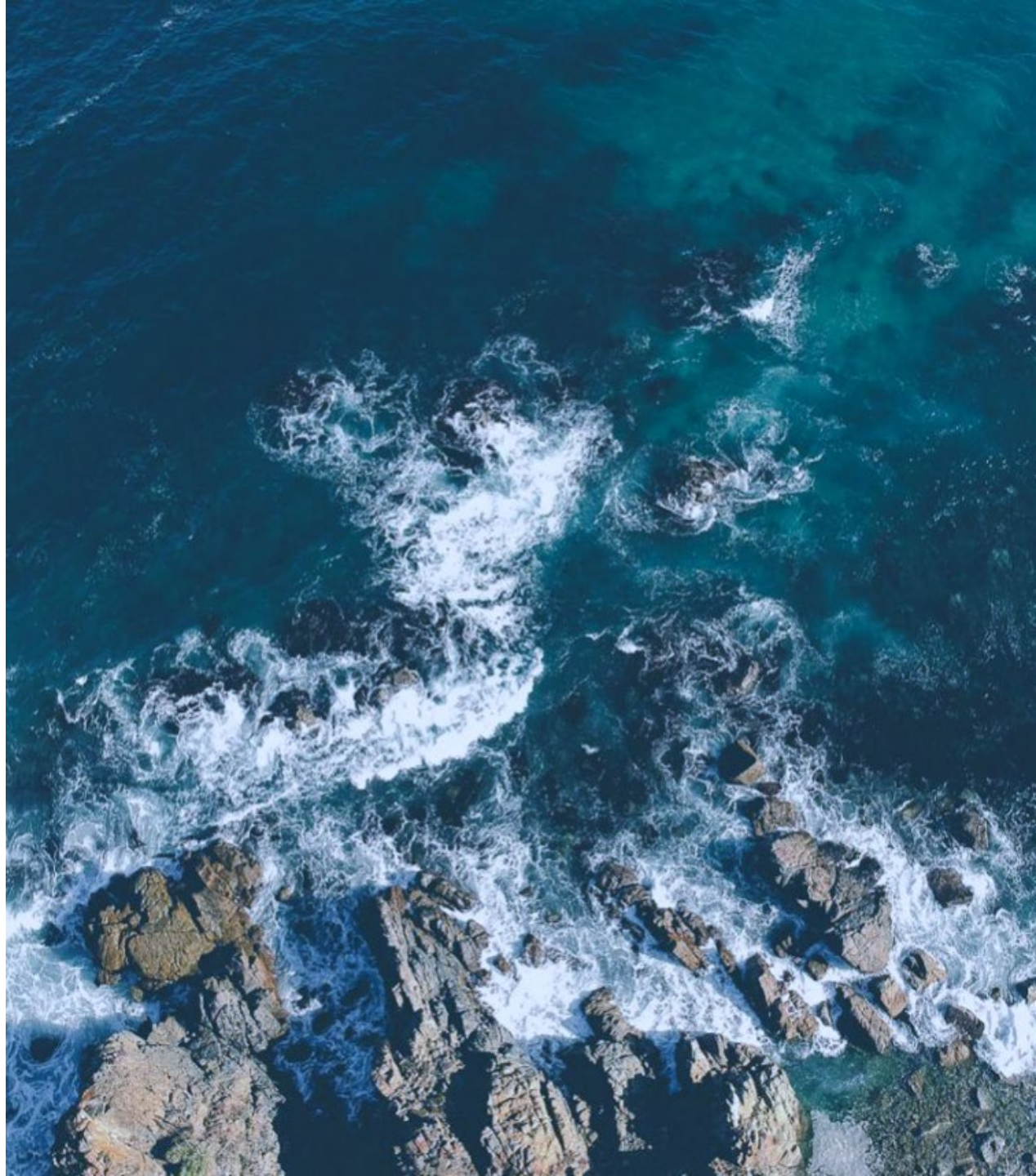
Tidal energy
41 MW
109 pipeline¹



Illustration by Joshua Bauer, NREL

Offshore wind
floating 200 MW
fixed 58.000 MW
12 MW pipeline²

Who we are?
Why ocean
energy in Chile?



Ma r i n e E n e r g y R e s e a r c h A n d I n n o v a t i o n C e n t e r

F u n d e d i n 2 0 1 5



8 y e a r p r o g r a m m e



P u b l i c

Proyecto apoyado por



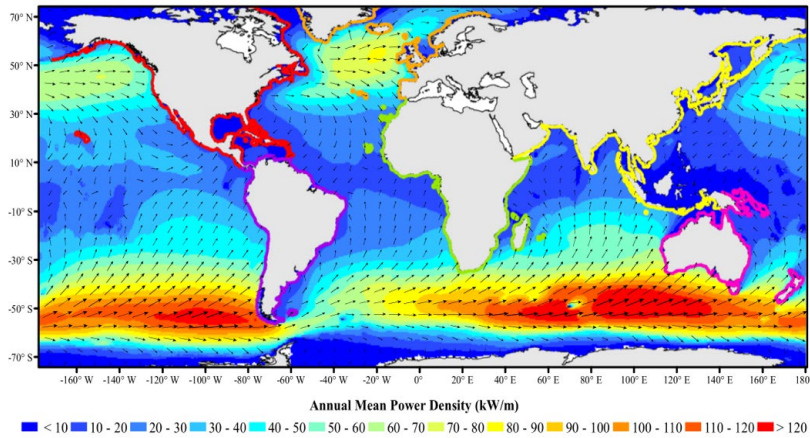
I n d u s t r i a l



Universidad Austral de Chile
Conocimiento y Naturaleza

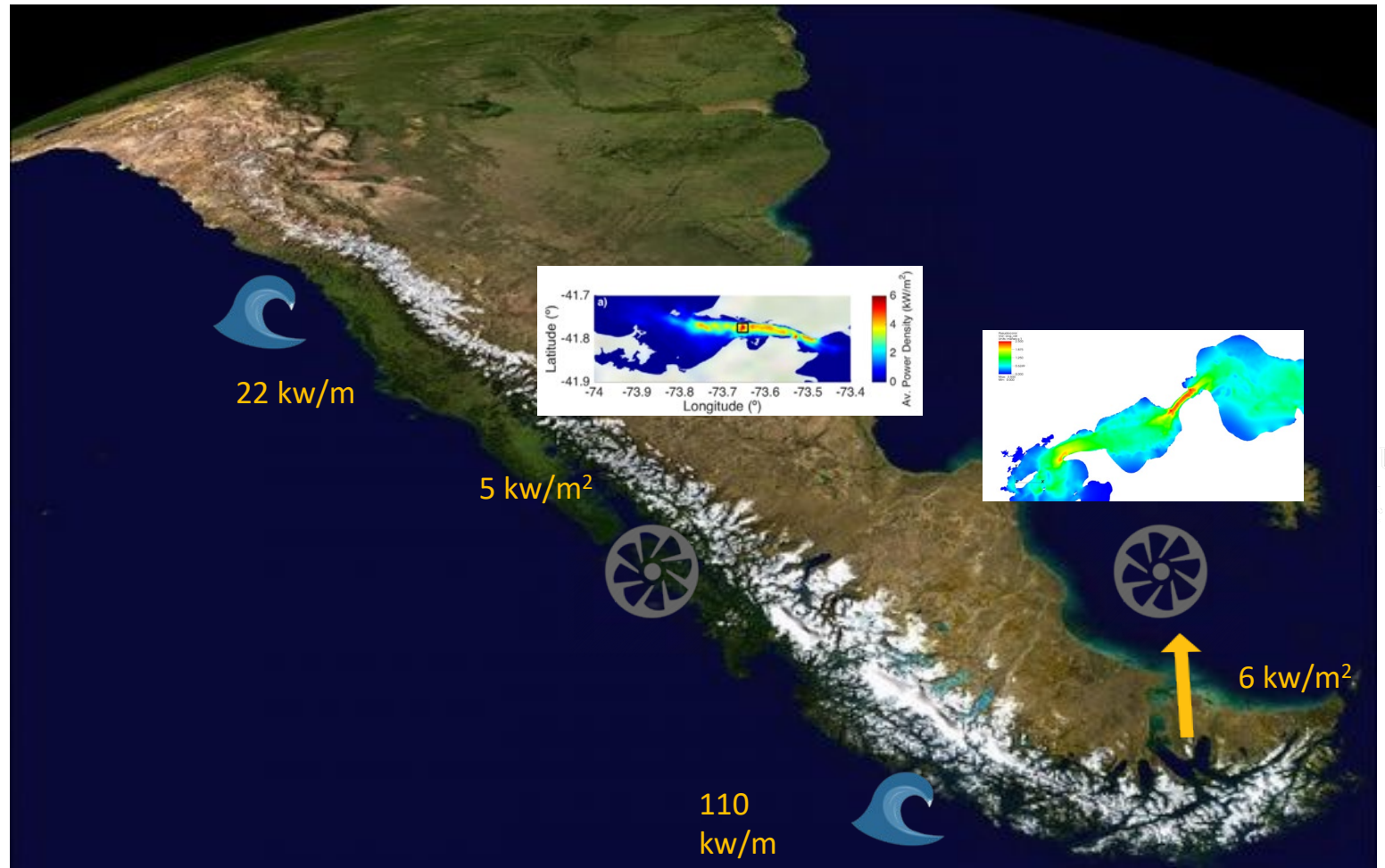
A c a d e m i a

2012 Boost from British Embassy into Chilean Government



Electrical grid installed capacity = 34 GW

Resource	Power to be extracted
Wave	165 GW ¹
Tides	2 GW ²
Offshore wind	957 GW ³



1 Garrad Hassan 2009; 2 Guerra 2016, Suarez 2023



Promote marine energy in Chile and LATAM through:



Develop human capital - technological capacities

Identified industries and supply chain for implementation of MRE Technologies



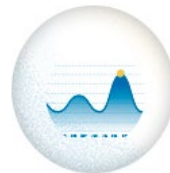
Facilitating the entrance of mature technologies identifying challenges and gaps

Market niches opportunities of marine energy in Chile



Comprehension of Chilean coast and extreme events

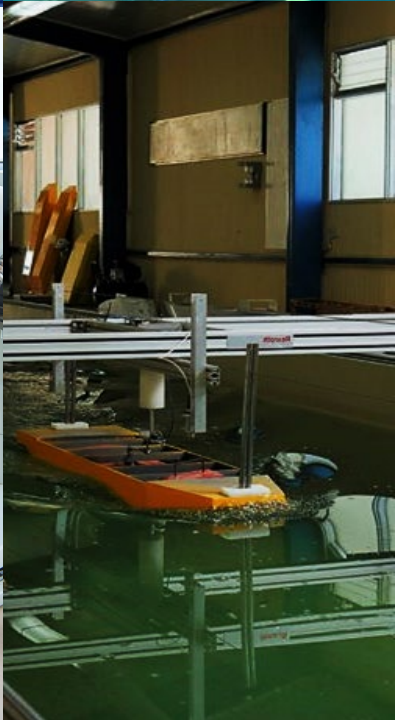
Engagement with international experts and organizations



Installation of first WEC - Open Sea Lab

For over 7 years, EM & MERIC have developed multidisciplinary capacities with no precedent in Chile, through R&D projects :

- Local **Biofouling** studies.
- Cutting edge research in **Marine Corrosion**.
- Wide spectrum of **Energy Resources Assessment**.
- Engagement with providers of the **Maritime Industry**.
- Development of **guidance tools** and **in house sea-monitoring** systems.
- **Test Tanks** for waves and currents simulation for **MRE Technology Adaptation** to local conditions
- **Technology integration** studies with local industry.



OPEN SEA LAB



2 YEARS OF OPERATION

CAPACITIES ON
EXPOSED SEA

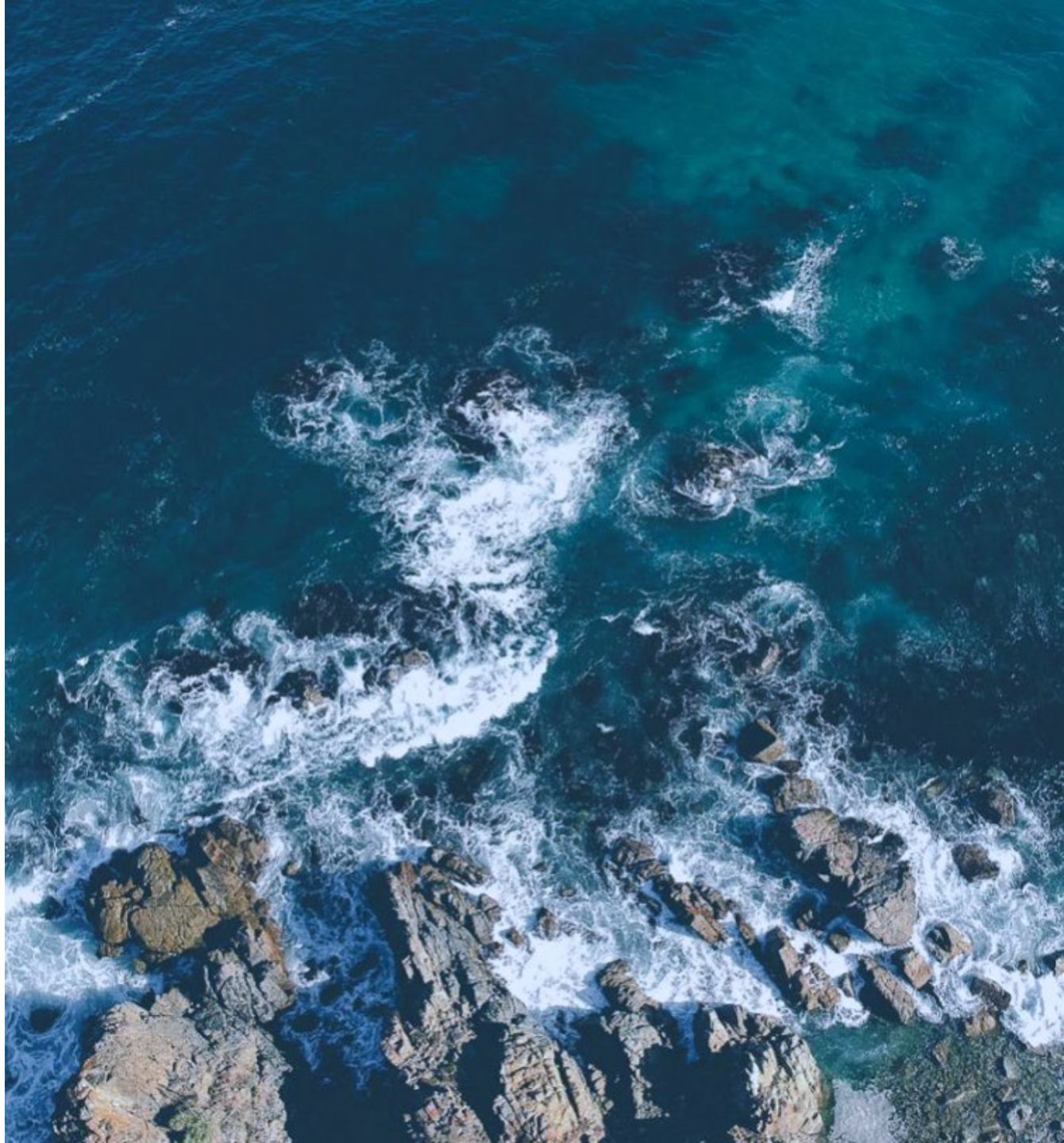
R&D MULTIDISCIPLINARY
TEAM

MARINE SPECIALIZED
MONITORING

UNDERWATER PORT FOR
ELECTRICAL CONNECTION



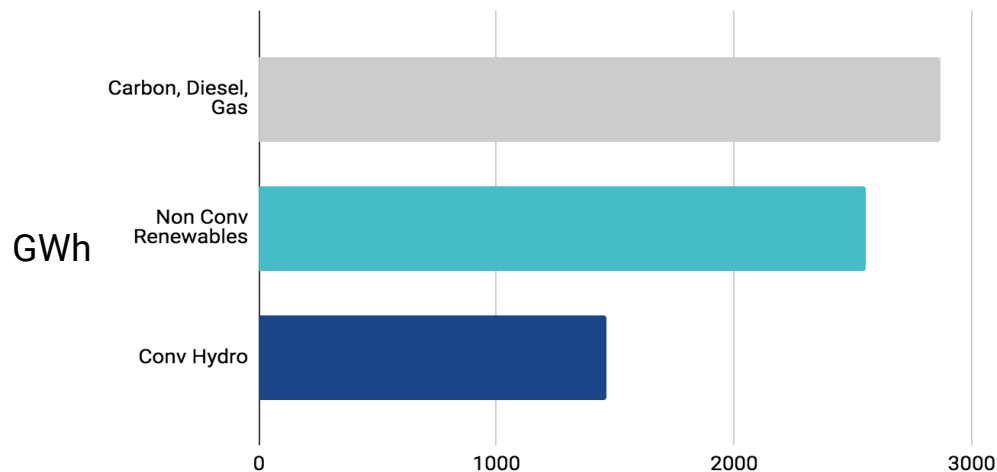
Chilean Context



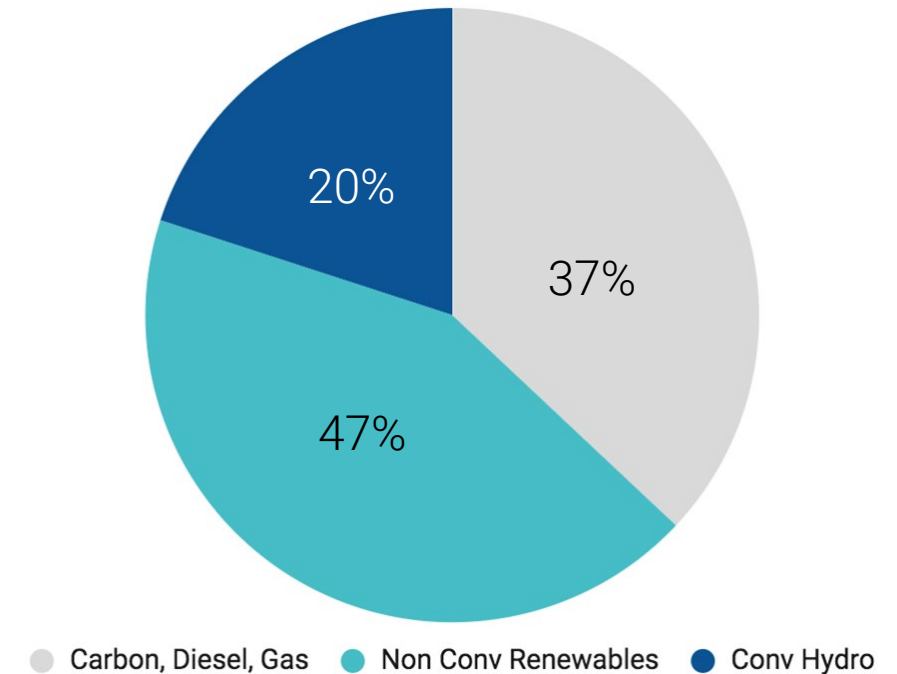
Chilean Energy Scenario

National Energy Policy to 2050

- Decarbonization goals: **100%** retirement or conversion of carbon plants by 2030¹
- By **2030** and **2050**, electrical generation would come in a **80%** and **100%**, respectively, from renewable sources.



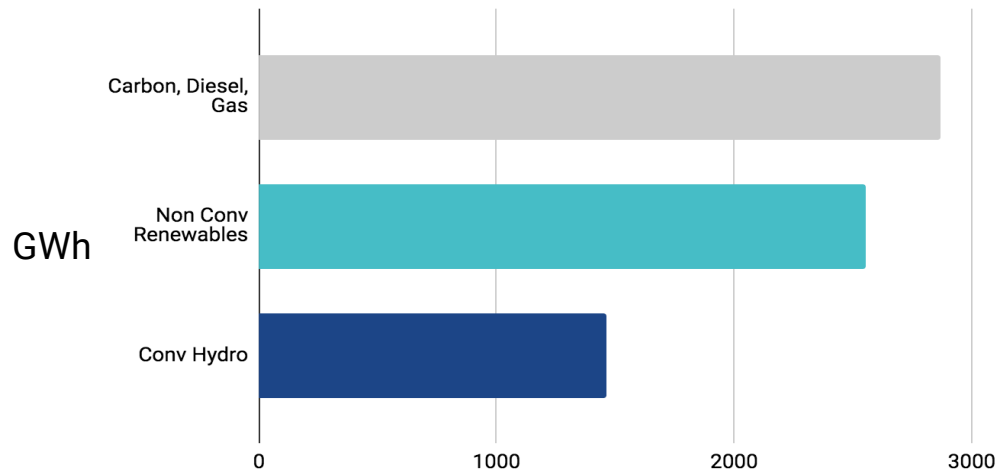
Electrical grid installed capacity = 34 GW



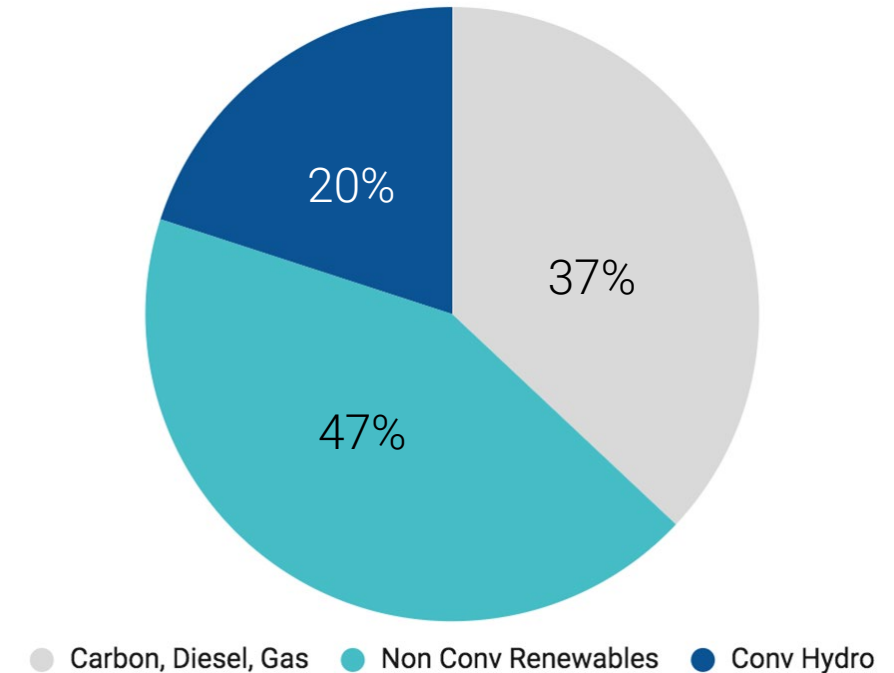
Chilean Energy Scenario

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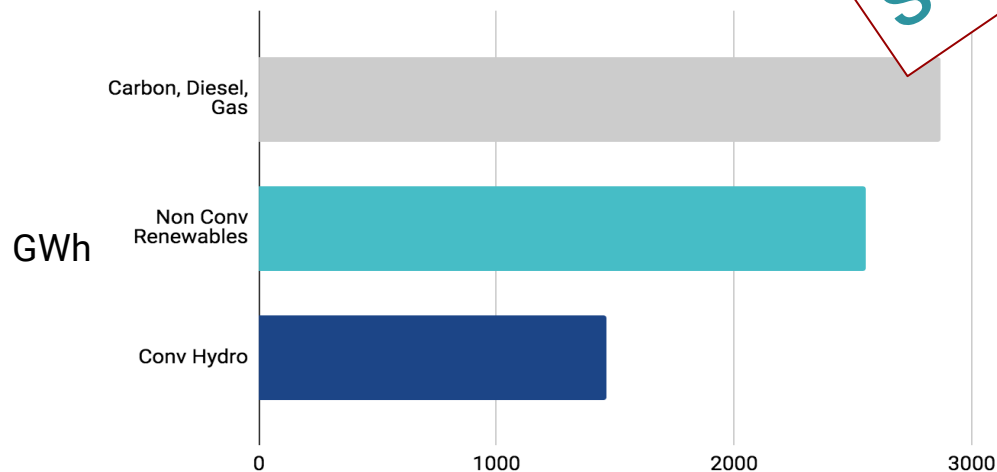
Chilean Energy Scenario

National Energy Policy to 2050

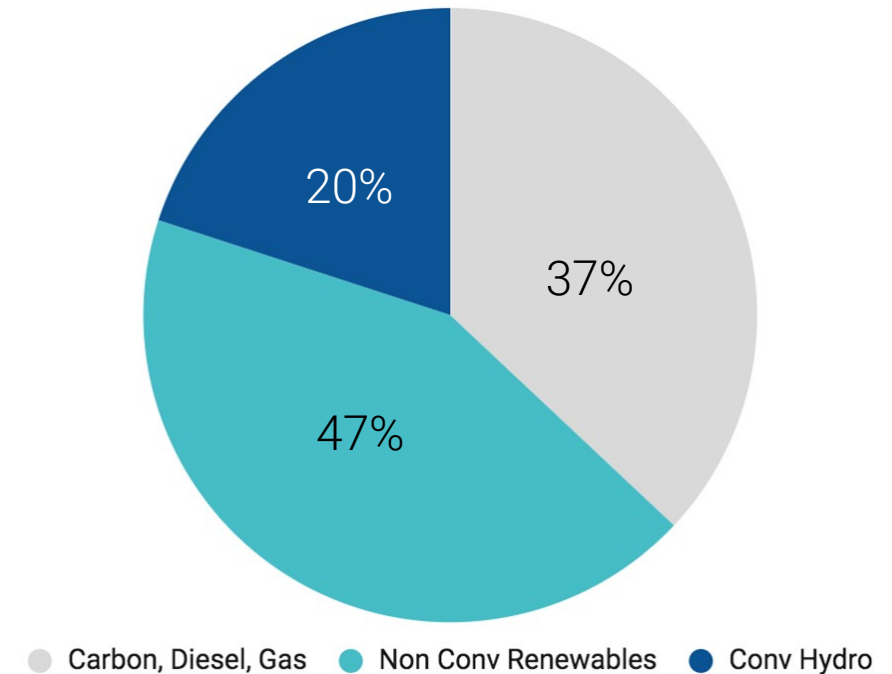
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WATER SCARCITY

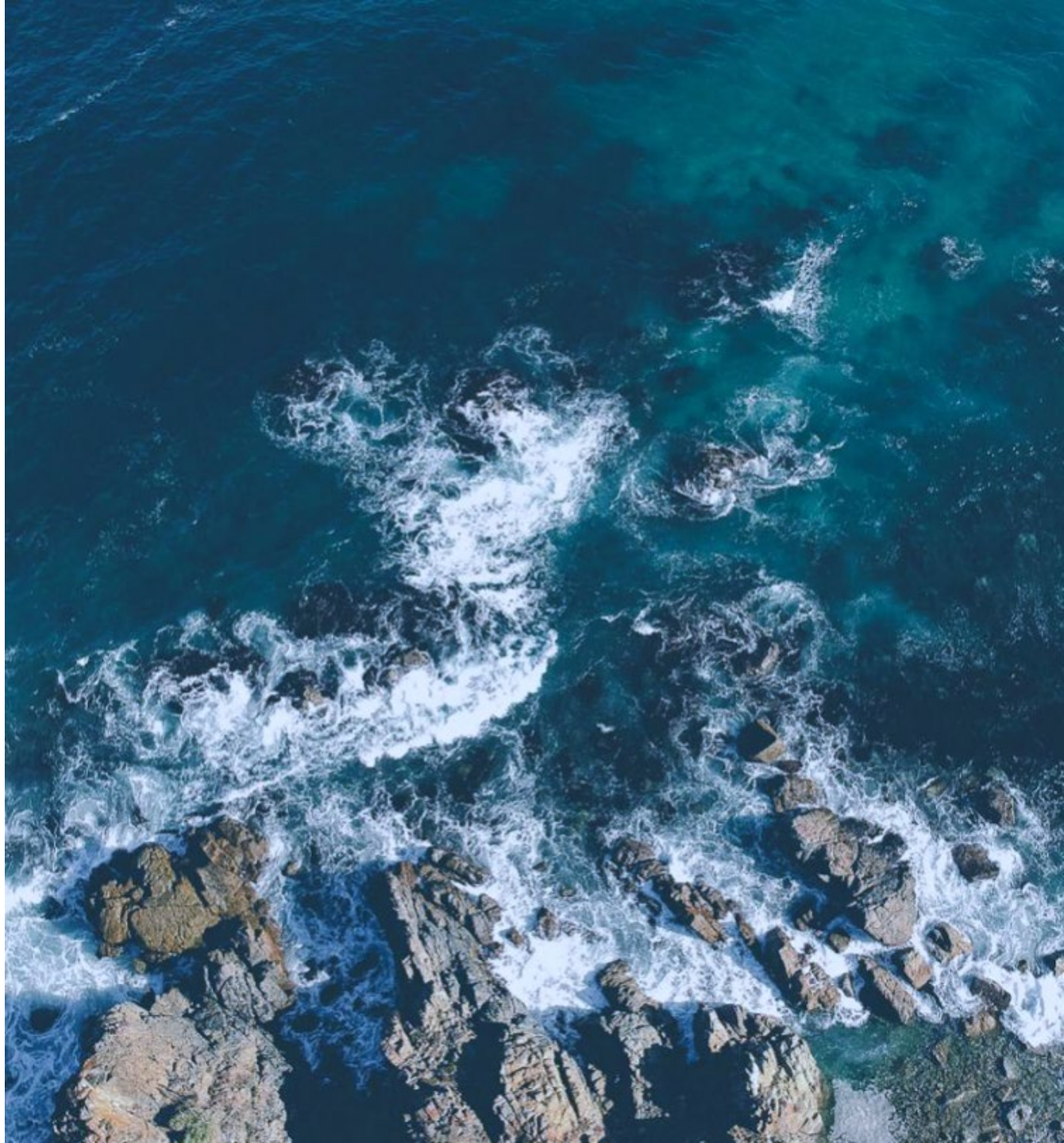
STORAGE



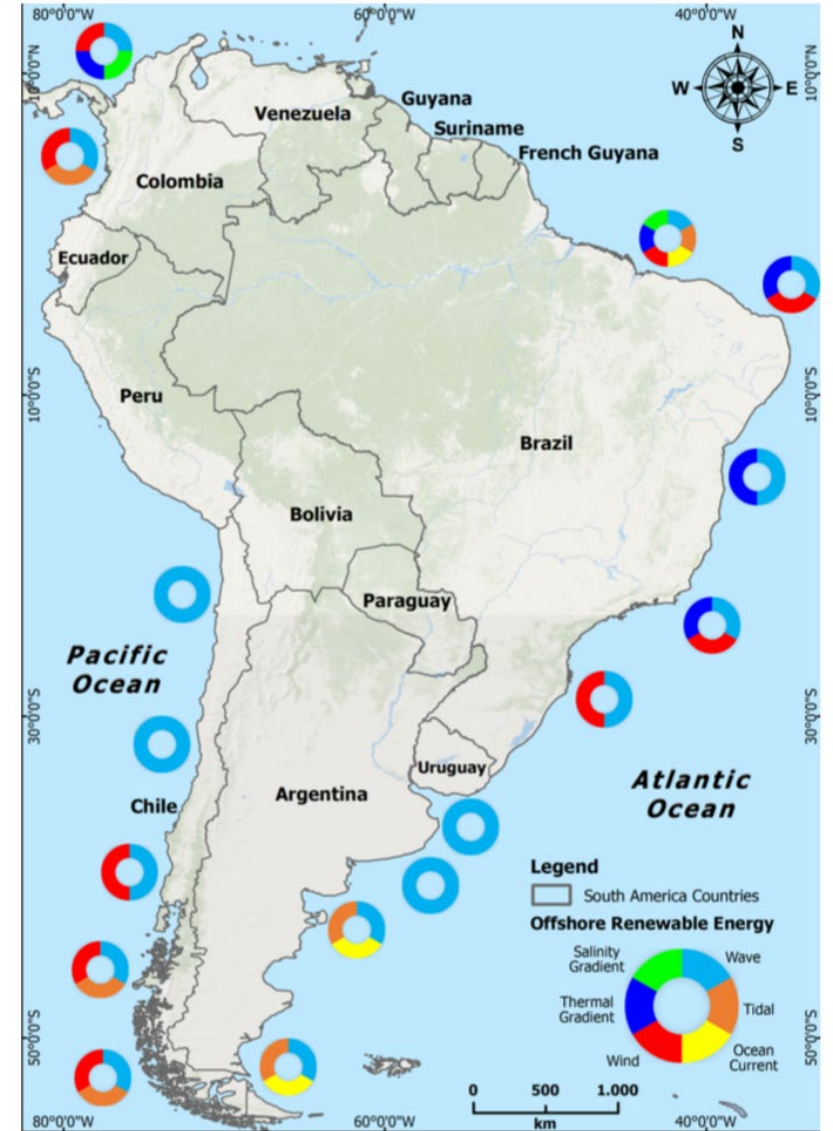
Electrical grid installed capacity = 34 GW



LATAM Context



LATAM



Networking: [PAMEC](#) (Panamerican Marine Energy Conference)
[REMAR](#) (Iberoamerican Network for Marine Energy)



Source: A review of ocean LAB renewable energy in South America



PROGRAMA IBEROAMERICANO DE CIENCIA Y TECNOLOGÍA PARA EL DESARROLLO

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ENTREVISTA

Colombia y Brasil lideran el mercado eólico marino regional

Bnamericas
Publicado: viernes, 04 noviembre, 2022

offshoreWIND.biz Home News Partners Long Read Jobs Events Vessels OEEC2023

71 Offshore Wind Applications Now Filed in Brazil, Proposals Total 176.6 GW

December 8, 2022, by Adrijana Buljan

Home > Hydrogen >

Uruguay unveils offshore wind-to-hydrogen plan

BUSINESS DEVELOPMENTS & PROJECTS

October 7, 2021, by Adrijana Buljan

Uruguay's state-owned oil and gas company ANCAP, together with the country's ministries of industry and environment, has presented a plan for green hydrogen production powered by offshore wind, which could see a tender launched in a couple of years.



ANCAP

Under the new H2U Offshore programme, ANCAP has called for interested parties to submit offers comprising a work plan, outlining the benefits for the country, and detailing on the possible participation of ANCAP.

A photo from ANCAP press conference on H2U Offshore Programme

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NEWS

Colombia readying offshore wind auction

Bnamericas

Published: Monday, May 08, 2023

Tenders Offshore Wind Green Hydrog...



The Colombian government has unveiled plans for an offshore wind auction amid broader efforts to decarbonize the energy sector and kick-start green hydrogen production.

Energy minister Irene Vélez said the Andean country would be the first in Latin America to offer power purchase agreements from offshore wind projects.



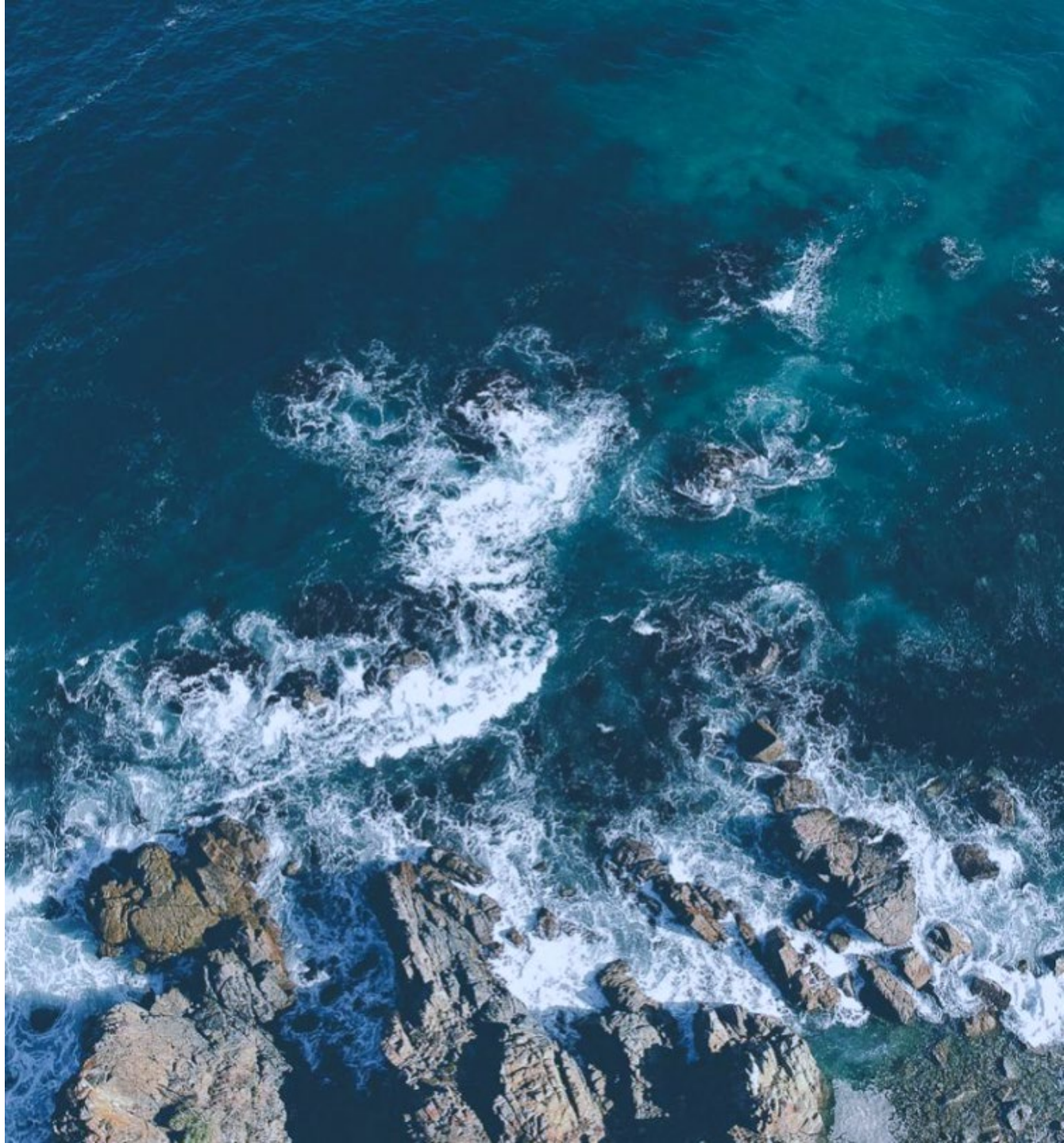
Ewind, hydrogen, News Menu, offshore, Uncategorized, Wind Energy

Abeeólica: Brazil will enter 2023 with regulated offshore wind energy

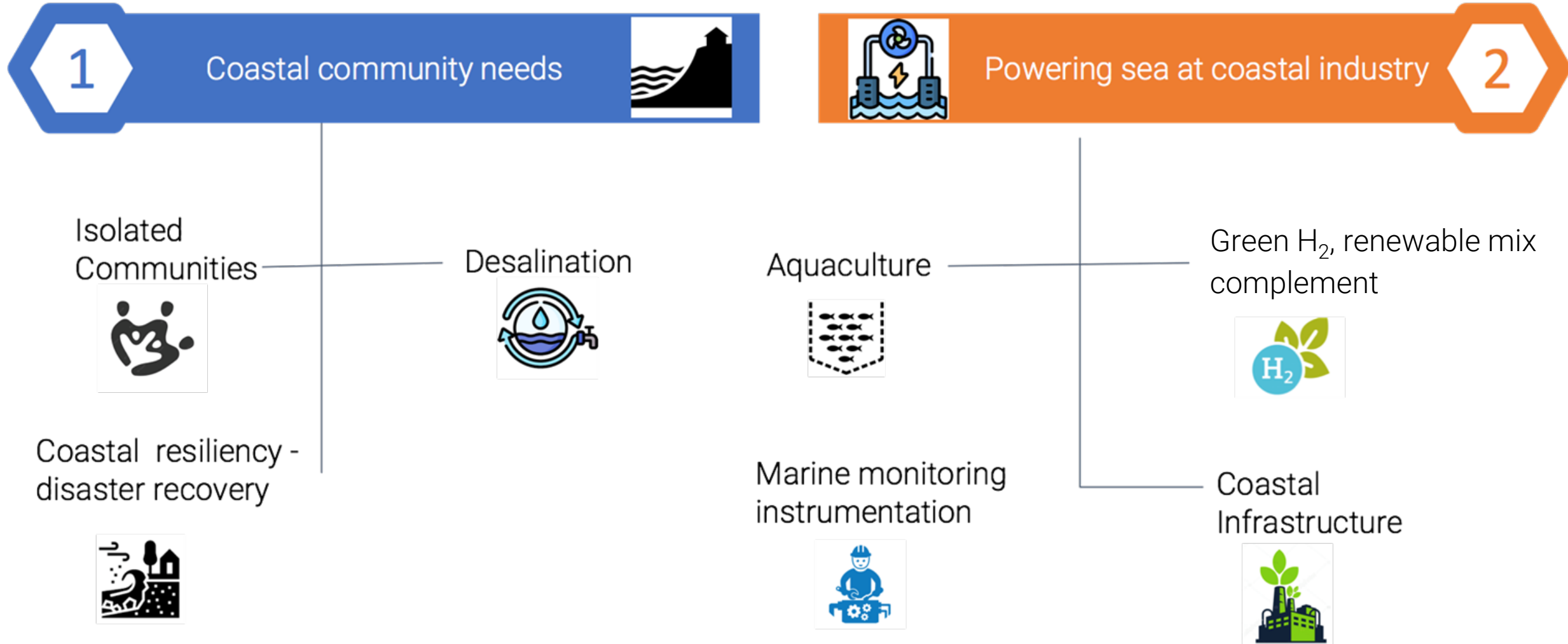
February 17, 2023 reve

A total of 169 gigawatts (GW) of offshore wind farm projects are al-

Ocean Energy Opportunities in developing countries



Powering Blue Economy, over the electrical grid



Isolated communities

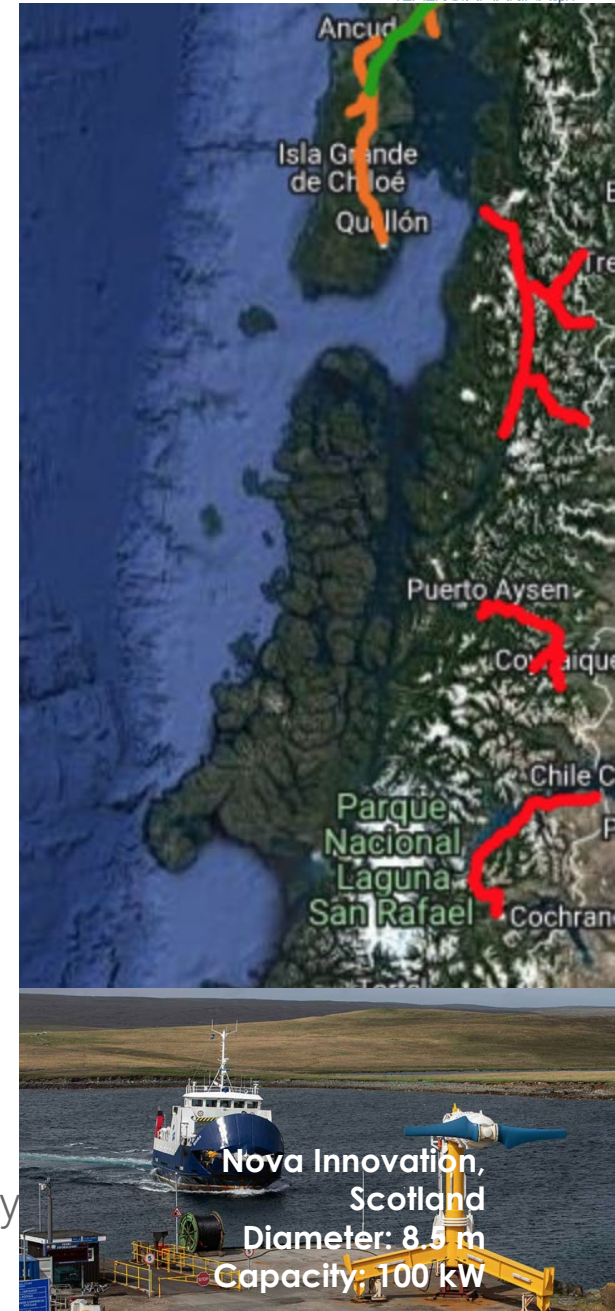
- 9% of global population without access to electricity, from this critical number in coastal and island areas¹
- Local government subsidies high cost warty diesel supply
- Risks of contamination and leaks
- Risks of not receiving the supply constantly
- Volatility in fossil fuel costs

Opportunity

- ORE costs competitive with high diesel costs
- Autonomous microgrid

¹ World Development Bank

Case Study:
 Islands in Los Lagos Region
 0,75 - 2,1 USD/kWh Diesel
 Subsidy 5,3 Million USD annually
 5,800 users



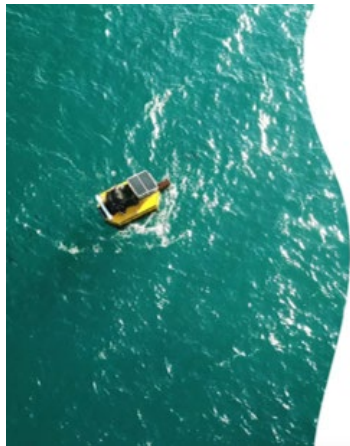
Desalination

Oneka scores multi-million investment in wave-powered desalination system

BUSINESS DEVELOPMENTS & PROJECTS

July 9, 2021, by Amir Garanovic

Canadian company Oneka Technologies has closed a Ca\$5.5 million (\$4.4 million) financing round, bringing in Innovacorp, Baruch Future Ventures and MANN+HUMMEL as its latest partners.



**ONEKA SETS FOOT
IN CHILE**

\$4.9M IN FUNDING



WATER STRESS BY COUNTRY

ratio of withdrawals to supply

- Low stress (< 10%)
- Low to medium stress (10-20%)
- Medium to high stress (20-40%)
- High stress (40-80%)
- Extremely high stress (> 80%)

This map shows the average exposure of water users in each country to water stress, the ratio of total withdrawals to total renewable supply in a given area. A higher percentage means more water users are competing for limited supplies. Source: WRI Aqueduct, Gassert et al. 2013

AQUEDUCT

WORLD RESOURCES INSTITUTE

Opportunity

- Offshore desalination systems
- Reducing emissions
- Not grid dependance
- Secure clean water in disaster

Fuente : [World Resources Institute - ONEKA in Chile](#)

Dirección General de Aguas, MOP

Aquaculture integration

Global trend 30,3% production increase by 2030.

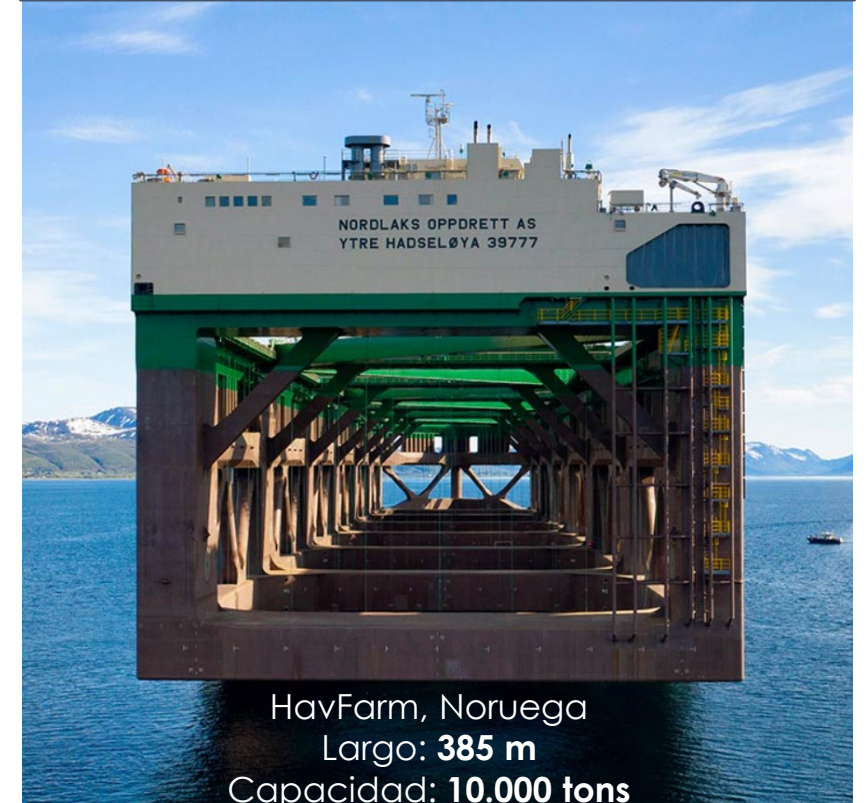


Migration of aquaculture to offshore

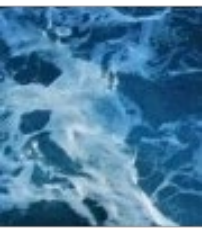
Opportunity

- ORE to power platforms and structures capable to survive in extreme sea conditions.
- Autonomous power systems and resiliency for their production.
- Minimizing their environmental impacts.
- Potential to develop multiuse platforms

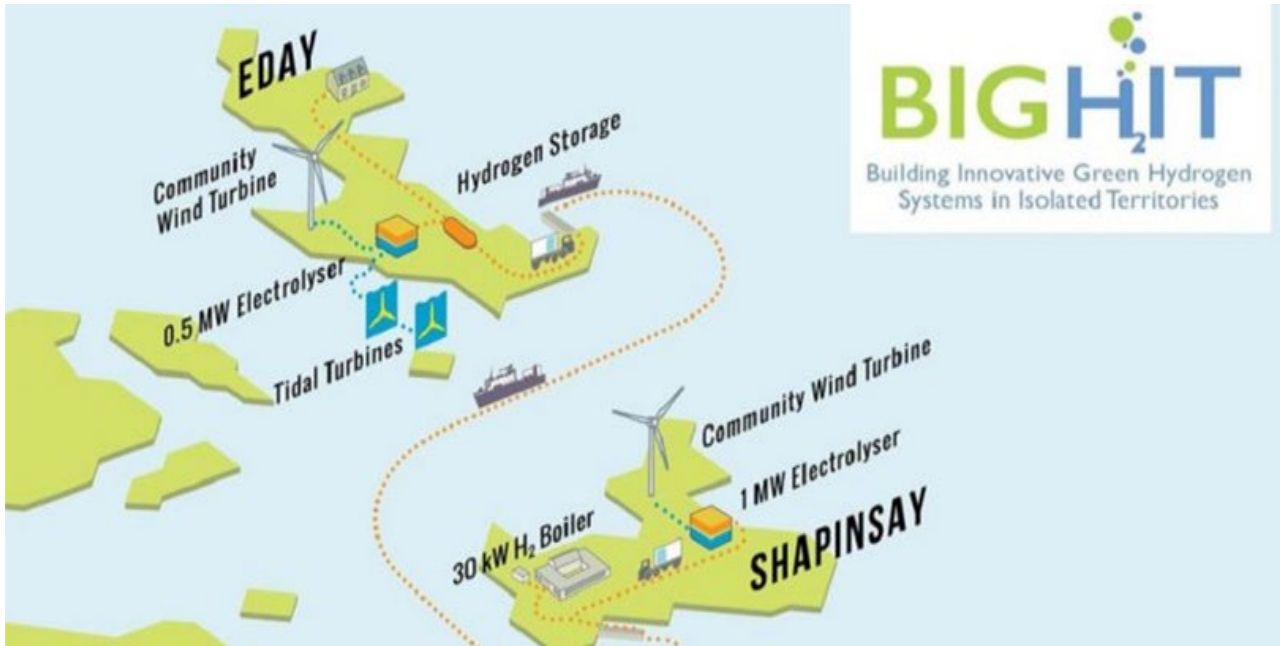
Offshore aquaculture:
Setting out to feed the
world



HavFarm, Noruega
Largo: **385 m**
Capacidad: **10.000 tons**



Complement for Green H₂ renewable energy mix



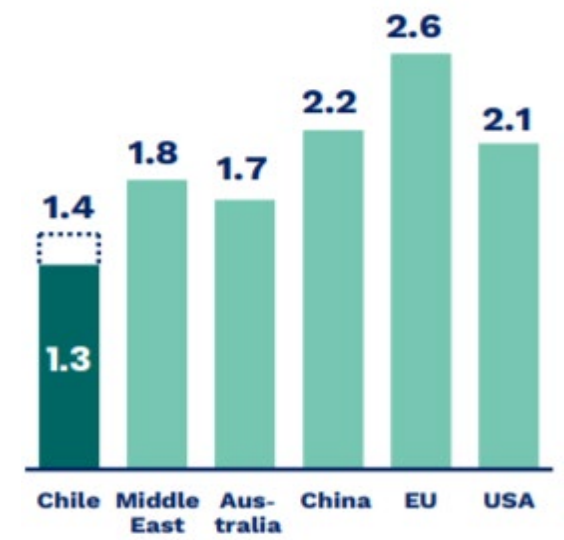
Tidal energy site in Orkney in hydrogen 'first'
 © 13 September 2017



Scotrenewables' prototype tidal energy converter - the SR2000 - was involved in the first production of hydrogen

Proyecto Big Hit, Orkney, Escocia.

Proyección LCOH 2030, Chile

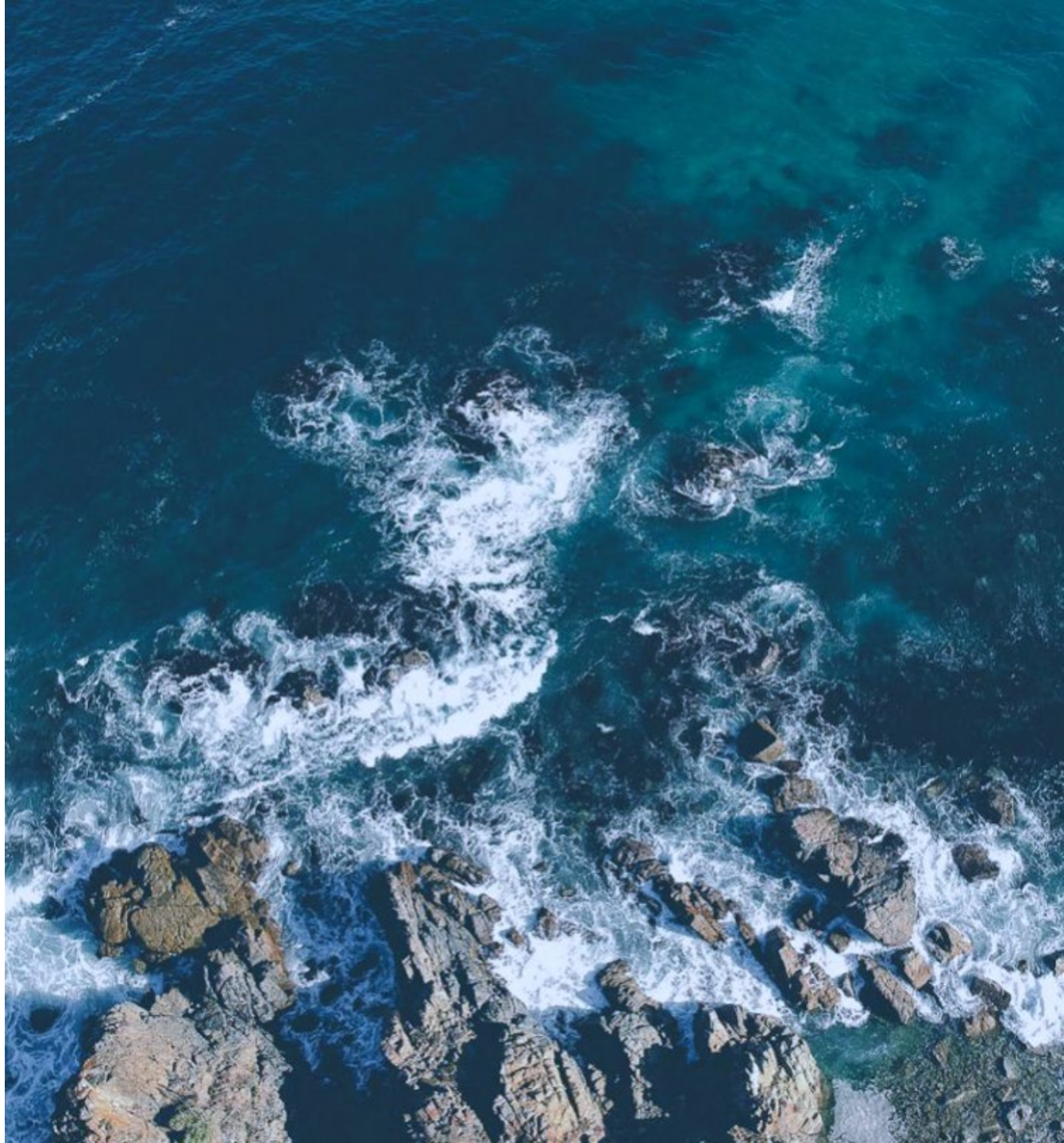


[Estrategia Nacional de Hidrogeno Verde, Ministerio de Energía, 2020](#)

Opportunity

- ORE strategy could be defined towards the Green hydrogen strategies.
- Complement from different renewable sources for achieving 100% green

Triggering Ocean Energy in Developing Countries





Challenges and actions

Challenges

No strategy for ORE

Unclear use of sea space

Lack of multisectorial network
(coastal communities and industries)

High CAPEX cost

Technological capabilities for offshore structures installation

Actions

Multisectorial committees to discuss use of space and preliminar design of ORE strategy

ORE to be integrated on the Green H₂ strategy

Initial funding scheme through international funds to reduce capex (>15 MM USD for pilot project)

Alliances with international expert organizations

Incentive strategy for engagement and technology transfer with developed offshore industries.

Cases

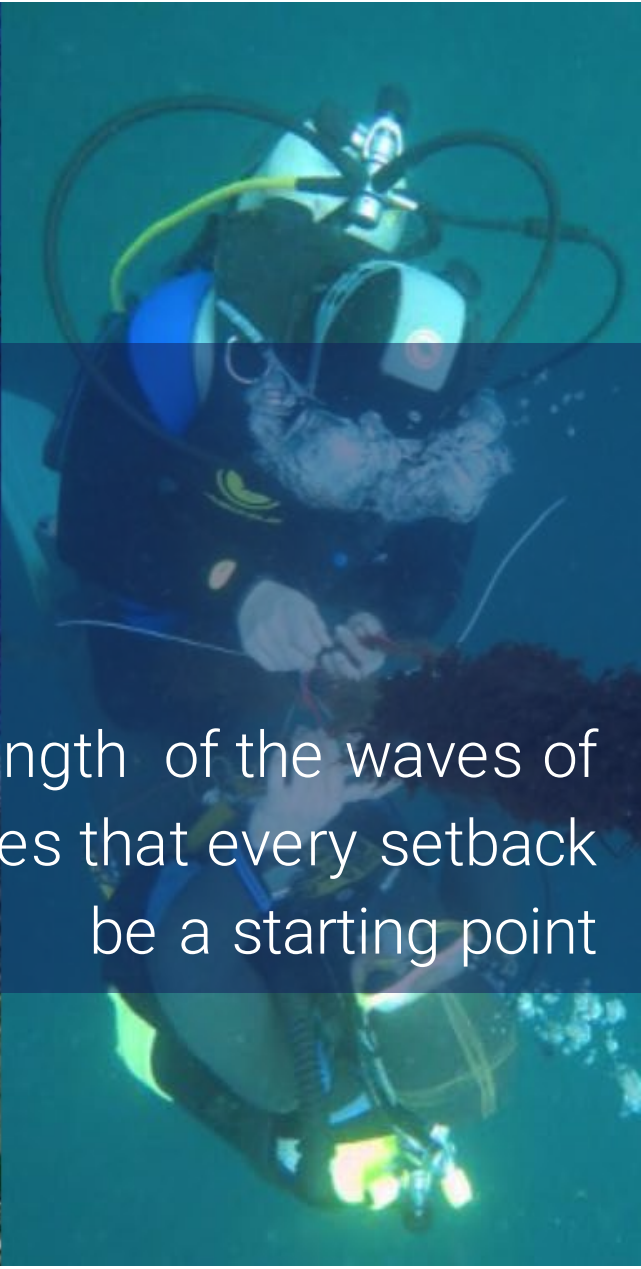
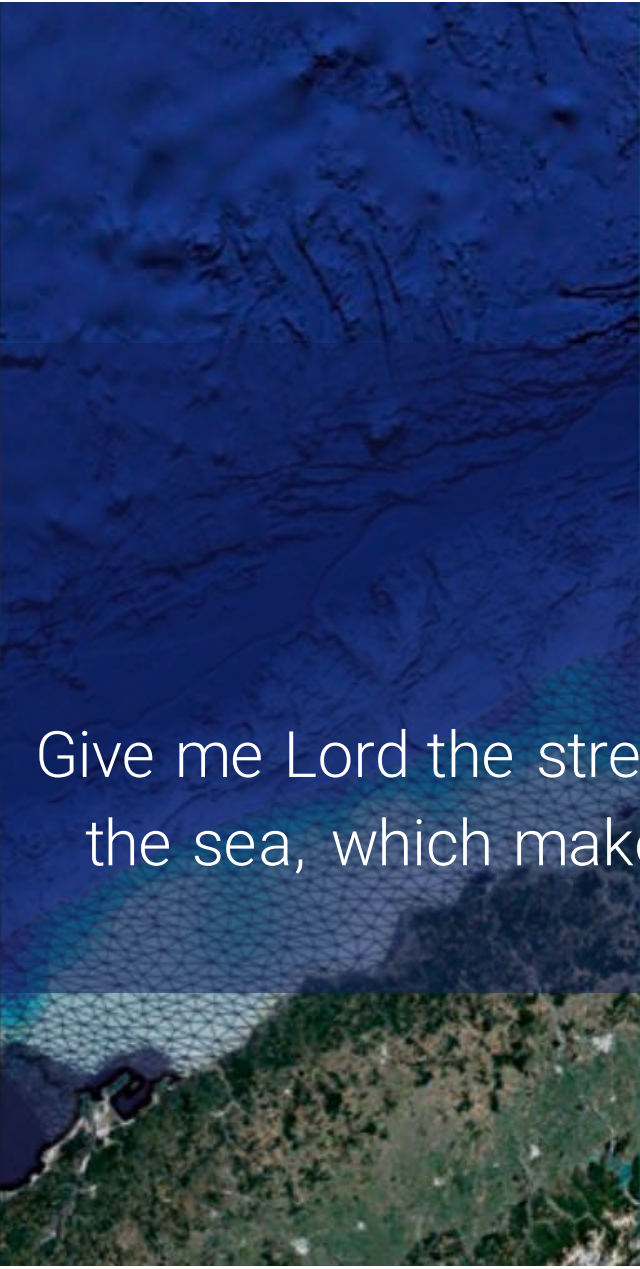
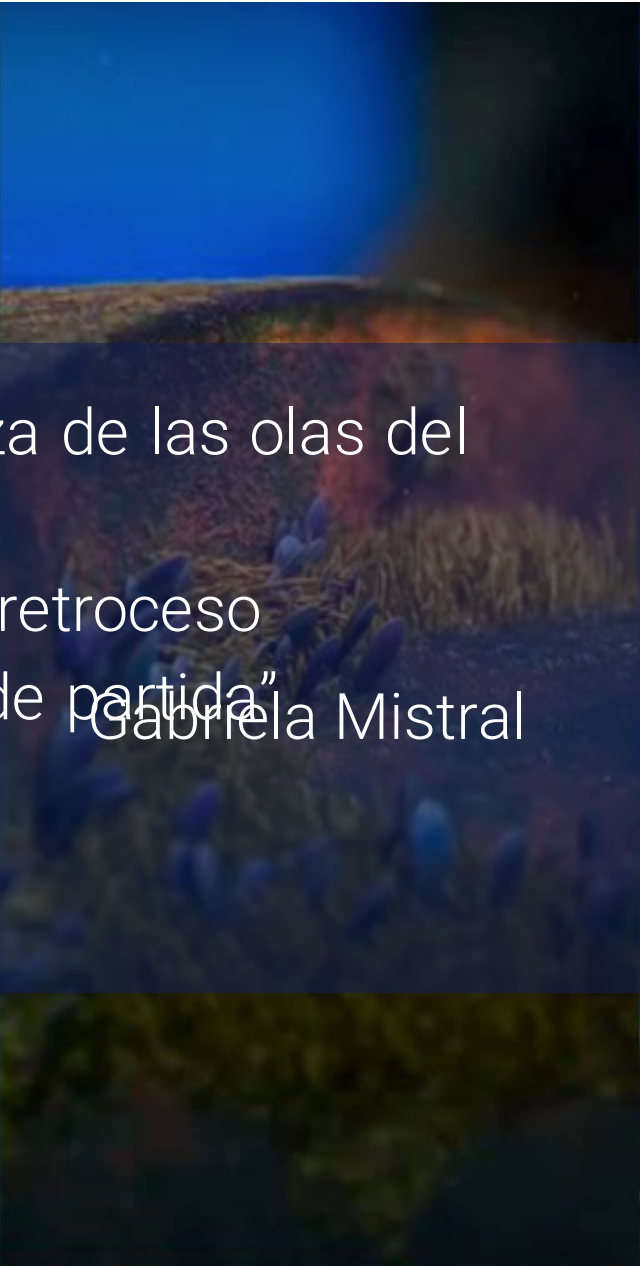
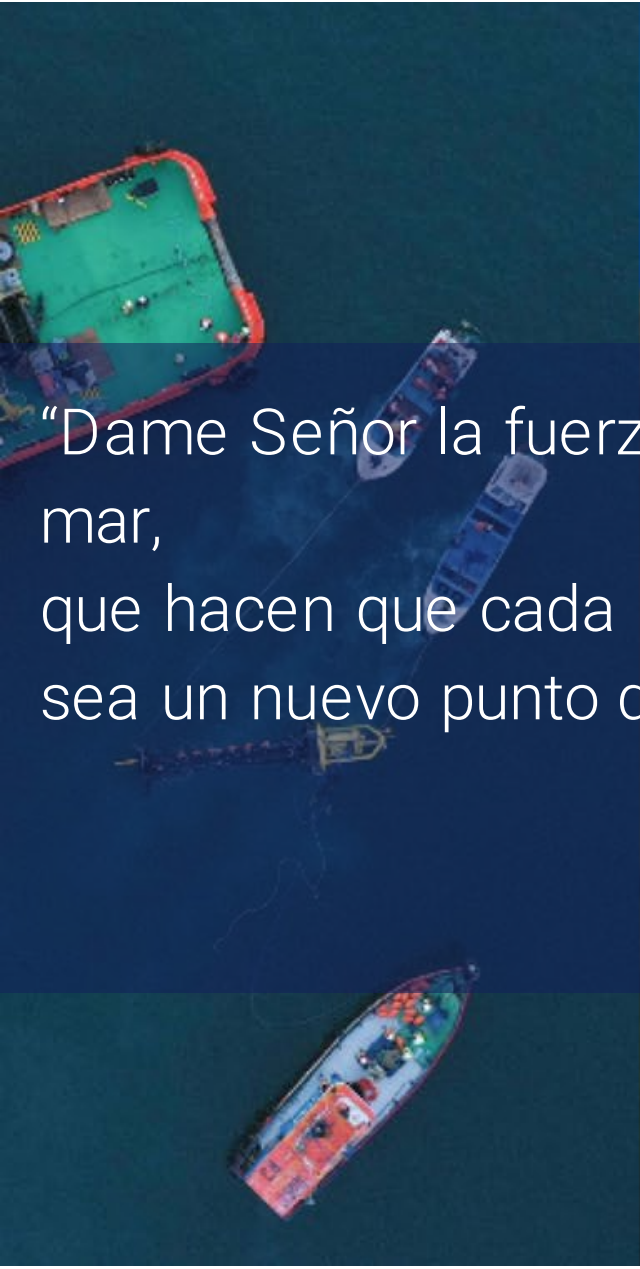
-[Blue Economy CRC](#), Australia
-[National Mirror committees of IEC's TC114](#)

[CFDs auctions, Feed in Tariff](#) (UK, Canadá)

[IDB Bank](#), CAF

[US Department of Energy](#)

[Equinor Project: Hywind Tampen](#)



“Dame Señor la fuerza de las olas del mar,
 que hacen que cada retroceso sea un nuevo punto de partida”
 Gabriela Mistral

Give me Lord the strength of the waves of the sea, which makes that every setback be a starting point