



**WAVE POWERED
SUSTAINABLE DESALINATION**

**Make the oceans a sustainable and
affordable source of drinking water**



Presented by Dragan Tutic
CEO & Cofounder of Oneka Technologies
SEPTEMBER 2022

Blue Economy Initiative Goals, Fort Bragg, California



Ocean Resiliency

**Mitigation, Sequestration
and Adaptation**

Renewable Energy

Emissions Reduction

Aquaculture and
Sustainable Fishing

Marine Cleantech

**Protection of Ocean
Ecosystems**

Promote Jobs in the
Environmental Sphere



WE NEED TO ELIMINATE FOSSIL FUELS FROM THE PRIMARY ENERGY SUPPLY



2020

2050

~1 %

of world's population
lives on desalinated
water

=

~0,5 %

of world's CO₂
emissions

10 %

of population

desalination expected to
to increase at current
growth rate

=

~ 5 %

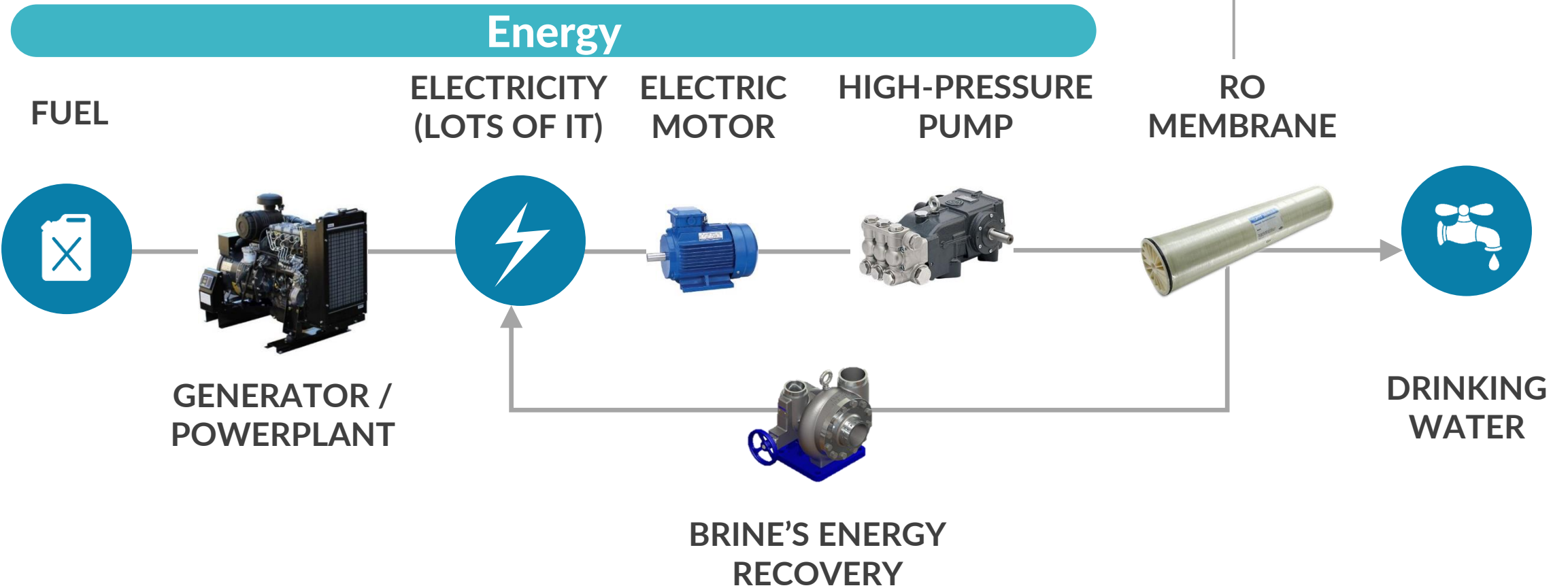
of today's world's CO₂
emissions

about twice the
aviation industry

CONVENTIONAL DESALINATION IS NOT SUSTAINABLE

A GROWING ALTERNATIVE

OCEAN



CONVENTIONAL DESALINATION TURNS FUEL INTO WATER



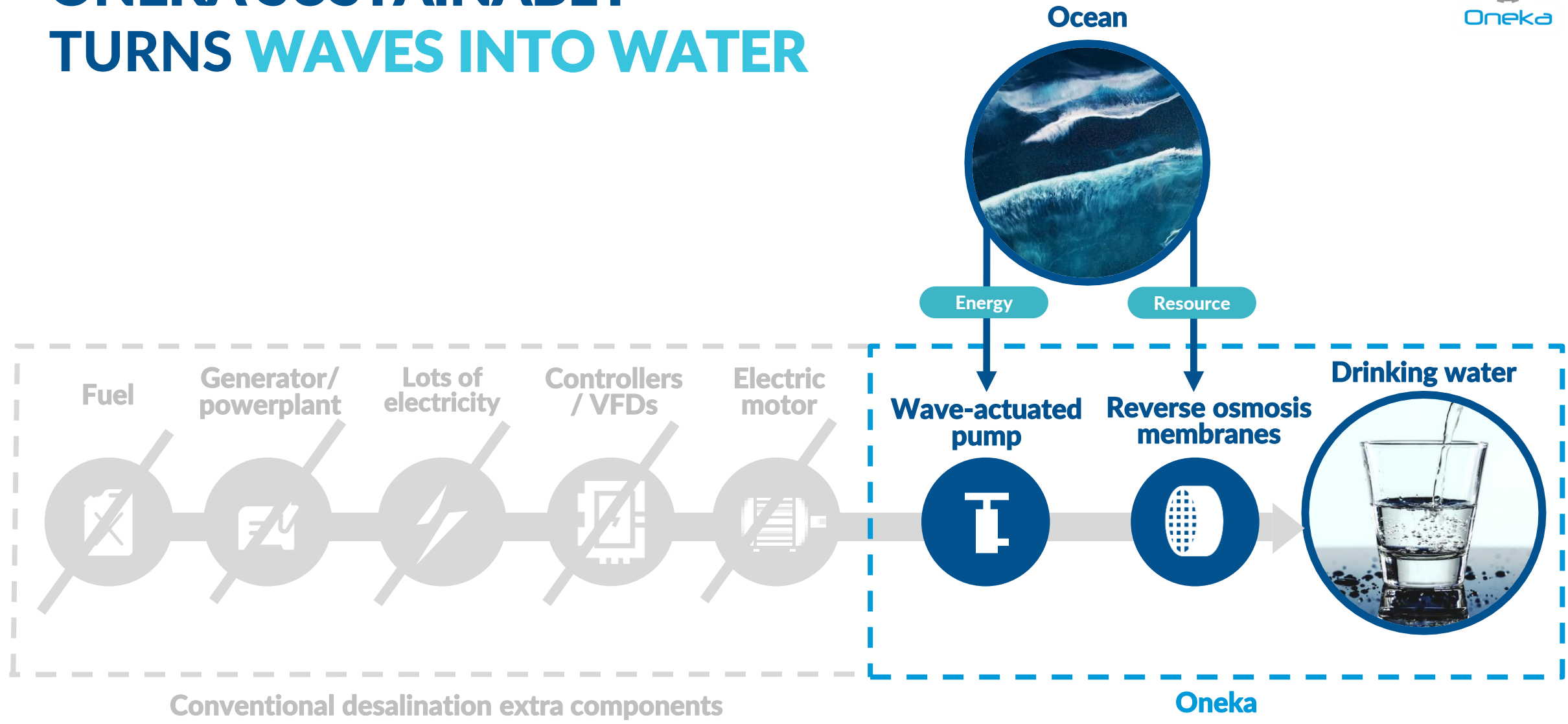
Oceans, the perfect match for a sustainable source of drinking water

RESOURCE
(Water)

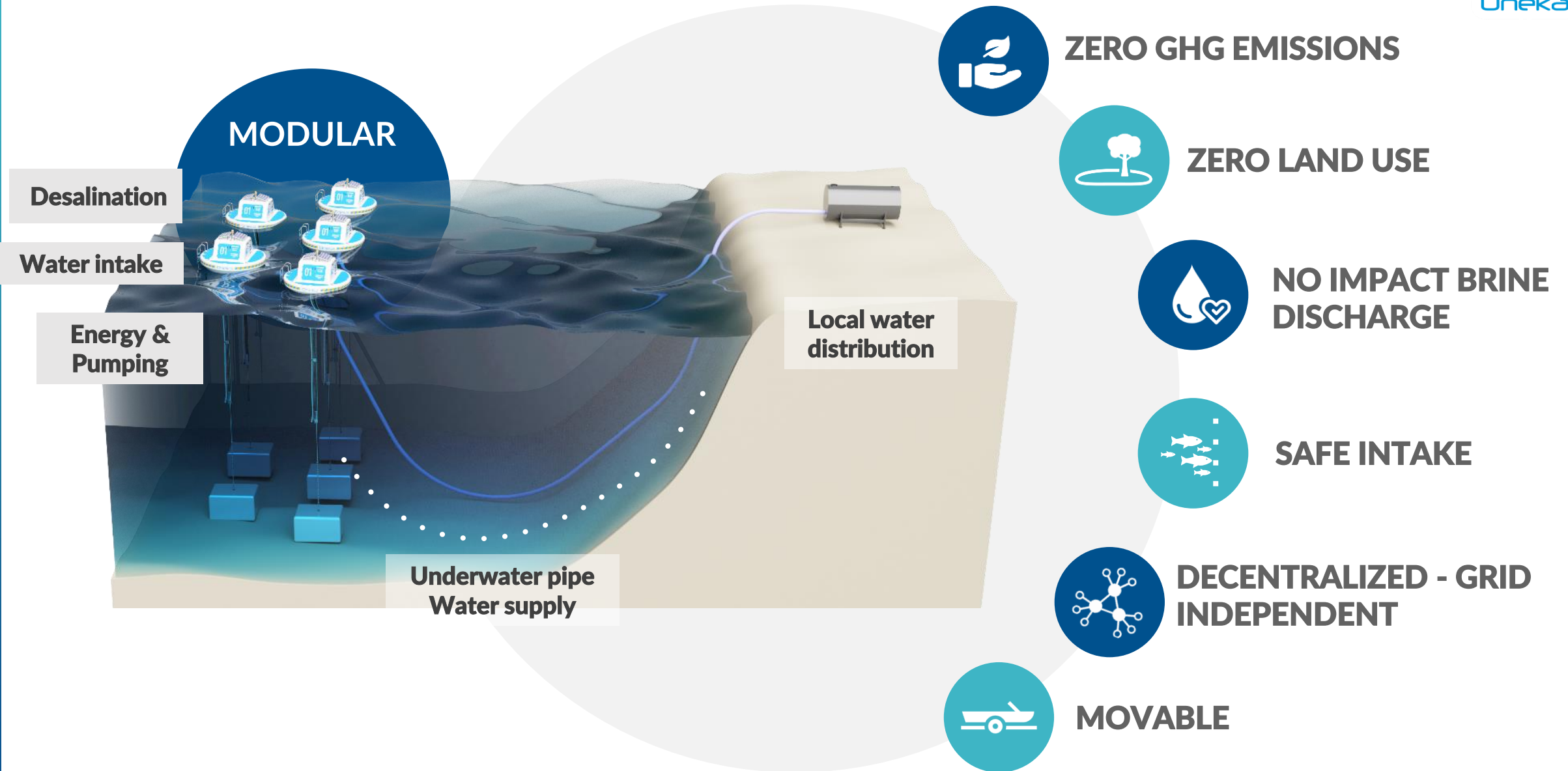
ENERGY
(Waves)

PROXIMITY
(to coastal
populations)

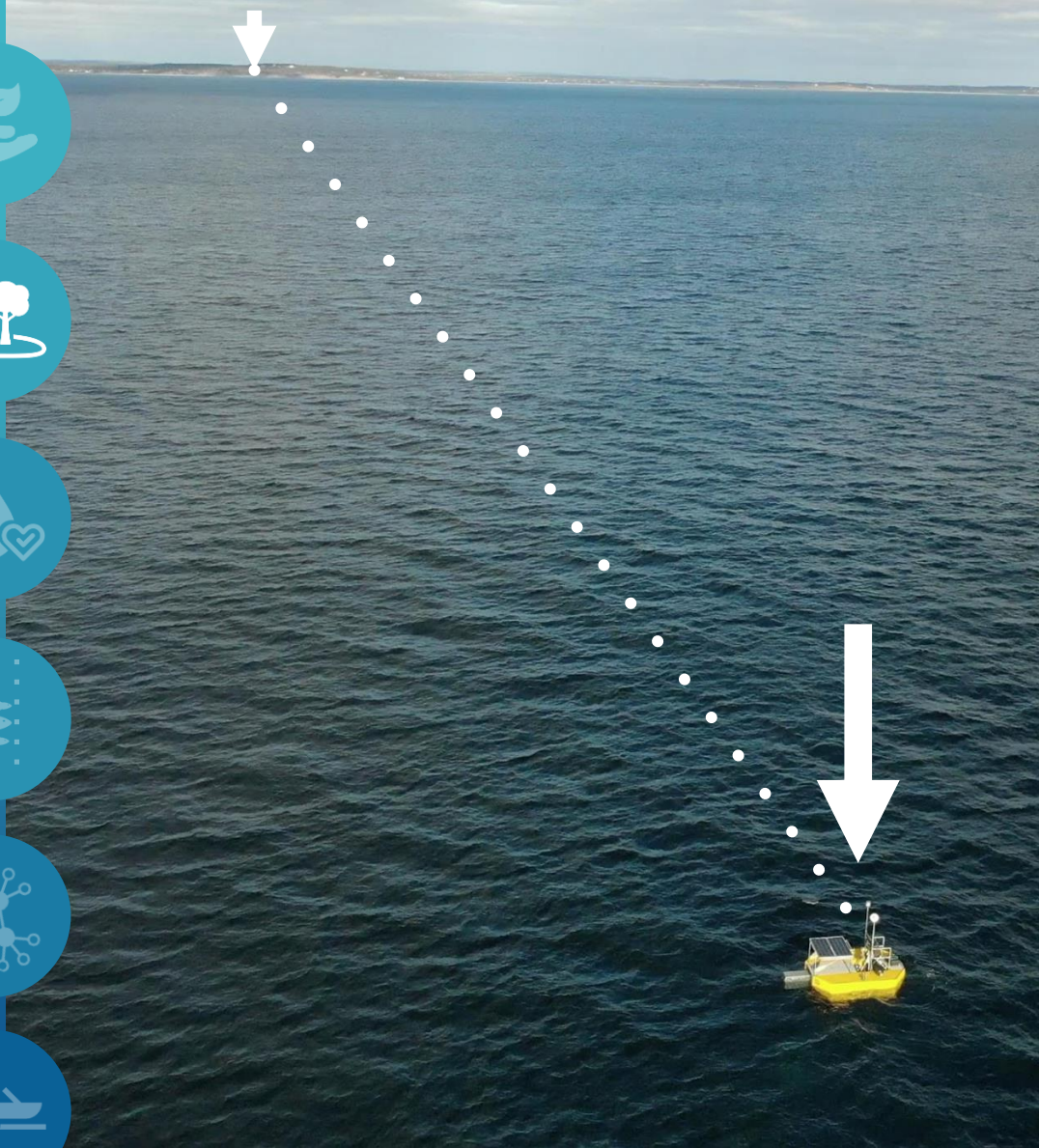
ONEKA SUSTAINABLY TURNS WAVES INTO WATER



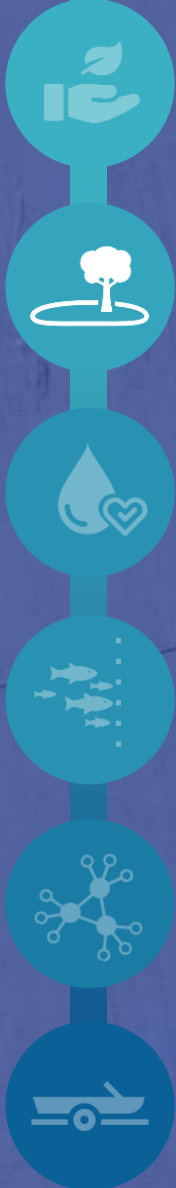
ONEKA'S WATER TAP FROM THE OCEAN



No Land or Visual Impact



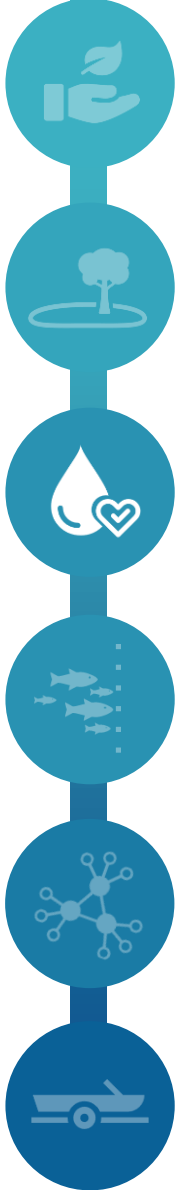
Compared to Solar Powered Desal



San Diego Airport

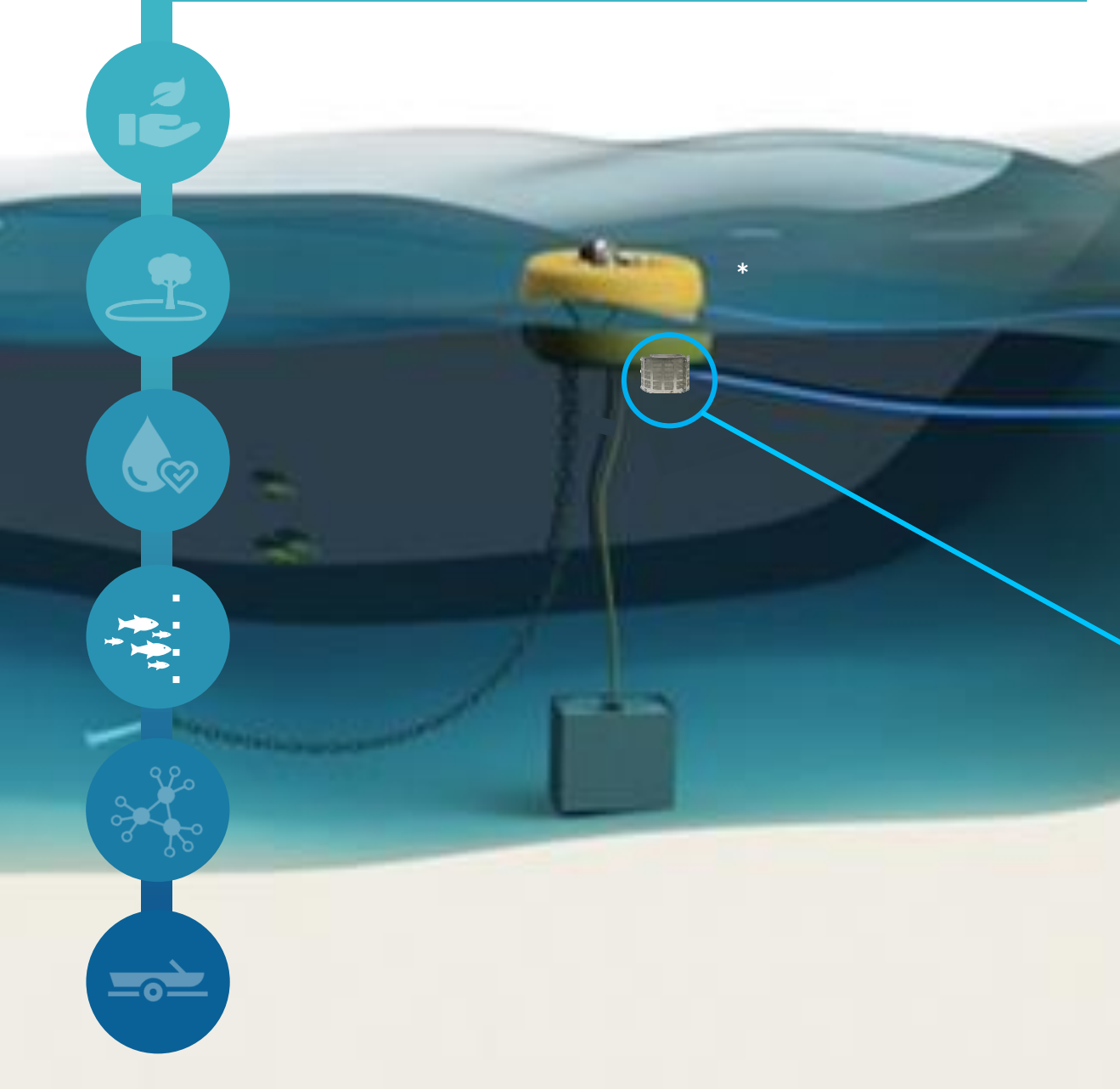
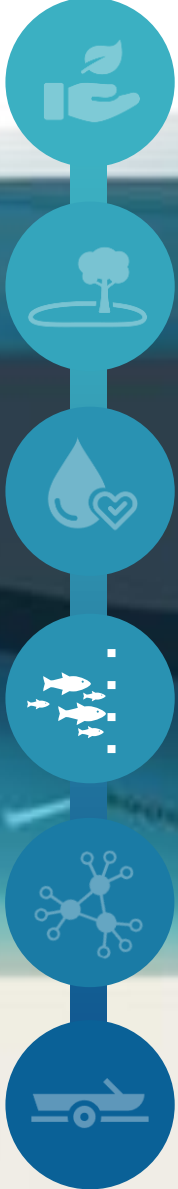
≈ Area of solar panels to power Carlsbad desalination plant

Responsible Brine: Low Concentration + Effective Diffusion



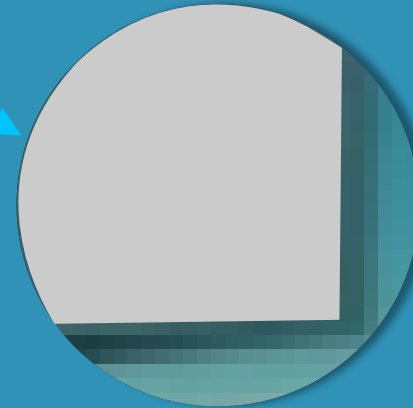
	WAVE POWERED DESALINATION	CONVENTIONAL DESALINATION
Salinity	<p>±35% higher salinity than seawater</p> <p>High efficiency energy recovery enables low recovery and reduces membrane fouling</p>	<p>±100-150% higher salinity than seawater</p> <p>Maximize recovery for energy cost efficiency, results in high salinity brine</p>
Diffusion	<p>Brine released over a vast area</p> <p>Modular system, offshore release combined with wave action mixing</p>	<p>Localized brine released zone</p> <p>Released from the coast, any diffusion systems are an additional burden or cost</p>
Result	<p>The salinity variation is extremely limited</p>	<p>Localised salinity increase can be significant in some cases</p>

Safe Intakes



Engineered to protect sea life:

- ✓ 60-micron-size intake holes to prevent harmful impact on ecosystems (adjustable)
- ✓ Backwashed to reduce maintenance and ensure enhanced suction protection



*ONEKA ICECUBE UNIT
AS AN EXAMPLE
(EMERGENCY RELIEF)

Decentralized Water Output: Minimize Infrastructure Costs

SANTA CATALINA ISLAND EXAMPLE

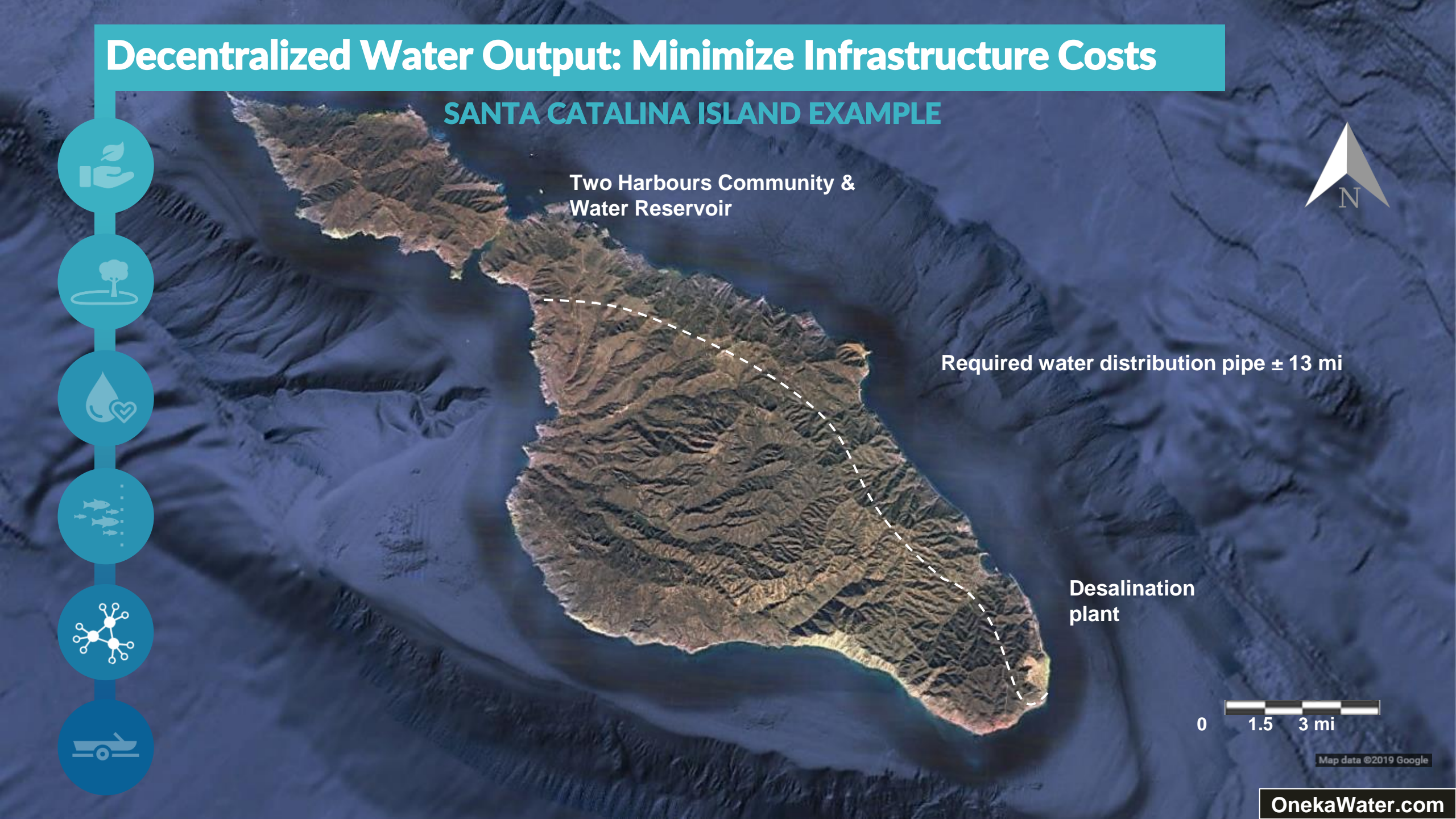
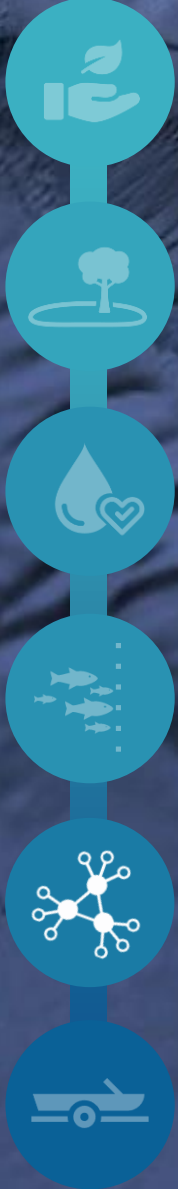
Two Harbours Community & Water Reservoir

Required water distribution pipe \pm 13 mi

Desalination plant

0 1.5 3 mi

Map data ©2019 Google



Easily Movable



- ✓ Towed by a boat
- ✓ Installation and removal:
 - Less than 2 hours/unit



RESPONSIBLE MATERIALS



Which represents :

P1

30,000 



Iceberg

150,000 

Typical Small Project (500 m³/d)

1,500,000 

PROVEN AND RELIABLE TECHNOLOGY



- #1 trial: Extreme wave conditions in Canada
- #2 trial: Tough feed water in Florida
- #3 trial: Deployment at user site in Chile



Survived Storms with
14 ft Hs Waves (near 20ft max)



10 m³/d capacity

**Ocean-Test Early
Learn and Iterate Rapidly**



V1



V2



V3



V4



V5

FULL PROJECT DEPLOYMENTS

FL, USA



FL Coastal community

- Gated community
- Water as a service agreement
- Well placed for Caribbean potential users to see

**300 m³/d in water need
(75k gal/day)**

300 T CO₂_{eq}/yr
avoided

Baseline: conventional
desalination solution

Status:

- Commissioning late 2022/early 2023

CHILE



Cofradia Nautica Del Pacifico

- Marina near Santiago
- Launching pad for Chile

50 m³/d

50 T CO₂_{eq}/yr avoided

Baseline: conventional
desalination solution

Status:

- Operating (commissioned in July 2022)
10 of 50 m³/d installed

SUSTAINABLE DESALINATION PROJECT PROPOSAL

CITY OF FORT BRAGG



Project deployed
in phases

Array of Oneka
desalination buoys*

Underwater pipe

Connection to
water storage
and distribution

Fort Bragg
Wastewater
Treatment Plant

SUSTAINABLE DESALINATION PROJECT PROPOSAL

CITY OF FORT BRAGG



Oneka would work with local partners to provide you a turnkey water-as-a-service solution that includes :



**Employment of
Local Contractors**



**Training Program for
Local Technicians for
O&M**



**Permitting with
Local Agencies &
Partners**



**Custom Project
Design & System
Manufacturing**



**Water Needs & Site
Analysis**



**Offshore
Installation**



Project Financing



**Monitoring of Water
Quality & System
Performance**

SOCIAL, ENVIRONMENTAL & ECONOMIC IMPACT



DESALINATION PROJECT PROPOSAL TO THE CITY OF FORT BRAGG



No Capital Expenses

For equipment purchase



0 Years Payback



Fixed Water Costs

No more water rate increases



Transition to Sustainable Desalination

Aligned with your Blue Economy Initiative



Increases Community Resilience to Drought



Long Term Solution & Reduced Energy and Water Costs. No need to buy a new desalination plant

PERMITTING PROCESS STRATEGY

Two tier permitting strategy:
Accelerated and Traditional
dual paths.

Working with:



TWO TIER PERMITTING PROCESS STRATEGY



ACCELERATED

The California Ocean Plan's Desalination Amendment (OPA) provisions apply to the buoys under most circumstances. Under the two following conditions the OPA would not apply:

1. "desalination facilities that are operating to serve as a critical short-term water supply during a state of emergency declared by the Governor" would not need to comply with any of the OPA;
2. "portable desalination facilities that withdraw less than 0.10 (MGD) of seawater and are operated by a governmental agency" would not need to comply with the OPA in the following sections:
 - o Chapter III.M.2 (Water Code section 13142.5(b) Determinations for New and Expanded Facilities: Site, Design, Technology, and Mitigation Measures Feasibility Considerations),
 - o Chapter III.M.3 (Receiving Water Limitation for Salinity), and
 - o Chapter III.M.4 (Monitoring and Reporting Programs).

TWO TIER PERMITTING PROCESS STRATEGY



TRADITIONAL (would conduct all concurrently)

1. **Entrainment Study.** A technical, field sampling study to determine what impact the seawater withdrawal will have on the plankton resources that include fish larvae.
2. **Benthic Habitat Survey.** A sonar survey of the seafloor to document the area's habitat to determine what type of seafloor habitat is present (rocky reef, kelp, sandy bottom, or some combination).
3. **Water Need.** Ideally this must be cataloged in a water planning document from the local water authority.
4. **Subsurface Intake Feasibility.** The Oneka buoy includes an integrated surface water intake. Therefore, before it can be used, at least at utility scale, the feasibility of a subsurface intake must be determined.
5. **Brine Discharge Technology Empirical Study.**
6. **Essential Fish Habitat Assessment.** A review by the National Marine Fisheries Service to ensure the project does not have an adverse impact on any Federally managed fisheries.
7. **Sensitive Species Survey.** A survey to ensure the installation and operation will not adversely impact any sensitive species in the area.

EXCELLENT TRACK RECORD IN PERMITTING

Past permitting sites

FORT PIERCE DEMO SITE, FL, USA (2017-2022)

5-year authorization used for V4, V5, P1, S1
(Approved or exempted by USCG, USACE, FDEP)

OCEAN VILLAGE, FL, USA (NOW-)

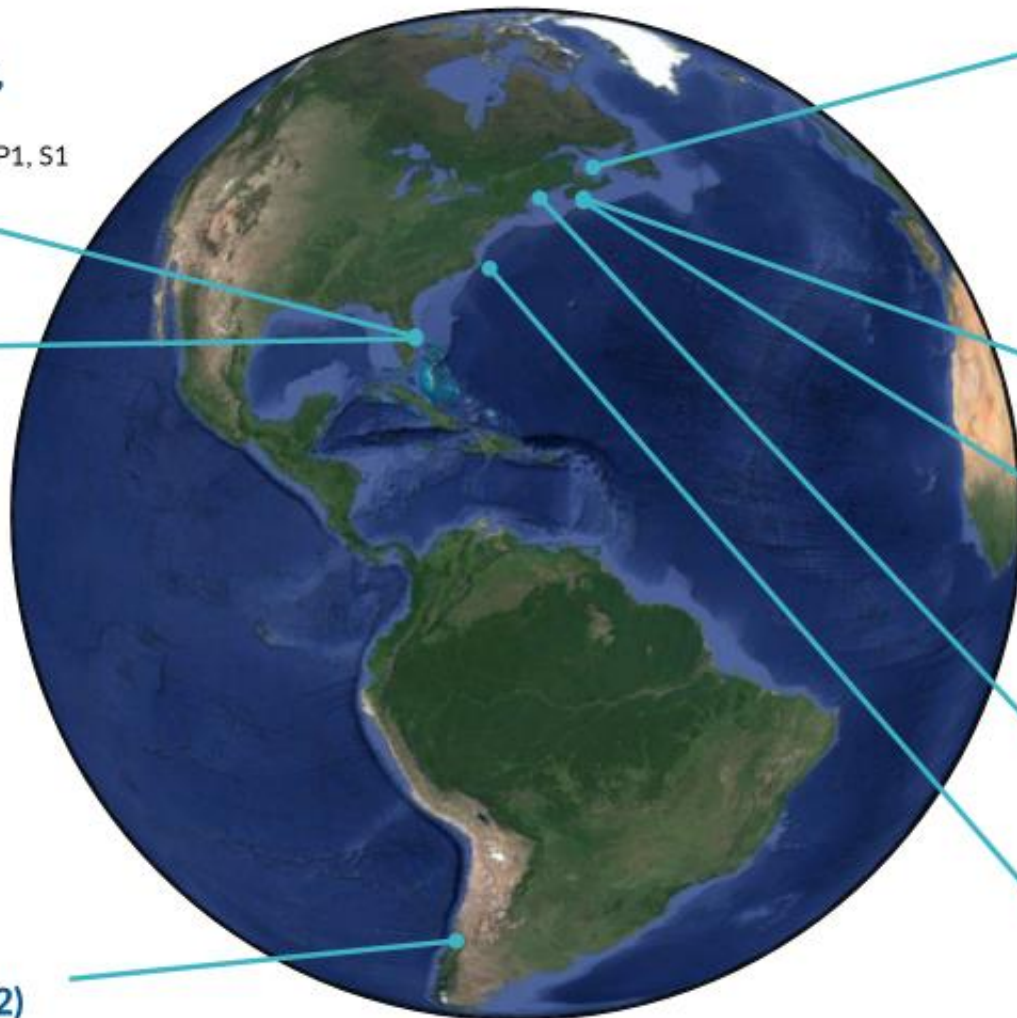
5-yr+ Commercial site permitting
Including pipe to shore
(Reviewed by USCG, USACE, FDEP, FWC, FWS, NFMS)

Steps completed: brine release, navigation hazards, animal entanglement, coral reefs (hard bottoms impacts), turtle nesting, public noticing etc. currently finishing the lease as the final step)



COFRADIA SITE, ALGARROBO, CHILE (2022)

1-yr Commercial demo permit including pipe to shore and optional on-shore process plant (led by our partner REDE)



MAGDALEN ISLANDS, QC, V1 TESTING

in partnership with CTMA - 1 week

NOVA SCOTIA



HALIFAX

EASTERN PASSAGE, NS, P1 TESTING (2020-2021)

1 month testing, 1 year authorization

COW BAY, NS, S1 DEMO (2021)

7 months authorization, including pipe to shore and process plant on shore for Snowflake
(Approved or exempted by Transport Canada, NSLF, DFO & Municipality)

SCARBOROUGH BEACH, ME, V3 TESTING (2016-2017)

4 to 12 mth authorization for testing and improvements

WILMINGTON, NC, USA, V2 TESTING, (2016)

in partnership with local partner - 2 weeks

PERMITTING



ENVIRONMENT: OCEAN

ENVIRONMENT: BEACH & COAST

NAVIGATION

AGENCIES



KEY CONCERN(S)

- Hard bottom impacts
- Brine
- Animal Entanglements

- Turtle nesting
- Coastal plants/ land use or impact

- Boat's safety
- Visibility
- Interference for navigation

MITIGATIONS

- Optimized route for minimal impact
- Pipe anchor design designed for 50 yr events
- Intrinsic low brine impact

- Horizontal directional drilling to avoid any influence on turtles
- No land use due to product's nature

- Safety and visibility features added to the buoys
- Array to be chartered
- Long spacing between buoys for smaller boats

ICECUBE CLASS AWARD WINNING DEVICE

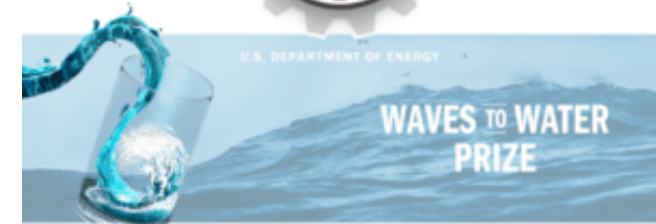
SMALL-SCALE

Capacity/unit : 250 Gallons per day

Size: 5 ft



US DOE - WAVES TO WATER PRIZE



U.S. DEPARTMENT OF
ENERGY

- World Renowned Competition
- Total Grants of \$1,3M CAD
- Grand Prize Winner
 - Best of overall score
 - Most water produced
 - Simplest assembly & Simplest deployment

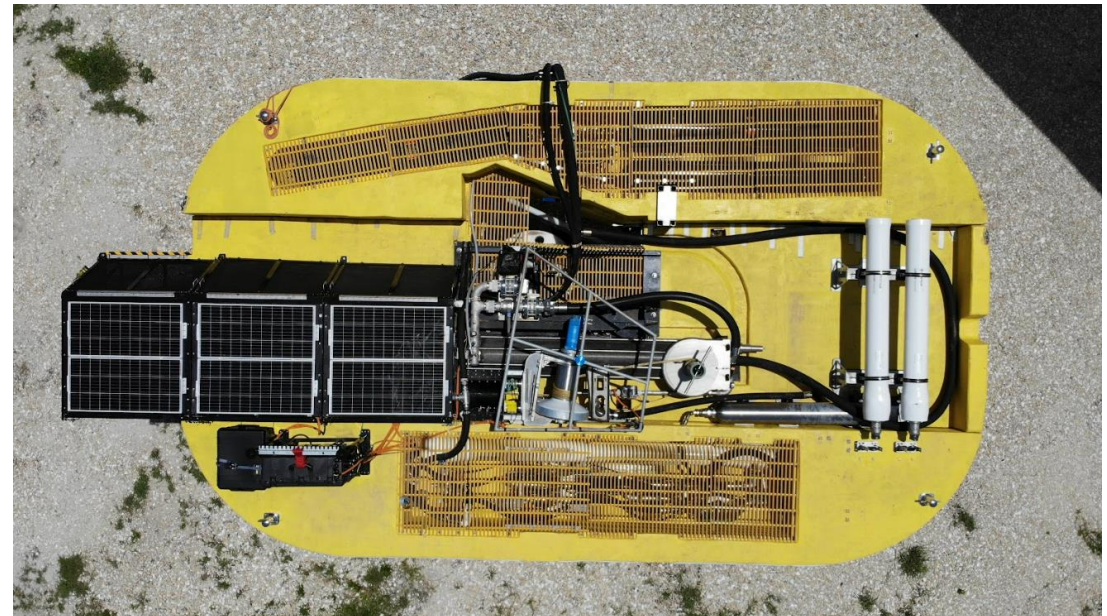
ONEKA'S ICEBERG

MID-SIZE

Project deployment : < 400 GPM installations

Capacity/unit : 5.5 - 9.2 GPM

Ed diameter : 20 ft



HOW ONEKA CAN SUPPORT FORT BRAGG



TRANSITION

to a sustainable water solution



ALIGNMENT

with your Blue Economy Initiative



INCREASE

community resilience to climate change



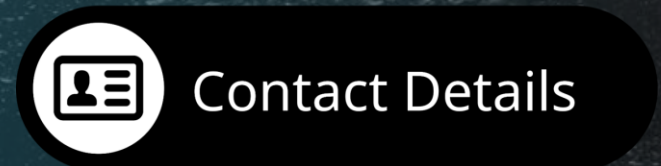
CONTACT US!

Oneka Technologies

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+1 819-485-0335

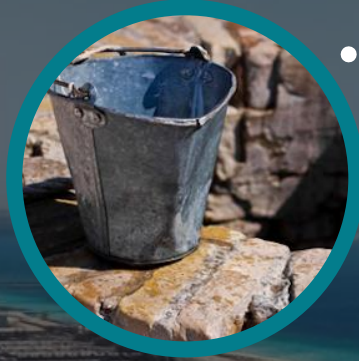


OnekaWater.com



APPENDICES

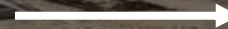
**WATER
SCARCITY**



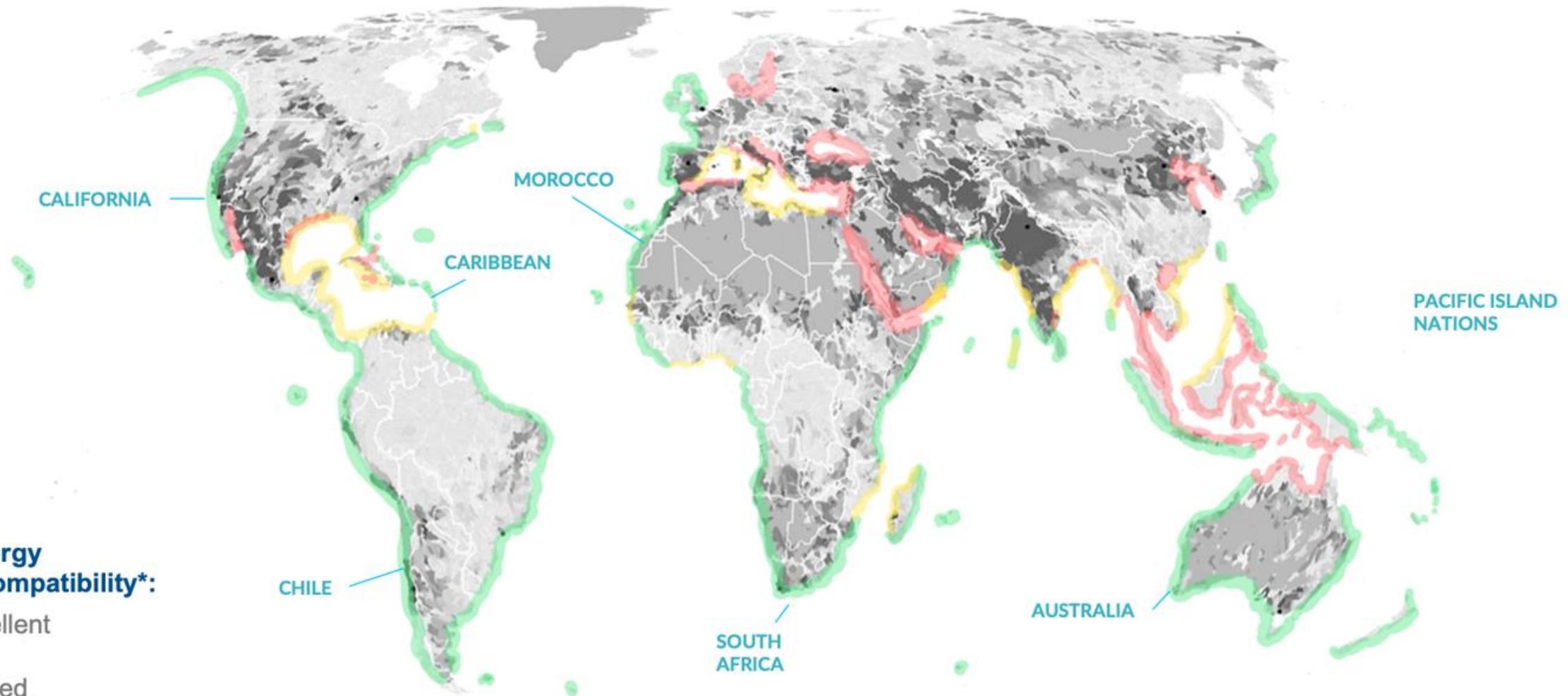
**CONVENTIONAL
DESALINATION**



**CLIMATE
CHANGE**



WAVE ENERGY MEETS WATER SCARCITY



Wave Energy density compatibility*:

- Excellent
- Ok
- Limited

*approximative zones for indicative purposes

Market examples facing water scarcity

ONEKA SUSTAINABLY TURNS WAVES INTO WATER



**NO
ELECTRICITY**

**\$0
ENERGY COST**

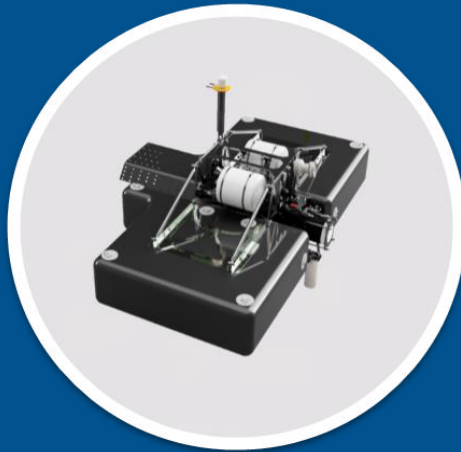
SIMPLICITY

MARKETS & PRODUCT CLASSES

CURRENT

SMALL-SCALE

Remote coastal bases, disaster recovery, coastal refugee camps



ICECUBE CLASS

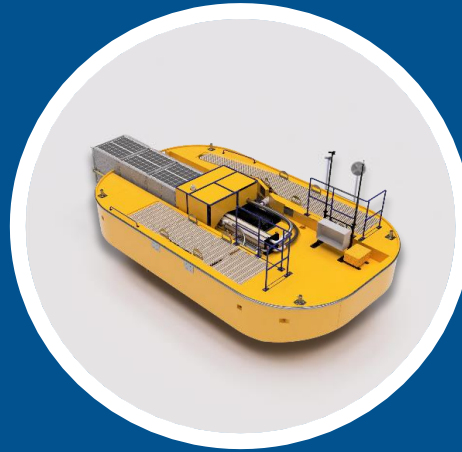


U.S. DEPARTMENT OF
ENERGY
Wave to Water
prize winner

- Capacity: 1 m³/day
- Diameter: 1.5 m

MID-SIZE

Communities, Resorts/Tourism,
Small Industries.



ICEBERG CLASS < 2000 m³/d deployments

- Capacity: 50 m³/day per u.
- Eq. diameter: 6 m

UPCOMING

UTILITY SCALE
Municipal, Mining,
Large industries, Ag.



GLACIER CLASS < 20,000 m³/d deployments

- Capacity: 500 m³/day per u.
- Eq. diameter: 12-15 m

ONEKA GLACIER

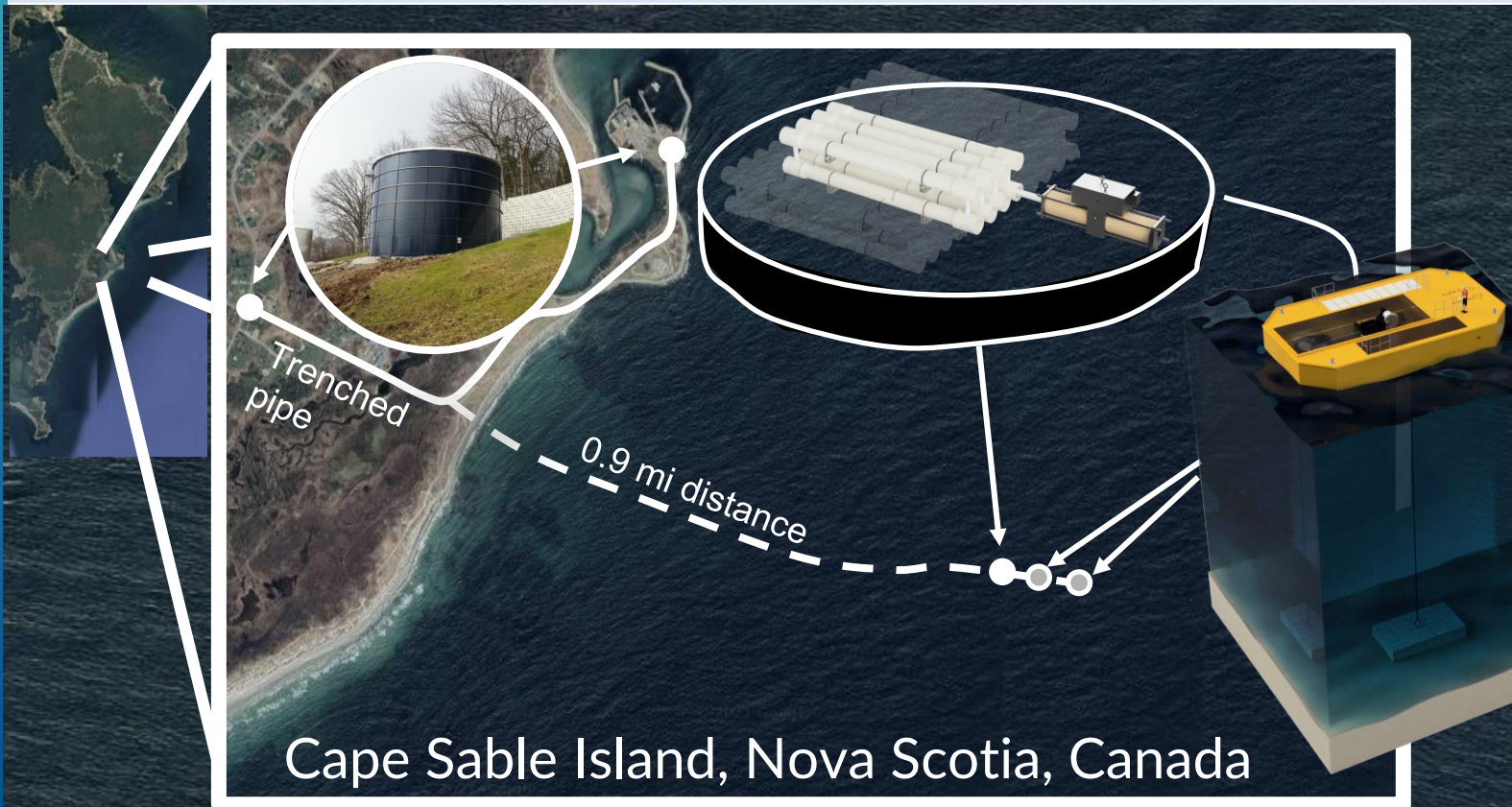
UTILITY SCALE PROJECTS

Project deployment : < 4000 GPM installations

Capacity/unit : 92 GPM

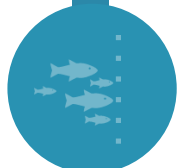
Eq diameter : 40-50 ft

For locations with water access issues and where energy cost, population density and environmental awareness are high.



ONEKA GLACIER DEMONSTRATION PROJECT

Responsible Brine: Brine Outfall Example



Brine Specifications

Salinity Increase

+ 2000 ppm California's salinity increase limit at 100m radius

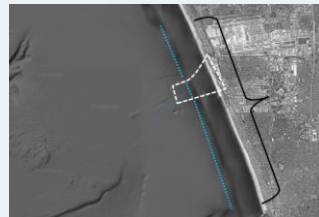
WAVE-POWERED DESALINATION LOS ANGELES PROJECT EXAMPLE (SAME CAPACITY)

Brine with a salinity of +10,000 ppm (+30%) diffused over 10 km

under +100 ppm

Based on a preliminary calculation using local currents, wave climate information

Diluted over 10 km



Potential alternative:

Mix it with the Hyperion's waste water outfall. 10x diffusion released 5 miles offshore with over 200ft depth

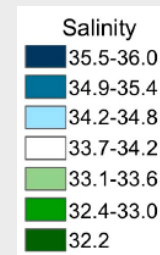
SAN DIEGO'S CARLSBAD DESAL PLANT

Brine with a salinity of + 45,000 ppm (+ 120%) diluted 10x in a powerplant's outflux and diffused at a single point right on the shallow beach

+2700 ppm

Value measured at over 200m from the outfall. Carlsbad got a derogation to move the point of measure to 200m instead of 100m. The impacts on the environment seem limited even in that situation. (Peterson, 2019)

Sanity variation chart



MANAGEMENT



DRAGAN TUTIĆ, P. Eng
Founder & CEO

- Vision
- Partnerships & Team
- Strategic planning & Sales
- Fundraising



ALAIN-OLIVIER DESBOIS, CFA
EVP Impact, Partnership, Financing

- 25 years experience impact financing, Cleantech VC, coach and strategist for startups and PE/VC funds



SHAWN MEYER-STEELE,
Chief Commercial Officer

- Desalination market veteran
- Caribbean Desal Asso. President
- Previously with Ionics, VP ERI, VP Seven Seas Water (all exited)



JOEL DION P.Eng PhD
Lead Engineer

- Experienced in innovative R&D product development
- Complex problem solver & synergy with field team

MULTIDISCIPLINARY TEAM OF >25 EMPLOYEES

- ✓ Ocean Engineering and Modelling
- ✓ Mechanical Engineering
- ✓ Marine Operations and Experience
- ✓ Desalination
- ✓ Finance, Sales & Marketing
- ✓ Build dedicated manufacturing team
- ✓ Satellite offices in Nova Scotia, Canada & Florida, USA

ADVISORS & COMMITTEES

BUSINESS DEVELOPMENT



TOM RYAN

Climate Governance Expert
CleanTech Finance &
ESG Metrics Specialist



MARK LAMBERT

Desalination industry and Water
project financing expert. Previously
IDE Tech CEO (Carlsbad Desal)

TECHNICAL ADVISORY BOARD



PETER TYSZEWICZ

Operations, Manufacturing and Scaling
Specialist. CEO Core Energy Recovery,
Previous Executive in Wind, Hydrogen,
Solar, Automotive Sectors



COLIN RYAN

Industrial Equipment Developer
Supply Chain Expert,
Serial Entrepreneur, Former
CanSolv Shenzhen CEO, Effenco CEO



PIERRE CÔTÉ

Expert in membrane and filtration
technologies, Zenon's CTO
Veteran in the Desalination Industry



ALAN TAYLOR

Naval Architecture & Engineer
Renewable Energy Project Finance
Marine Technologies Expert