



WAVE POWERED SUSTAINABLE DESALINATION PROJECT

Making the oceans a sustainable
and affordable source of drinking
water



Presented by Dragan Tutic
CEO & Cofounder of Oneka Technologies
November 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



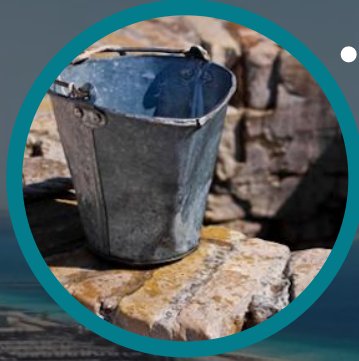


Fort Bragg City water challenges



- ✔ Dependence on rainfall and riverwater for water supply
- ✔ Repetitive droughts strained the water supply
- ✔ Brackish water desalination plant added as supplement
- ✔ Water availability too low to supply local communities and required expensive supplemental long-haul trucking
- ✔ Situation unlikely to improve naturally
- ✔ Long-term, affordable & sustainable water supply is required

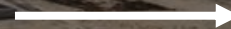
**WATER
SCARCITY**



**CONVENTIONAL
DESALINATION**



**CLIMATE
CHANGE**



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

=

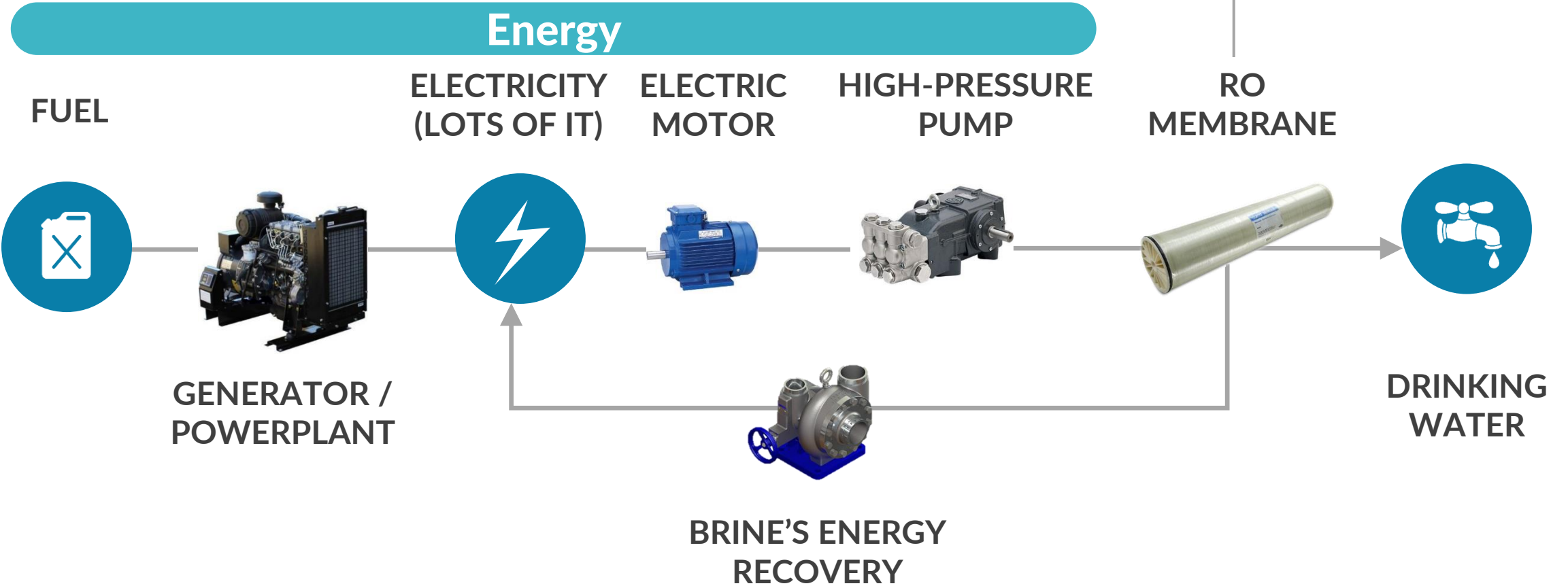
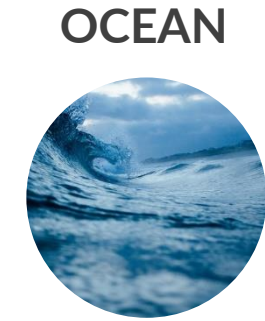
~ 5 %

of today's world's CO₂
emissions

about twice the
aviation industry

CONVENTIONAL DESALINATION IS NOT SUSTAINABLE

A GROWING ALTERNATIVE



CONVENTIONAL DESALINATION TURNS FUEL INTO WATER



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

RESOURCE
(Water)

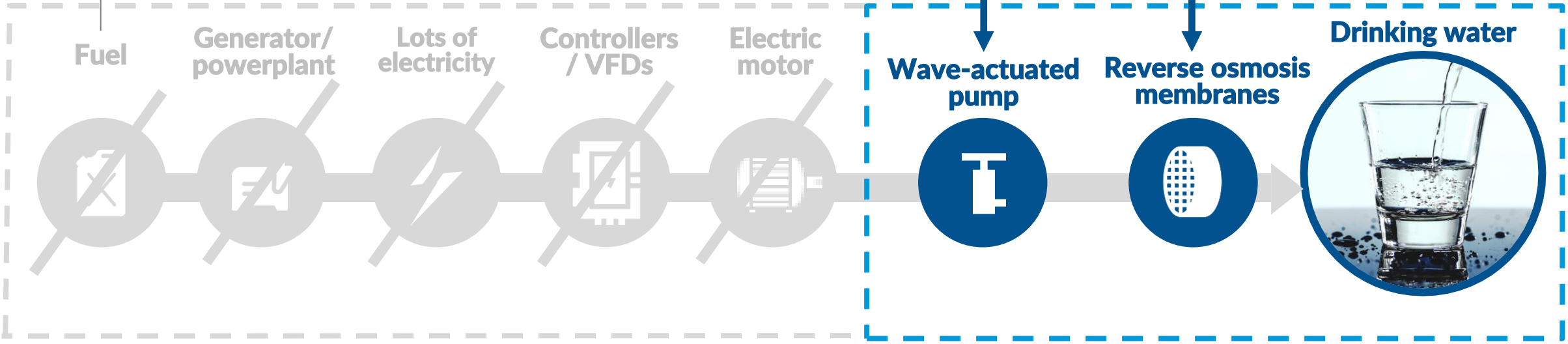
ENERGY
(Waves)

PROXIMITY
(to coastal
populations)

ONEKA SUSTAINABLY TURNS WAVES INTO WATER



30-50% of
cost eliminated



Conventional desalination extra components

Oneka

Ocean



Energy

Resource

Fuel

Generator/
powerplant

Lots of
electricity

Controllers
/ VFDs

Electric
motor

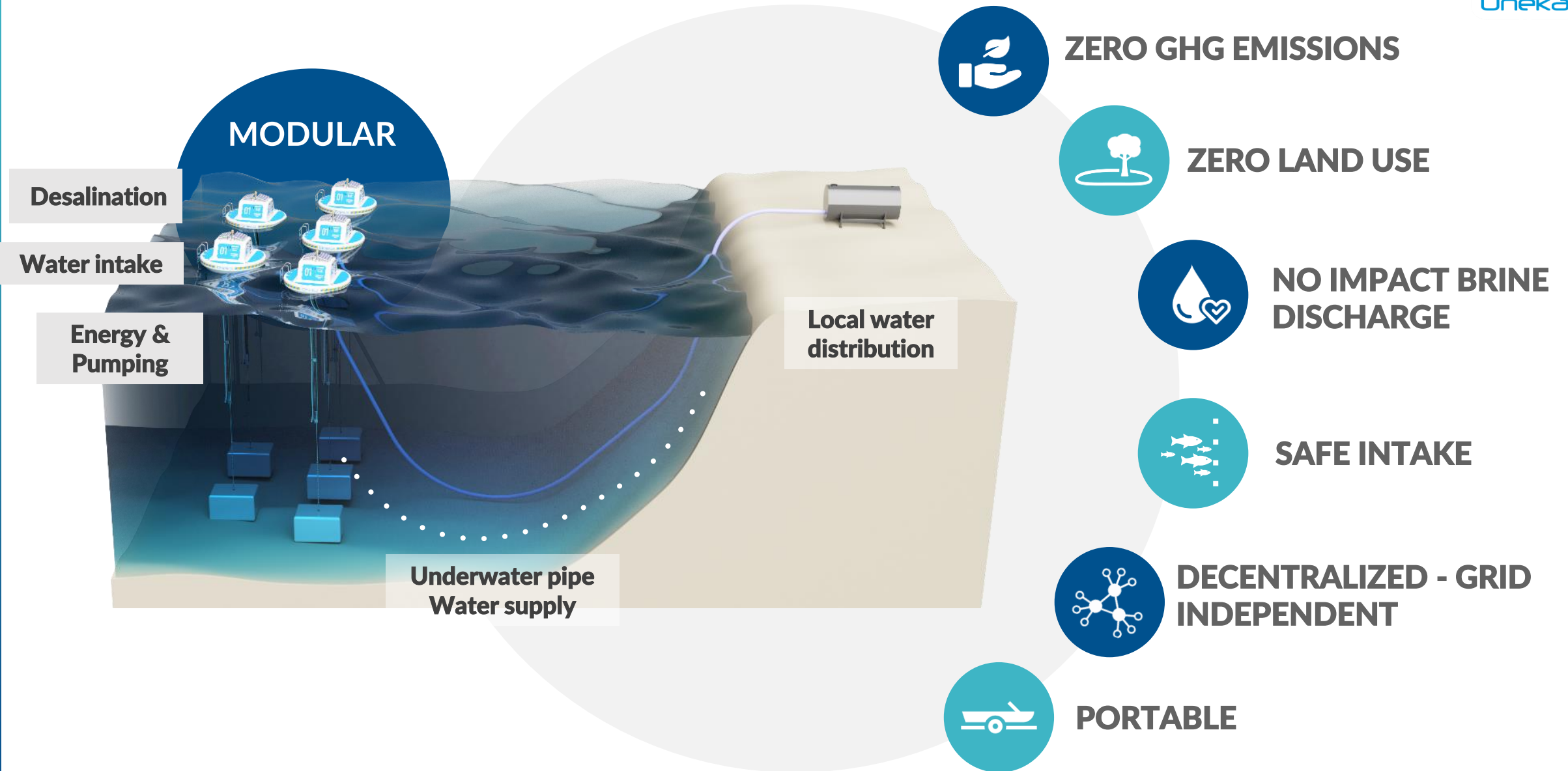
Wave-actuated
pump

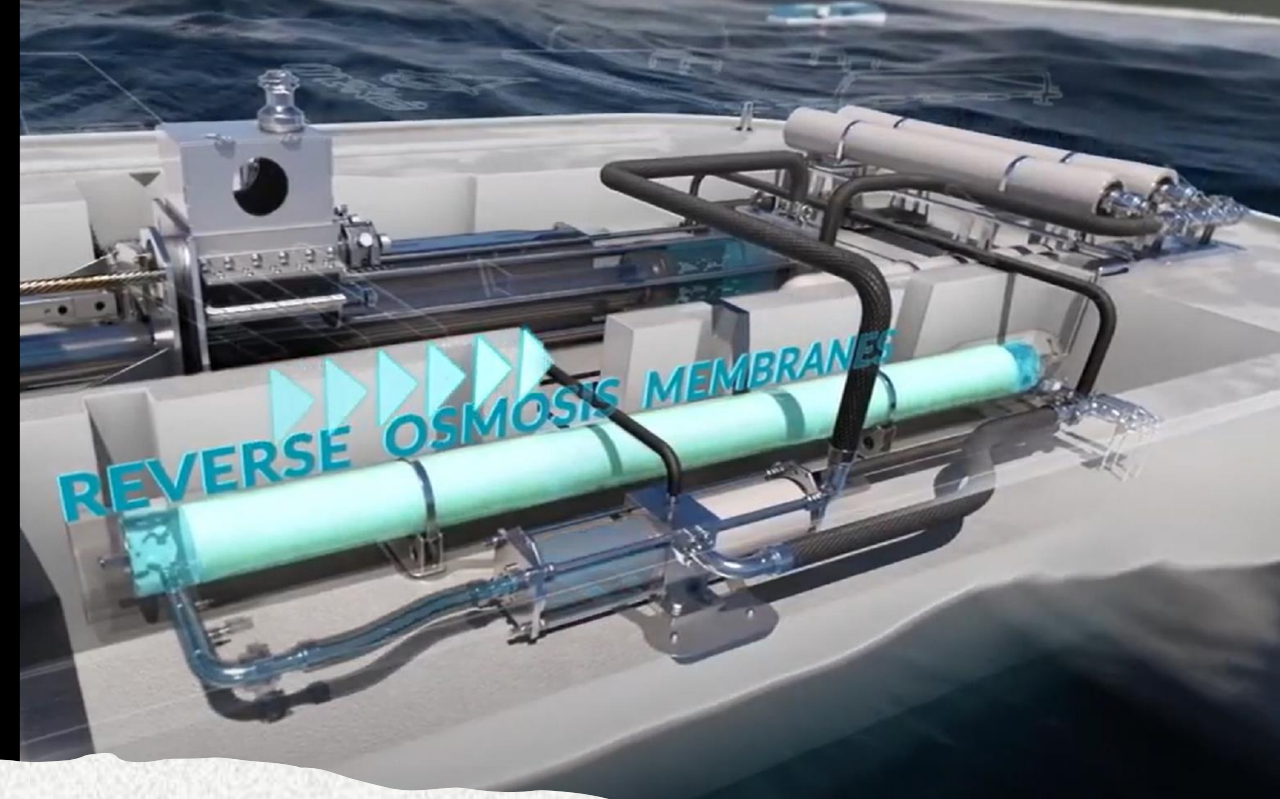
Reverse osmosis
membranes

Drinking water



ONEKA'S WATER TAP FROM THE OCEAN

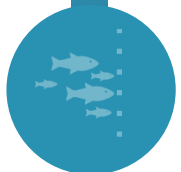




3D VIDEO EXPLAINING HOW IT WORKS

Link sent in chat

CARBON-FREE DESALINATION PROCESS



AVOIDED CARBON EMISSIONS:

Saves about
1 m³/d of desalinated water produced = 0.75 to 1 ton of CO₂e per year

Compared to fossil-fuel powered high efficiency desalination (with ER)

Small community project example

3500 m³/d project (for Fort Bragg)
(640 gpm)

2500 to 3500 T of CO₂e saved per year

Large project

185,000 m³/d for larger city needs
(50 MGD)

140,000 to 185,000 T of CO₂e saved per year

G R O U P E
AGĒCO

Preliminary assesement based
on the Project International
Standard - Part 2 (ISO 14064-2)
on the Oneka Technology

New study planned in 2023

No Land or Visual Impact

Nova Scotia, Canada, 2020

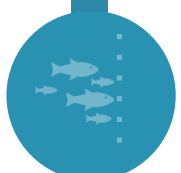


1 mile offshore

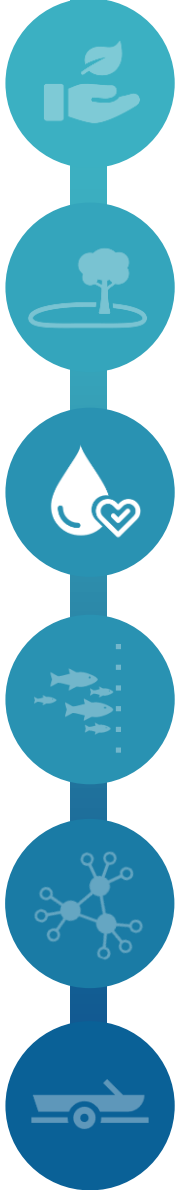
Algarrobo, Chile, Nov 2022



0.5 mile offshore

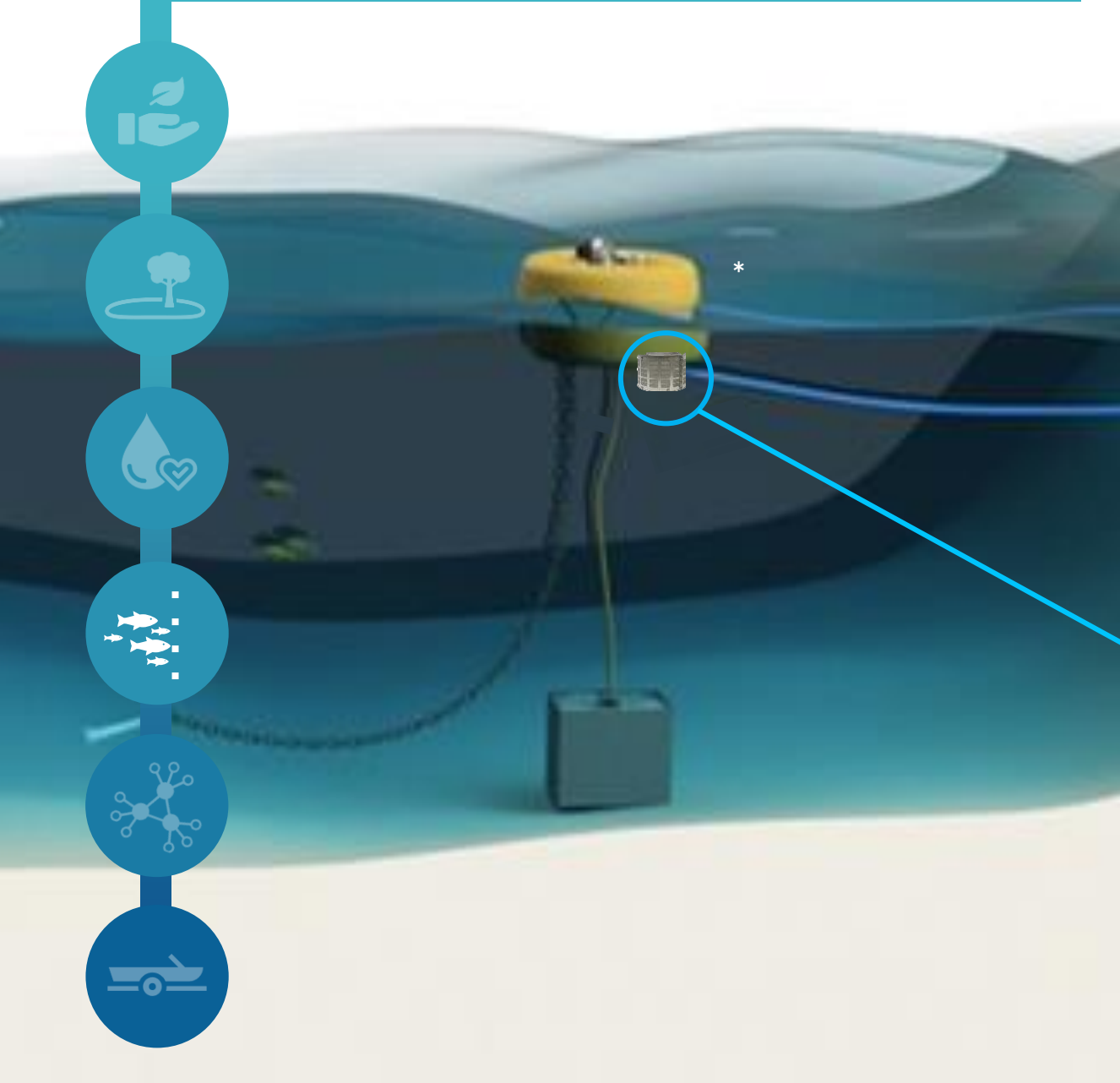
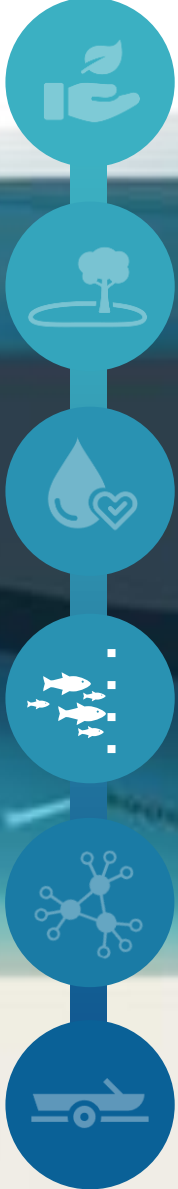


Responsible Brine: Low Concentration + Effective Diffusion



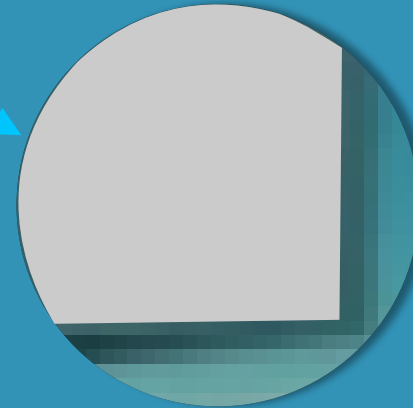
	WAVE POWERED DESALINATION	CONVENTIONAL DESALINATION
Salinity	<p>±35% higher salinity than seawater</p> <p>High efficiency energy recovery enables low recovery and reduces membrane fouling</p>	<p>±100-150% higher salinity than seawater</p> <p>Maximize recovery for energy cost efficiency, results in high 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



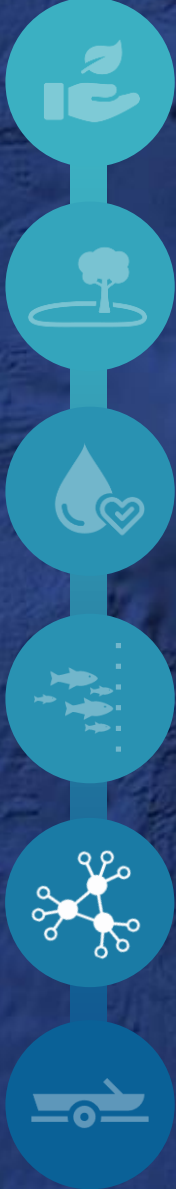
Engineered to protect sea life:

- ✓ 60-micron-size intake holes to prevent harmful impact on ecosystems (adjustable)
- ✓ 60 micron is smaller than nearly all fish larvae at any stage including egg
- ✓ Backwashed to reduce maintenance and ensure enhanced suction protection



*ONEKA ICECUBE UNIT
AS AN EXAMPLE
(EMERGENCY RELIEF)

Decentralized Water Output: Minimize Infrastructure Costs



New potential water source locations

Fort Bragg

Mendocino

Examples of communities exposed to water scarcity risks

Covelo, California

Laytonville, California

Willits

Ukiah

Lakeport

Gualala

Sea Ranch

Easily Movable, Portable



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

The same P1 unit was installed, operated and moved to:

- Nova scotia, Canada, 2020
- Florida, USA, 2021
- Algarrobo, Chile, 2022

Oneka P1 Towing in Nova Scotia,2020



Iceberg unit towing in Florida,2022



VIDEOS SHOWING THE TECHNOLOGY OPERATING IN CHILE & FLORIDA

Video link sent in chat



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

AWARD WINNING TECHNOLOGY

US DOE - WAVE TO WATER PRIZE GRANDPRIZE



- World renowned competition
- Total of \$1,3M CAD in winnings
- 1st place among 70 participants
 - Highest water production
 - Best water quality
 - Fastest assembly & deployment

PEERS RECOGNITION



2022 Innovation Award



Innovative game-changing desalination or water reuse technical solution reaching a commercial stage.

Voted by a panel of industry experts

MARKETS & PRODUCT CLASSES

READY FOR COMMERCIALISATION

SMALL-SCALE

Remote coastal bases, disaster recovery, coastal refugee camps



ICECUBE

1000 L/d per unit

- Diameter: 1.5 m

MID-SIZE

Communities, Resorts/Tourism, Small Industries.



ICEBERG

50 m³/d per unit

- < 2000 m³/d projects
- Eq. diameter: 6 m

IN DEVELOPMENT

UTILITY SCALE

Municipal, Mining, Large industries, Ag.



GLACIER

500 m³/d per unit

- < 10 000 m³/d projects
- Eq. diameter: 12-15 m

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 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

*Flexible installation
approach to minimize
environmental impacts

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



**Employment of
Local people &
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**



**Increases Community
Resilience to Drought**



**Monitoring of Water
Quality & System
Performance**

ONEKA'S ICEBERG – Pilot project Unit

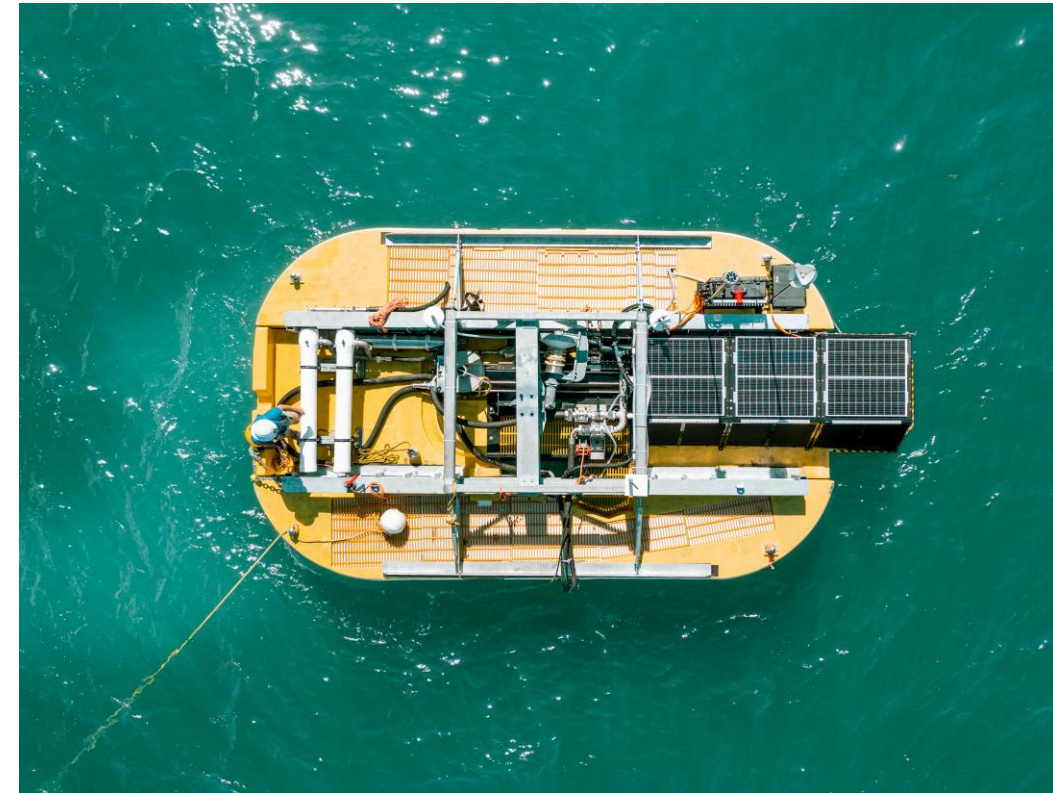
Typical Project Deployment – up to 40 units :

< 2 000 m³/d or 520 000 gallons per day per full scale project

Pilot project : 1 single unit

Capacity per Iceberg : 50 m³/d or 13 000 gallons per day

Ed diameter : 6,5 m || 20 ft



Pilot Project permitting



The California Ocean Plan’s Desalination Amendment (OPA) provisions don’t apply with the following conditions :

OPA Criterion (at M.1.a.)	Oneka Pilot Project Satisfies Criterion?
“desalination facilities that are operating to serve as a critical short-term water supply during a state of emergency declared by the Governor”	Yes
portable desalination facility	Yes
withdraw less than 0.10 MGD	Yes
operated by a governmental agency	Yes

GENERAL PERMITTING PROCESS SUBJECTS

ENVIRONMENT: OCEAN - BEACH & COAST

KEY CONCERN(S)

- Hard bottom impacts
- Brine
- Animal Entanglements
- Intakes

CONCESSIONARY RIGHTS

- Location
- Ocean, coastal and land use

NAVIGATION SAFETY

- Navigation international codes
- IMO safety standards

HEALTH

- Water quality
- WHO standards

Oneka is working with governments and local agencies to minimize negative impacts and maximize positive impacts of each project we undertake.

Building and implement best practices and strong relationship with local communities is central to our permitting process.

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-)

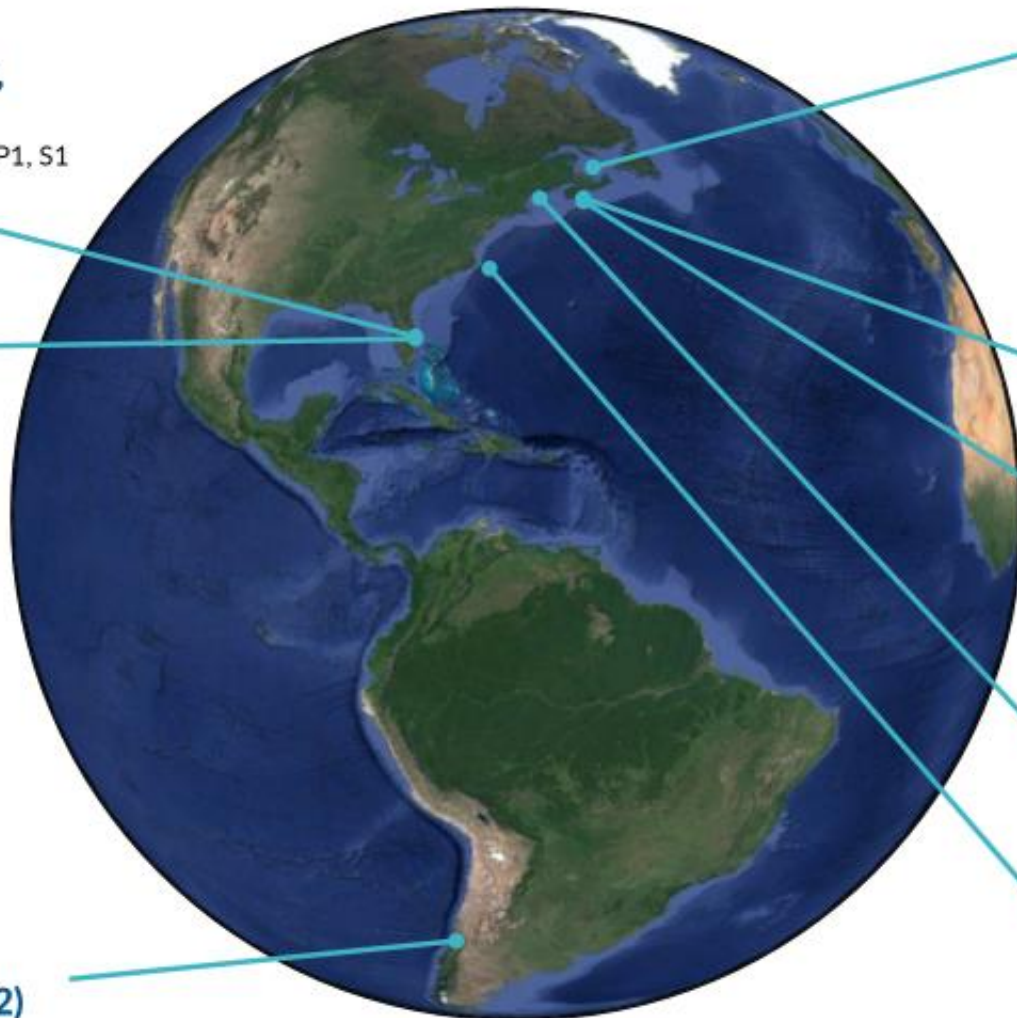
5-yr+ Commercial site permitting
Including pipe to shore
(Reviewed by USCG, USACE, FDEP, FWC, FWS, NFMS)

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

Use the pilot project to conduct studies



Potential studies that could be conducted 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.

MANAGEMENT



DRAGAN TUTIĆ, P. Eng
Founder & CEO

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



ALAIN-OLIVIER DESBOIS, CFA
EVP Impact & 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)



ALEXANDRE BERTRAND P.Eng, MBA
VP of Operations

- Goal-oriented management executive in operations, engineering and manufacturing.
- Execution & quality processes expert

MULTIDISCIPLINARY TEAM OF > 30 EMPLOYEES



Ocean Engineering
and modelling



Mechanical
Engineering



Marine Operations
and experience



Desalination



Build dedicated
manufacturing team



Offices in Qc, Canada &
Florida, USA

FORT BRAGG BENEFITS FROM THE PROJECT



TRANSITION

to a sustainable water solution



ALIGNMENT

with its Blue Economy Initiative goals



INCREASE

community resilience to climate change

AND CALIFORNIA



OPPORTUNITY

to demonstrate a new scalable & sustainable desalination solution adapted for the state



Project proponent – City of Fort Bragg

John Smith, Director of public works

jsmith@fortbragg.com
+1 (707) 961-2823

Technical support - Oneka Technologies

Dragan Tutic, CEO & Founder

DT@OnekaWater.com
+1 819-485-0335

Pilot Project permitting



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:

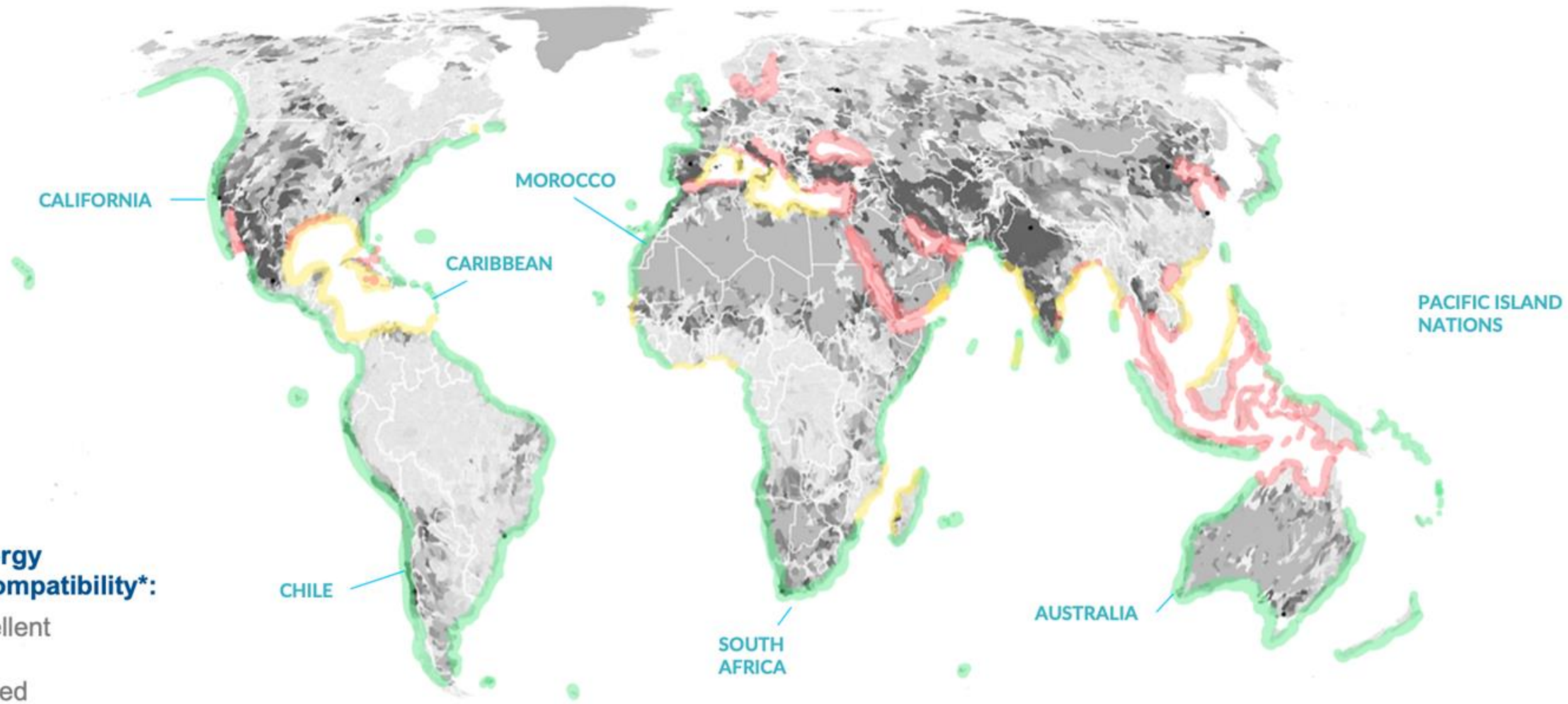
1. “desalination facilities that are operating to serve as a critical short-term water supply during a state of emergency declared by the Governor” would not need to comply with any of the OPA;

The unit of the pilot project would be sold to the city of Fort Bragg who would also own it (exception to typical business model)

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).

WAVE ENERGY MEETS WATER SCARCITY



Wave Energy density compatibility*:

- Excellent
- Ok
- Limited

*approximative zones for indicative purposes

Market examples facing water scarcity

ADVISORS



BUSINESS DEVELOPMENT



MARK LAMBERT

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

TECHNICAL & OPERATIONS



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

Advantages of Oneka vs Renewable Energy + DESAL

- ✓ No land costs
- ✓ No building
- ✓ No electrical motors, electrical panels or components (except sensors for info.)
- ✓ No need for batteries or grid connection
- ✓ No losses in energy conversion
- ✓ No additional intake costs
- ✓ No pretreatment energy costs
- ✓ Sustainable brine discharge

Advantages of Oneka vs fuel + desal

In addition to RE Desal comparison

- ✓ No fuel needed
- ✓ Potential CO2 avoidance/reduction monetization

Fundamentals vs other conventional desal solutions