

# Wave<sub>2</sub>O™ In Cabo Verde

*Solving global water scarcity  
using ocean waves*

**Resolute Marine**  
Clean Water From Ocean Waves





## **Resolute Marine**

has developed a technology called...

### **Wave<sub>2</sub>O™...**

that harnesses ocean wave energy to produce fresh water in off-grid areas of the world and provide rapid relief from the harmful economic and social effects of water scarcity.

### **Starting in Cabo Verde...**

our goal is to improve access to water for coastal populations and agricultural operations in developing countries and islands and to displace the emissions-producing diesel-powered systems that are in common use worldwide.

### **A \$3.0 million Series Seed Extension investment...**

will match and unlock a non-dilutive €2.5 million grant that RME's subsidiary in Ireland is poised to win. A term sheet is available upon request and investment commitments of \$500k and above are being sought.

### **The next step will be...**

to deploy multiple Wave<sub>2</sub>O™ plants in more countries around the world and enable millions of people to lead more healthy, peaceful and productive lives.

# Problem

Globally, water scarcity impacts more than 1 billion people and, as a result, more than **2.5 million people** die each year (mostly children).

Developing countries & small-island developing states **cannot afford the capital or time** needed to build large-scale water infrastructure projects.

Developing countries and islands often use **diesel-electric systems** to...

- provide power for desalination plants; and
- withdraw fresh water from depleted coastal aquifers





# Solution

**Seawater desalination** can alleviate water scarcity problems for millions of people worldwide

**Ocean Waves are an ideal renewable energy resource** for desalination

- clean
- powerful
- consistent

**40% of the global population** lives within 100 km of a coastline with direct access to the clean fresh water provided by Wave<sub>2</sub>O™

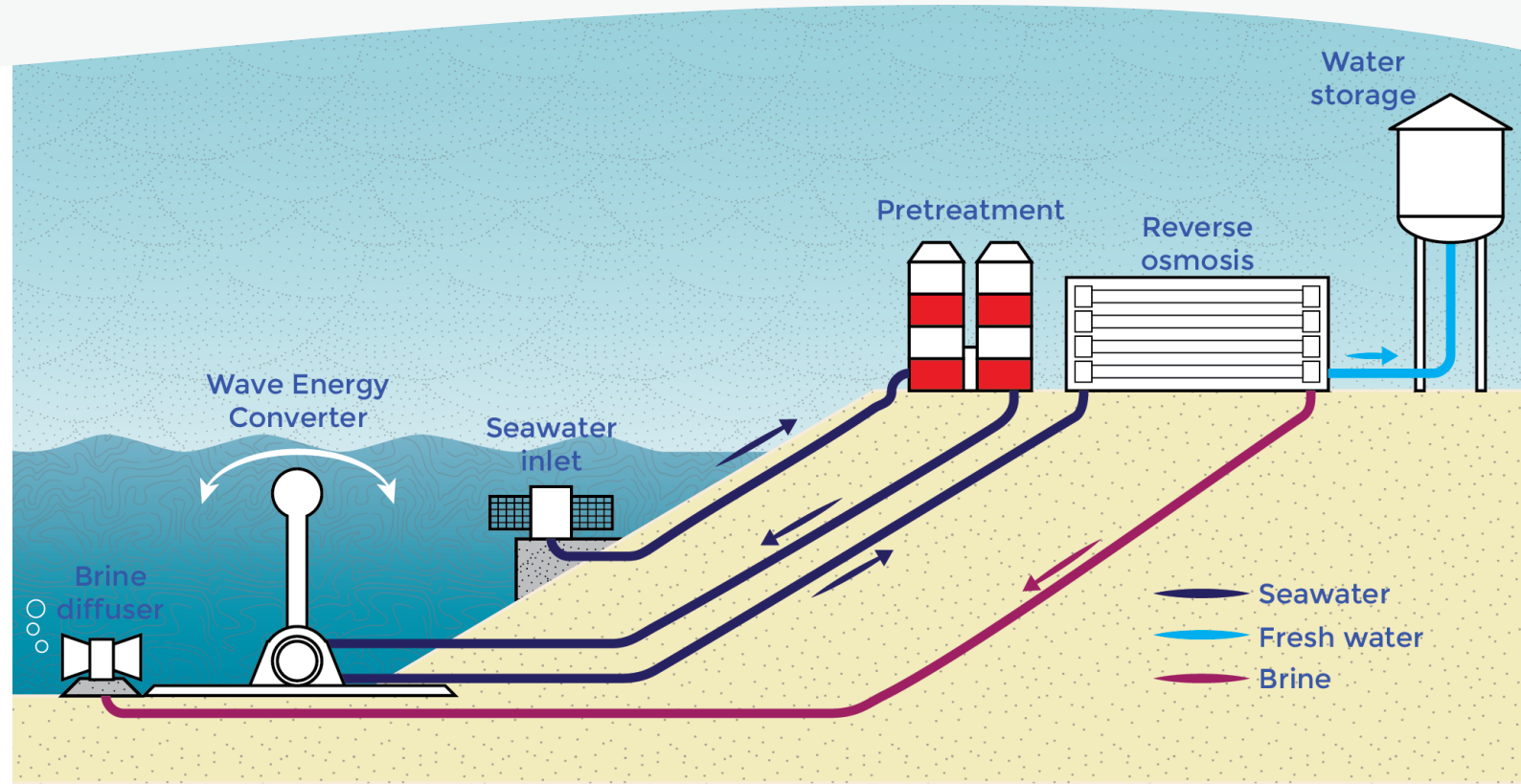


# Wave<sub>2</sub>O™

Wave<sub>2</sub>O™ can operate completely “off-grid” and quickly deliver large quantities of fresh water where it’s most needed.



This will take you to video which shows how it works.



Off-Grid



Hybrid



Economical

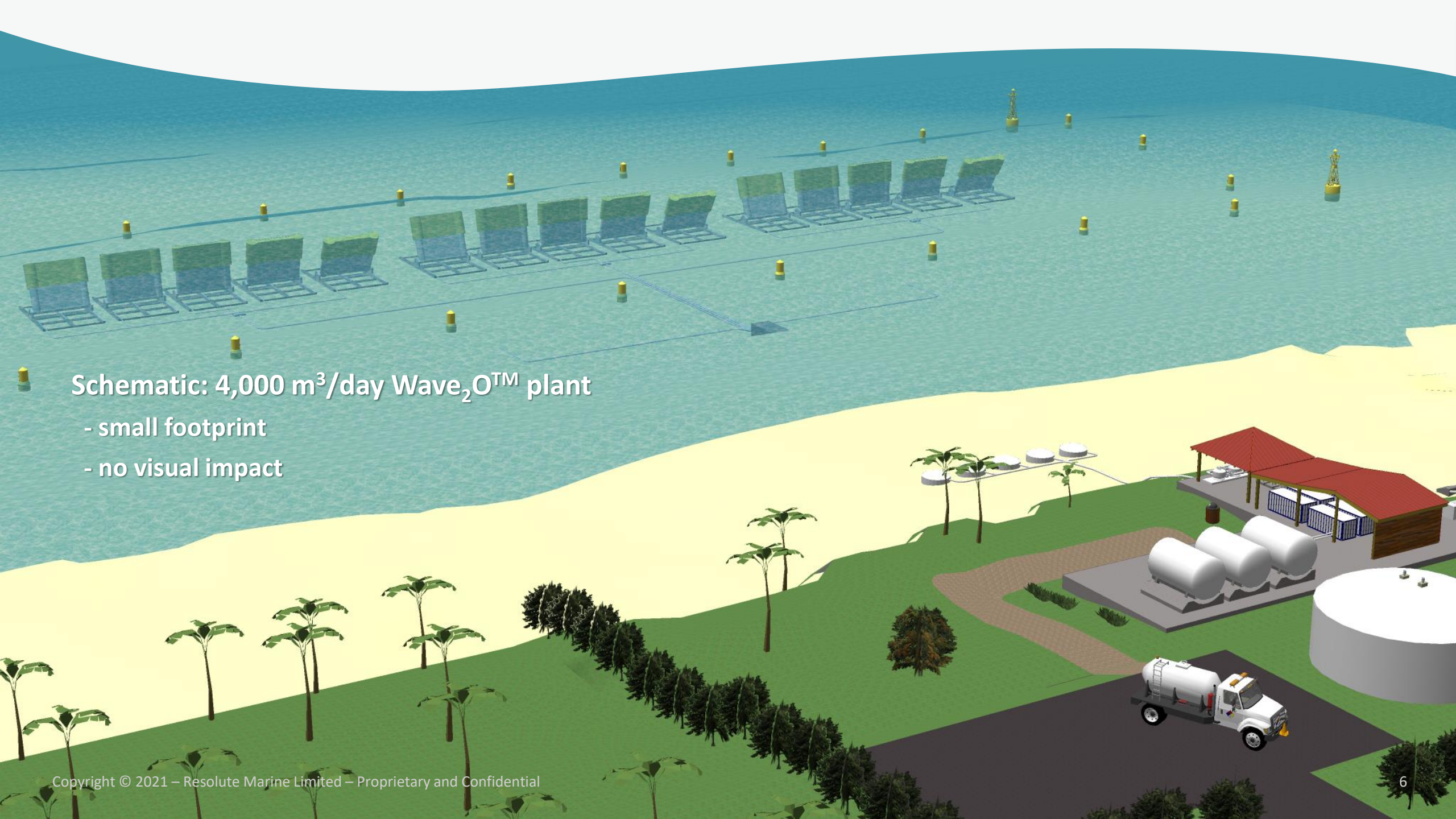


Clean



Modular



A 3D perspective rendering of a coastal area. In the foreground, a green hillside with palm trees and a row of dark evergreen trees slopes down to a sandy beach. On the beach, there is a small industrial facility with a red-roofed building, several white storage tanks, and a white tanker truck parked on a dark paved area. The ocean extends to the horizon, with a series of yellow buoys marking a path. In the water, there is a long, low-profile structure consisting of two rows of green, rectangular wave energy converters mounted on blue frames. A blue line, likely a cable or pipeline, runs from the shore through the water to the plant.

### Schematic: 4,000 m<sup>3</sup>/day Wave<sub>2</sub>O™ plant

- small footprint
- no visual impact

## Economics

Wave<sub>2</sub>O™ projects are financed independently by investors who seek a fair return on capital while generating positive social impact. A 4,000 m<sup>3</sup>/day Wave<sub>2</sub>O™ plant in Cabo Verde will provide:



**4,000** m<sup>3</sup> of fresh water/day  
**40,000** people with access to clean water at...  
**1/3** of the current cost.



**\$25M** CAPEX provided by project finance partners  
**23%** IRR for project equity partners  
**6** year investment payback period



**4,000** tons of CO<sub>2</sub> avoided per year; equal to taking  
**900** cars off the road





# Design Strategy

Simple installation, operation & maintenance

Wave<sub>2</sub>O™ is designed to be deployed in developing countries and islands where infrastructure and support services are often limited.

- **Easily transportable** - requires minimal port facilities and can be conveyed over unimproved roads
- **Small size** - enables on-site assembly and deployment w/o the need for heavy equipment or special-purpose vessels
- **Simple O&M** - a local workforce can carry out all operations and maintenance activities
- **Off-the-shelf components** - simplify repair operations and minimize system downtimes
- **Array configurations** – improve plant efficiency and lower risk of missing contractual water supply requirements



Wave<sub>2</sub>O™ prototype testing – Outer Banks, NC (USA) 2014



# Social Impact

Wave<sub>2</sub>O™ addresses nine of the U.N.'s 17 SDGs

Wave<sub>2</sub>O™ uses clean and abundant ocean waves as an alternative to diesel powered systems to produce fresh water, thus reducing carbon emissions.

Wave<sub>2</sub>O™ is tailored to the needs of coastal communities in island nations and developing countries and enables people to live more healthy, peaceful and productive lives.

Wave<sub>2</sub>O™ scale enables recipient countries to quickly build critical infrastructure and grow their local supply chains to create high value jobs and stimulate economic growth.



# Potential global impact

Wave<sub>2</sub>O™ can have a positive impact on millions of people in dozens of countries

**Africa** 20.6 million

- South Africa 2.0 million
- Morocco 1.6 million
- Cabo Verde 0.5 million

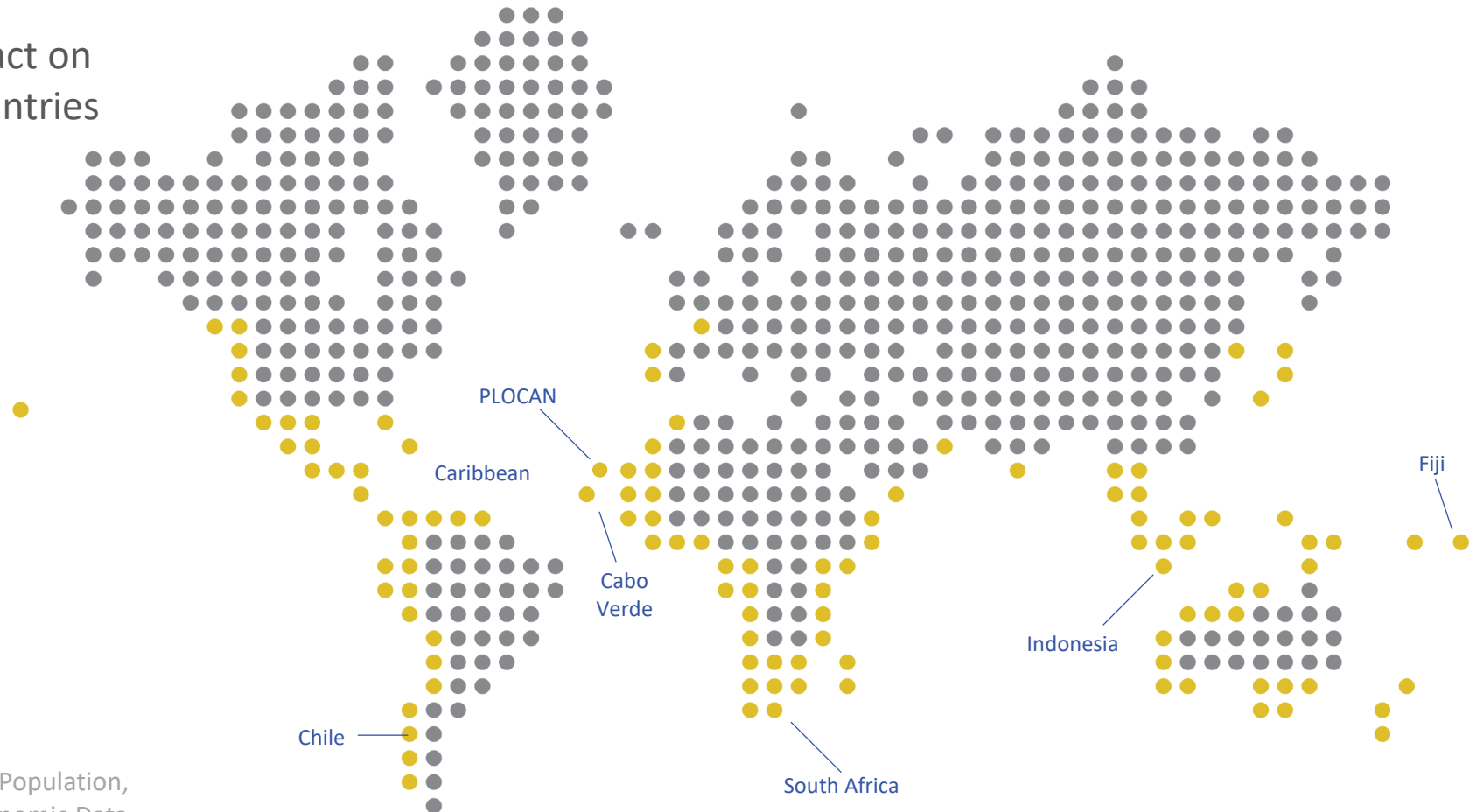
**Asia** 45.7 million

- Indonesia 18.9 million
- Oceania 1.3 million

**Americas**

- Caribbean 2.3 million

Reference: National Aggregates of Geospatial Data: Population, Landscape and Climate Estimates (PLACE); Socioeconomic Data and Applications Center (SEDAC); Center for International Earth Science Information Network (CIESIN); Millennium Development Goal; World Resources Institute



● Addressable markets

— Discussions in progress



## Cabo Verde case study

Cabo Verde has a relatively small population spread across a nine-island archipelago.

- relies upon diesel powered desalination plants to provide **85 percent** of its freshwater needs.
- has **high electricity costs** due to its remote location and absence of indigenous energy resources.
- has average water cost of is **the highest in Africa** and among the highest in the world.



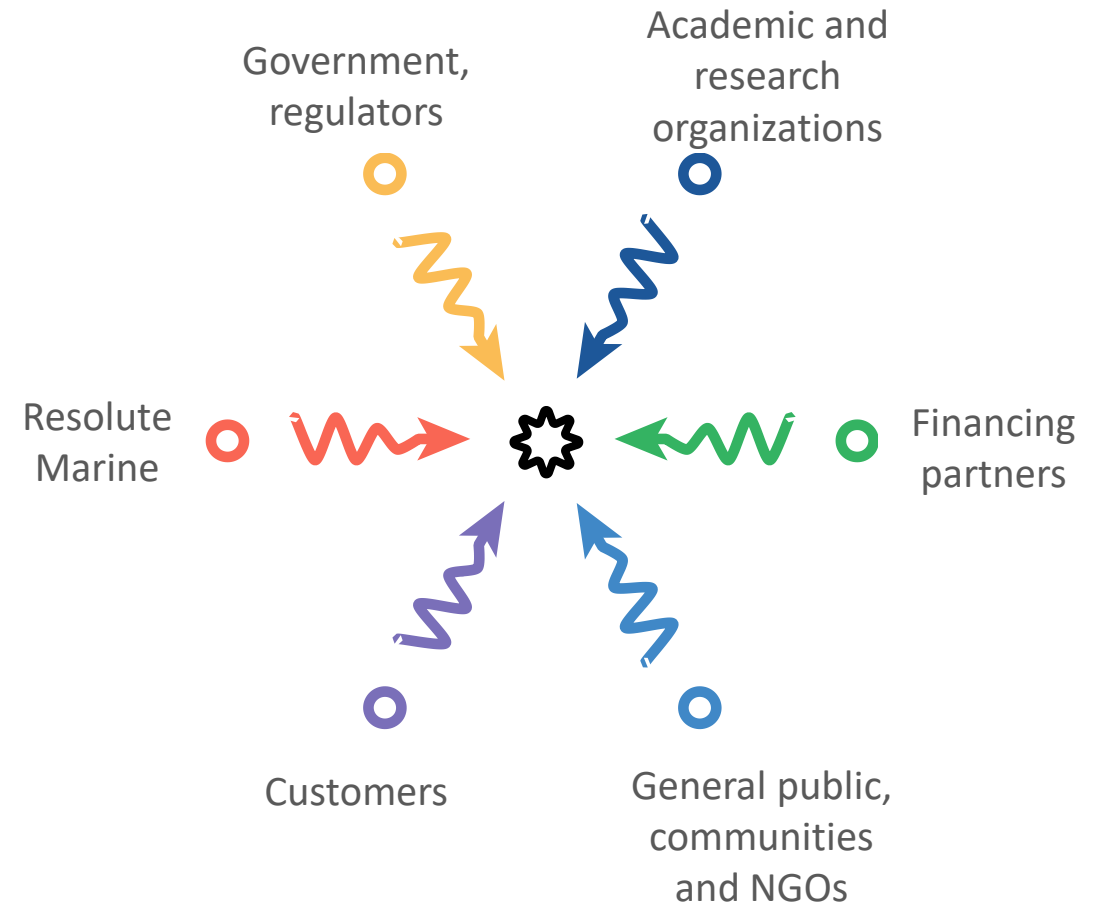
Mindelo, Sao Vicente, Cabo Verde, first community to be served by Wave<sub>2</sub>O™

## Our approach in Cabo Verde

**Solving water scarcity** is the focus of a group of **stakeholders** assembled by Resolute Marine, e.g., customers, regulators, general public, and investors, who bring different perspectives on how best to address this problem.

By **understanding the context** in which we are operating, we are in a better position to marshal resources, **achieve sustainable buy-in**, identify **new partnerships**, and develop new approaches to project development that we may not have known about otherwise.

**This process will be replicated** wherever we work.





# Capacity building activities in Cabo Verde

Purchase of equipment for local partners



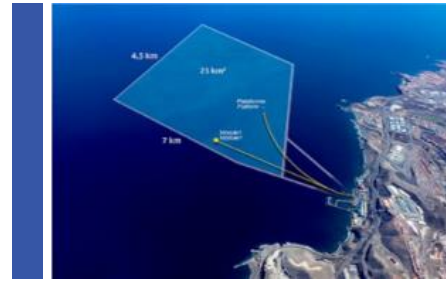
Participation of local stakeholders



Training of local partners



# Implementation roadmap



## 2008 - 2021

- Technology Validation
- Lab, wave tank, ocean
- Up to 2.5 m<sup>3</sup>/day



Grants and seed equity (over \$12M raised so far)

## 2022 - 2023

- Technical pilot
- PLOCAN test site
- 25 m<sup>3</sup>/day



\$3.0M  
Your investment will enable this

## 2024 – 2025

- Commercial pilot
- Praia Grande site
- 500 m<sup>3</sup>/day



Project Financing  
(Impact investment funds, private equity + debt providers (African Development Bank))

## 2025 - 2028

- Five commercial plants
- Global commercialization
- 4,000 m<sup>3</sup>/day





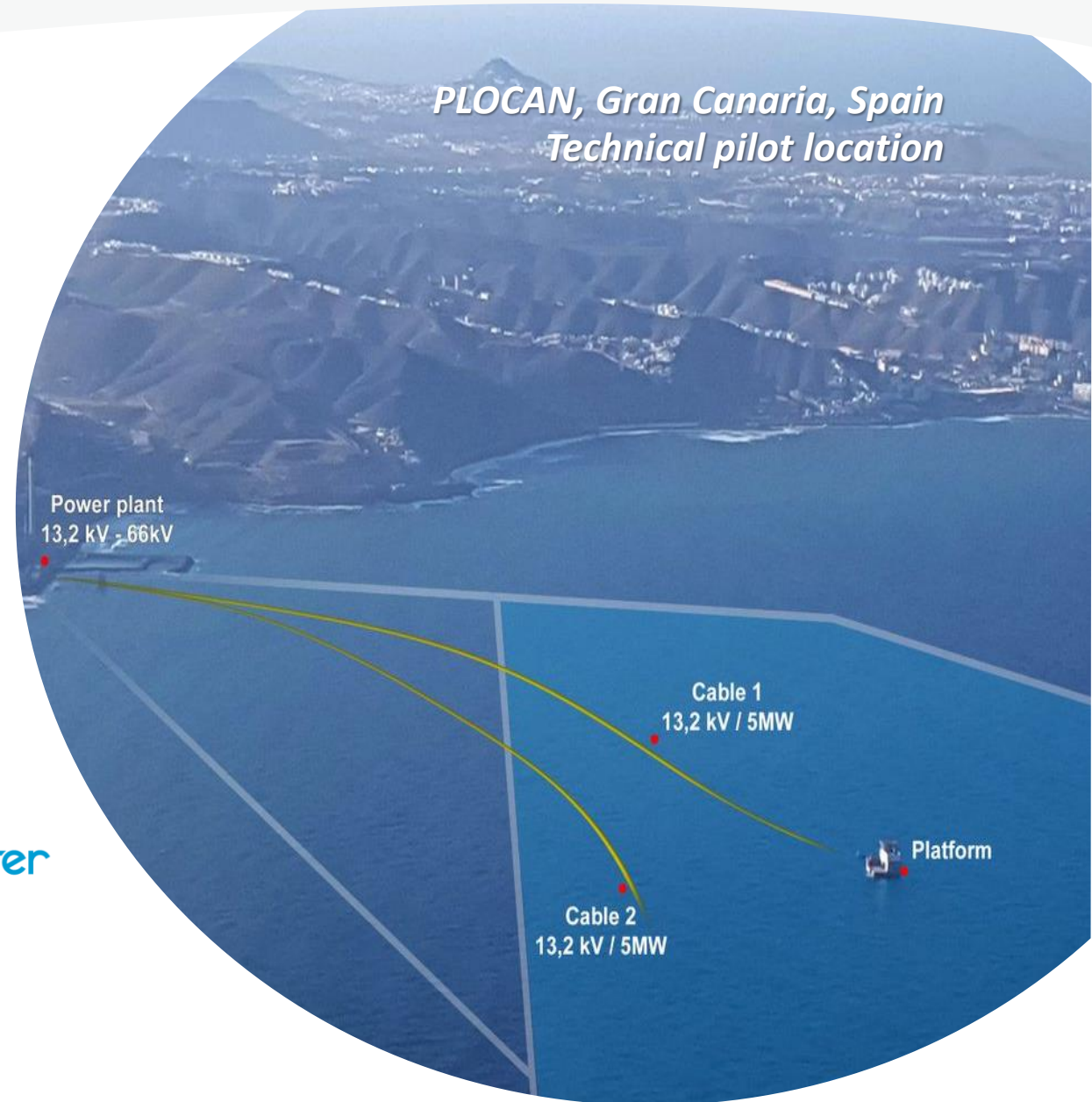
## Technical pilot

Purpose: Final technical validation of Wave<sub>2</sub>O™ at the PLOCAN test facility before moving onward to the development of commercial projects in Cabo Verde.

- Underway: Project preparation (funded by a €400K Interreg Atlantic Area grant called “EERES4WATER”)
- Deployment & testing (supported by the Interreg Atlantic Area “BlueGift” program)
- Strong partner network including the following...



Co-funded by the Horizon 2020 programme of the European Union



# Goals





## Commercial launch

Phased installation of Wave<sub>2</sub>O™ plants in Cabo Verde at the Praia Grande site starting in 2024 with the local power and water utility, Electra, as the first customer.

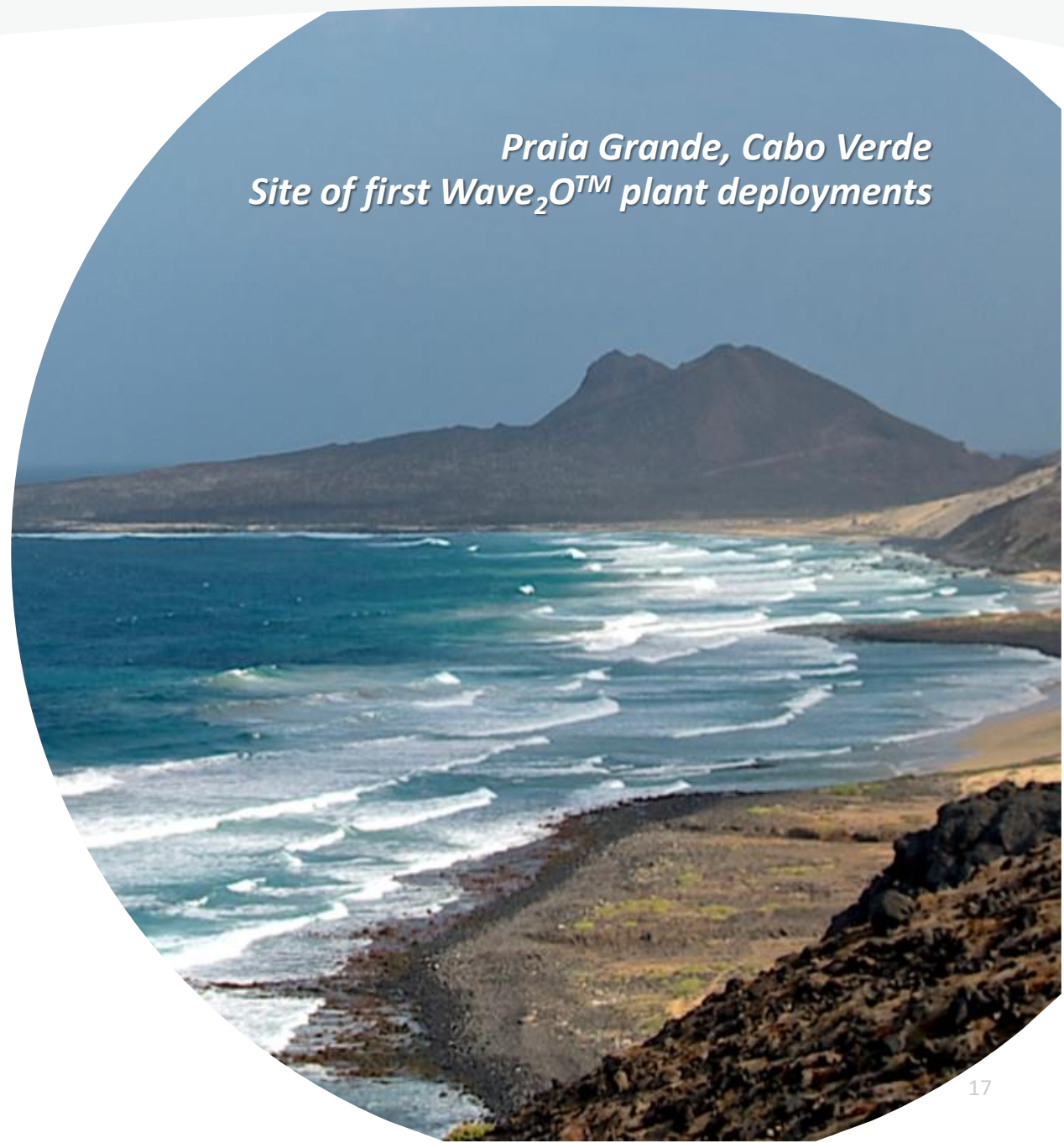
- Underway: Site preparation (funded by \$1.0M AfDB grant)
- Phase 1 – commercial pilot 500 m<sup>3</sup>/day capacity
- Phase 2 - expansion to 4,000 m<sup>3</sup>/day capacity
- Strong partner network including the following...



Co-funded by the Horizon 2020 programme  
of the European Union



*Praia Grande, Cabo Verde*  
*Site of first Wave<sub>2</sub>O™ plant deployments*



# Experienced management team



## **Bill Staby, Co-Founder and CEO**

- Entrepreneur (4th startup);
- M&A/Corporate Finance - First Boston, Rabobank, Prudential
- Chair - U.S. delegation to IEC TC-114 (international standards body)
- Board member - World Ocean Council
- 14 years Marine Renewable Energy industry experience/leadership



## **Olivier Ceberio, Co-Founder and COO**

- Experienced in technical and strategic development (McKinsey)
- International business development experience (World Bank)
- 12 years wave energy system development
- 10 years experience working in developing countries



## **Marcus Gay - Director of Product Development**

- 10 years - water industry consulting (NEWIN, IHS Markit, BlueTech Research)
- 10 years - energy systems development (GreenFuel Technologies, Trophos)
- Research Engineer/Science Diver – Marine Biological Laboratory
- BS/MS in Marine Geochemistry



## **Peter Carter**

- Senior Marine Systems Engineer



## **Allan Chertok**

- Senior Electrical Engineer



## **Linda Rauch**

- Chemical Engineer (desalination)



## **Oscar Melicio**

- Country Manager (Cabo Verde)



## **Darragh Clabby**

- Senior Controls Engineer



## **Allan Henry**

- Senior Marine Systems Engineer



## **Matt Folley**

- Senior Wave Energy Systems Engineer



# Thank you!

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