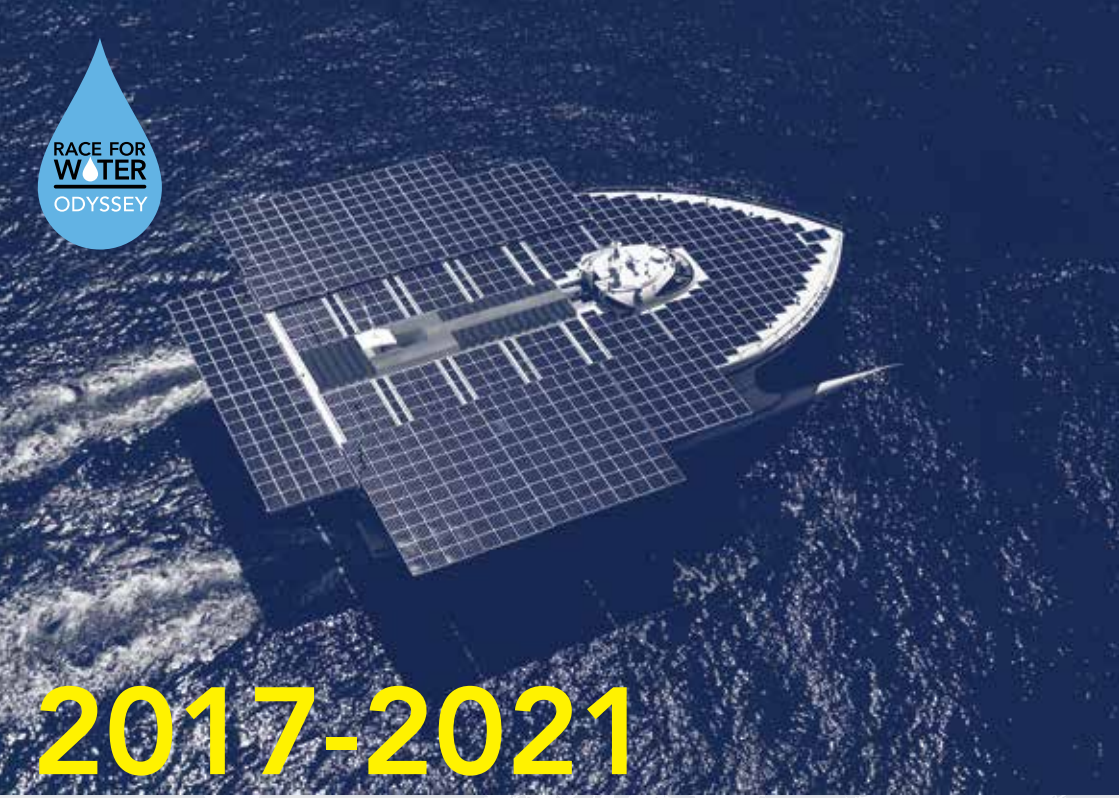
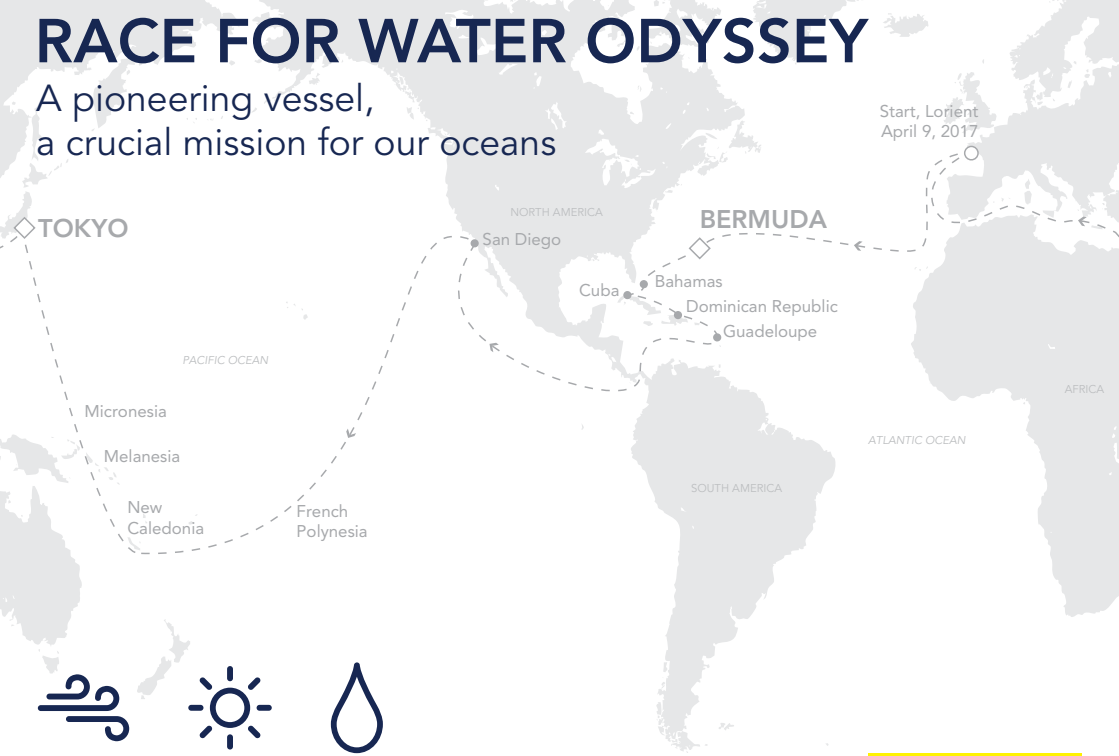


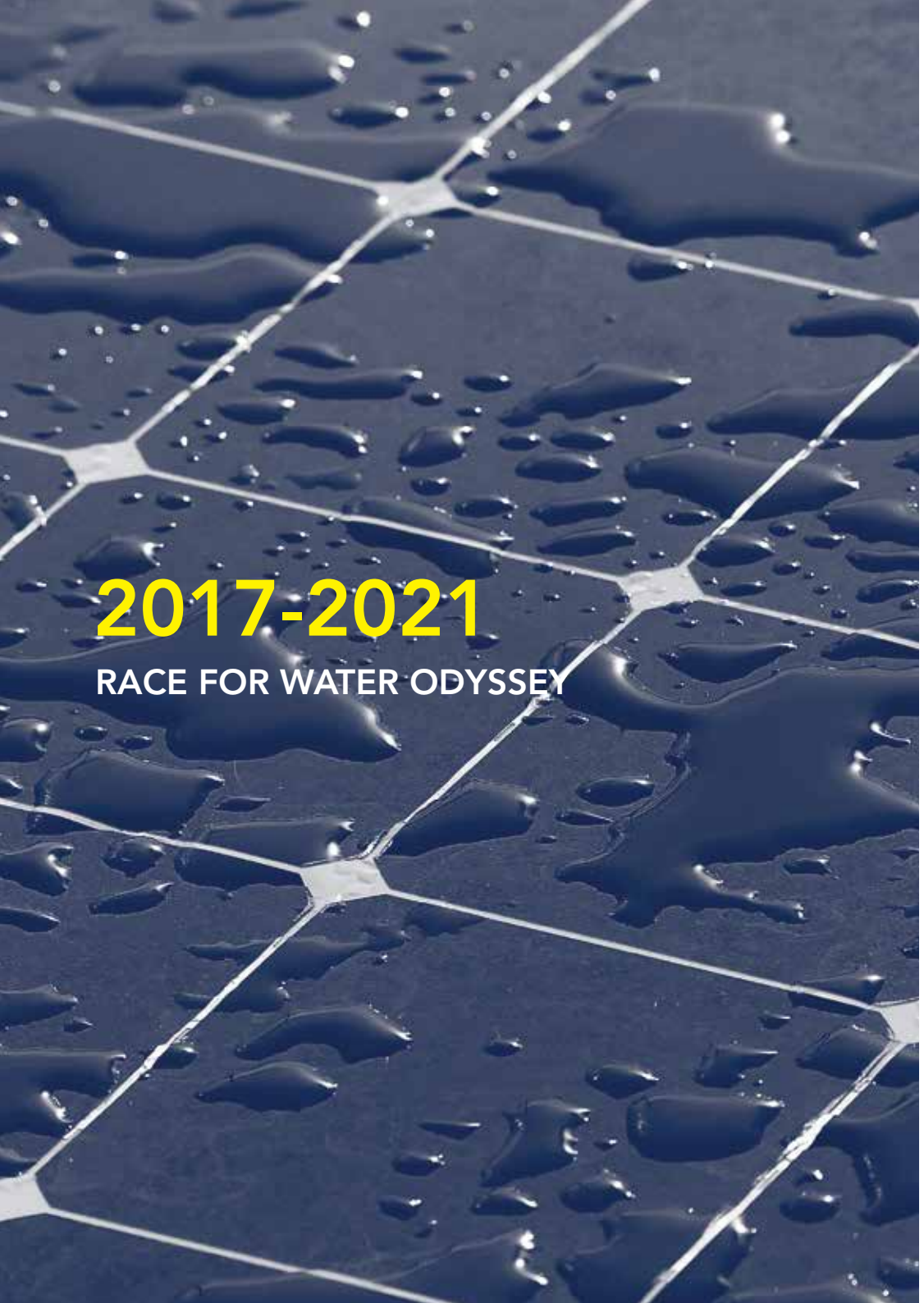
2017-2021

RACE FOR WATER ODYSSEY

A pioneering vessel, a crucial mission for our oceans



MEDIA GUIDE



Bringing hope to ocean preservation: solutions do exist

"This new expedition is going to demonstrate that real solutions exist for the conservation of the ocean. On the one hand, we will be accelerating energy transition with our mixed solar-hydrogen-kite-powered vessel. On the other hand, we are going to further advance research toward a clean energy transition by integrating technology capable of transforming plastic waste into an energy resource with environmental, economic and socially sustainable benefits."

Marco Simeoni
President of the Race for Water Foundation

"The ocean is at the heart of the United Nations' sustainable development goals. The innovative hybrid solar-hydrogen propulsion system of the *Race For Water* vessel will advance the vital cause of energy transition. This is an essential project for the conservation of the oceans, our most precious resource."

Michael Møller
Director-General of the United Nations in Geneva

1

THE RACE FOR WATER FOUNDATION

In 2010, the Swiss entrepreneur, Marco Simeoni, created the Foundation in Lausanne and devoted all of his entrepreneurial spirit to the service of the oceans. With his passion for the sea, he decided in 2015 to launch a scientific and environmental expedition, the Race for Water Odyssey, to make the first one-swoop global assessment of our ocean's plastic pollution.

The conclusions were clear: "plastic islands" do not exist. In effect, the idea of collecting plastic waste at sea turns out to be an utopian dream. Instead, in the middle of the oceans there is a "soup" of microplastics that swirls in the oceanic gyres. "We quickly realized that the long-term solution was here, back on land," Simeoni says. "It is absolutely essential to prevent plastics from leaking into the ocean."

This year, Race for Water is embarking on a second oceanic tour with this new Odyssey. We aim to provide concrete, technology based solutions for the preservation of the ocean. "In 2015, we were, in the final analysis, powerless up against the scale of the problem of plastic pollution of the ocean. With the 2017-2021 Odyssey, and its integrated mixed solar-hydrogen-kite-powered vessel, we want to demonstrate that sustainable solutions for ocean conservation can be realized thanks to innovative technologies."

Our missions

1. To promote innovative solutions capable of transforming plastic waste into energy resources (a machine developed with our partner ETIA, whose pilot project will be carried out in autumn 2017).
2. To accelerate the clean energy transition by improving the mixed solar-hydrogen-kite power of our ambassador vessel, the *Race for Water*.
3. To contribute to science by hosting international teams of researchers and educational science projects on our vessel.
4. To raise awareness among decision-makers, the general public and younger generations about the urgent need to conserve the oceans.

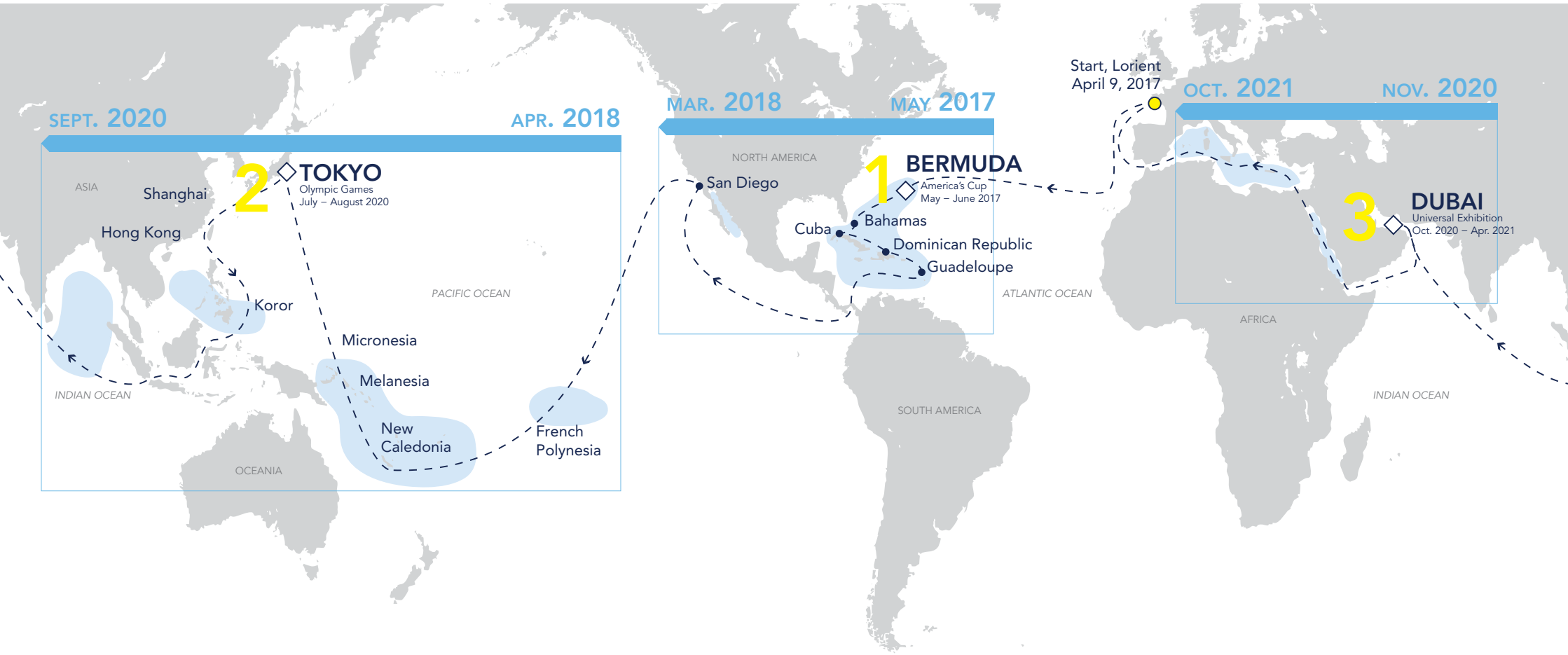
The Race for Water Odyssey

For 5 years, the *Race for Water* vessel will travel around the world to promote solution to preserve the ocean from pollutions. The route has been organised around two objectives:

- ◇ Making stopovers at international events with the goal of raising awareness among decision-makers and the general public about the different solutions proposed by the Foundation.
- • Welcoming scientists and students on board the Odyssey, for research, training, and information sharing.

1 **First Stovover**
Bermuda – America's Cup 2017
Dates May to June 2017
Location Bermuda archipelago
Ocean zone Atlantic Ocean, Sargasso Sea
Scientific programs Ephemare and Weather-MIC
Event America's Cup

2 & 3 We will participate in two other major international events: the Tokyo Olympic Games in 2020 and the Universal Exhibition of Dubai in 2021.



The Race for Water Odyssey team

Sailing the world's first mixed solar-hydrogen-kite powered vessel is a technological achievement that has required the support of many engineers, professional sailors and experienced technicians. The Race for Water Odyssey team is an eclectic mix, composed of a great variety of talents, all united around the same passion for the oceans and offshore racing.

After more than a year of preparation, the project will come to fruition with the launch of the Odyssey in April 2017 in Lorient. On the program: festivities, meetings and shared moments on board the ambassador vessel. The adventure is just beginning; some are heading out to sea while the others will remain at base in Lorient to ensure the Odyssey runs smoothly.

Marco Simeoni, head of expedition
Gérard d'Aboville, vessel captain
Pascal Morizot, offshore captain
Annelore Le Duff, first officer
Annabelle Boudinot, first officer
Martin Gavériaux, energy engineer
Charles-Henri Gremaud, energy engineer
Anne Le Chantoux, seaman
Olivier Rouvillois, intendant
Franck David, head of operations
Jean-Marc Normant, technical manager
Franklin Servan-Schreiber, director of communications
Laure Lunven, media relations
Peter Charaf, filmmaker
Luce Molinier, project manager

"Tangible solutions are needed to solve the problem of ocean pollution. Race for Water is giving us hope. Being the skipper, even if I'm there intermittently, on such a pioneering expedition in terms of the energy mix, is exactly the kind of experience and challenge by which I like to measure myself!"

Gérard d'Aboville
Skipper of Race for Water

2

THE STATE OF OCEAN POLLUTION

Some data to underline the urgent need to preserve the oceans

80% of marine debris is made of plastic

Toxic plastic waste is carpeting the bottom of the ocean

Here we identify extraordinary levels of persistent organic pollutants in the endemic amphipod fauna from two of the deepest ocean trenches (>10,000 metres). Contaminant levels were considerably higher than documented for nearby regions of heavy industrialisation, indicating bioaccumulation of anthropogenic contamination and inferring that these pollutants are pervasive across the world's oceans and to full ocean depth.

Nature, ecology & evolution, February 2017.

More plastic than plankton

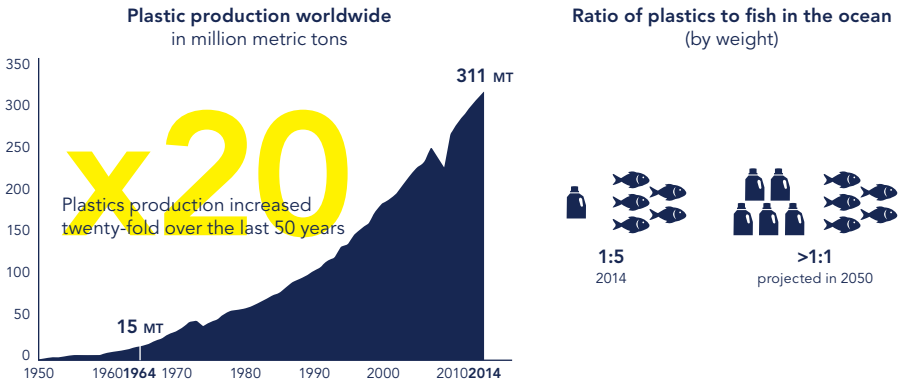
Seven expeditions are being carried out in this area of 3.4 million km², which is commonly referred to as the "Great Pacific Garbage Patch". The team counted an average of 334,271 fragments of plastic per km² there, with a peak of 969,777 fragments per km². The mass of plastic is six times higher than that of plankton, with an estimated weight of several tens of thousands of tons to several millions, according to different studies, whose calculation methods and results diverge.

Le Monde on a study by Charles Moore, May 2012.

Uncontrolled growth of plastic production

By continuing with the existing system of production, use and disposal of plastics, the ocean will contain more plastic than fish (by weight) by 2050.

It is estimated that there will be more plastic produced in the next ten years than has been produced since the beginning of its industrialisation in the 1950s.



Study by McKinsey and the Ellen MacArthur Foundation, January 2016.

Public health threats from container ship pollution

In a study published at the beginning of June 2016, the University of Rostock and the German environmental research centre, Helmholtz Zentrum Munich, established an unequivocal link between container ship exhaust gases and certain serious human diseases. According to this study, emissions from maritime transport cause 60,000 premature deaths a year in the European Union alone. The cost for European health services: €58 billion.

Le Monde, July 2015.

The ocean is our planet's biosphere

71% of the earth's surface is made up of ocean. But it is the volume that is interesting: the average depth is 3,800 metres, so if you look at the volume of the ocean, it represents 99% of the volume available for life in the biosphere.

Gilles Bœuf, biologist and professor at the University of Pierre and Marie Curie - RFI Radio, March 2017.

3

FROM PLASTIC WASTE TO AN ENERGY RESOURCE

After traveling the world's seas, the Foundation set out in 2016 to find solutions to prevent plastic waste from leaking into the ocean. "An idea occurred to me during a conversation with a street collector," Marco Simeoni explains. In many cities around the world, collectors are paid to collect aluminium, glass, cardboard and even the PET, and the system supports them (recycling, burning etc.). However, they do not pick up the plastics because they have no market value. "Together with our industrial partner, ETIA, we have come up with a technology capable of transforming end-of-life plastics into energy, be it gas or electricity," Simeoni says. "The sale of this energy will allow us to pay the street collectors, which will encourage them to pick up end-of-life plastics." The machine for converting plastic waste into an energy resource uses a unique and patented gasification process. The machine is currently in production and the Race for Water Foundation is waiting for delivery in the autumn of 2017, before launching a six-month pilot project.

"ETIA is continuously developing the manufacture of processes for energy recovery from waste and residual plastics in order to convert them into renewable energies, particularly those adapted to remote ecosystems (a gasification process for the production of electricity, methane and hydrogen). It is therefore natural that ETIA wished to associate itself with the Race for Water Foundation in order to develop industrial and economic solutions that are addressing both the threat of pollution of the ocean by flows of waste plastics, but also to the growing energy needs of islands and coastal towns directly impacted by this pollution."
Olivier Lepez, managing director of ETIA

This innovative technological approach demonstrates that remote plastic waste can be an additional resource in energy transition while generating social, economic and environmental benefits.

The way the machine works

All organic matter contains energy, called calorific value. For example, when wood is burned, it emits energy that is felt in the form of heat. Plastics also have a high energy potential.

A patented process, called Biogreen®, enables the exploitation of the calorific values of materials such as biomass, plastic and even fuel residues through various reactions such as pyrolysis, torrefaction and gasification. Pyrolysis is achieved by heating organic material at a high temperature in the absence of oxygen. Beyond a certain temperature, the material decomposes chemically and is transformed into other states; gases, liquids or solids.

In order to recover the calorific value of plastic, mainly in the form of a gas, a simple pyrolysis reaction is not sufficient. It is necessary to go further by carrying out pyrolysis at very high temperatures, still without oxygen. This heat treatment makes it possible to break up the carbon chains that make up the plastic. This oxygen-free carbonisation leads to the production of a synthesis gas called Syngas, mainly composed of methane and hydrogen.

During this Biogreen® process, high-temperature pyrolysis is carried out using an innovative and unique piece of equipment, the Spirajoule®. This long screw pushes the plastic material into a sealed compartment while heating it by Joule effect. Thus, the material travels at a consistent speed within the apparatus and the temperature of the screw can be controlled very precisely up to temperatures of 800°C. This makes it possible to perfectly adjust the duration and the temperature according to the material due to be treated and to the desired final product. In the case of a treatment at 800°C, the objective is to maximise the yield of Syngas and to achieve the most complete transformation of the plastics as possible.

The Syngas is then cleaned through various stages of filtration, purification and condensation. The goal of this crucial step is to remove dust, fine particles, tar-like fatty acids, condensable gases, as well as undesirable molecules such as chlorine and other pollutants. The gas is thus purified, non-toxic and can be used as fuel in engines or turbines to generate electricity. It is also possible to extract and resell hydrogen or methane fractions directly.

The solid and liquid residues resulting from this transformation are optimised since the gaseous fraction reaches up to 80%.

Installing the machine

Compact, modular and mobile, it takes only a few weeks to install a unit that can process 5 to 12 tons of used plastics per day. Several machines can operate in parallel in order to achieve greater processing capacities. The Biogreen® plant meets the strictest environmental standards and is CE certified. These small and medium capacity technical solutions encourage decentralised waste management and energy production. And such business models, already tried in some Nordic countries, are recognised for their efficiency, as well as their social and environmental benefits.

1 Job creation
Not-for-profit collect organisation

2 Turning plastic waste into energy
Innovation technology managed by local cooperatives

3 Creating economic value
Profitable outputs

Strategic objectives

By 2025, we want our model to be replicated on a global scale and to have a lasting impact in the following 3 areas:

1 **Environmental**
Safeguard human health and species survival by materially reducing the amount of plastic waste reaching the ocean every year.

2 **Economic**
Transform more than two million tons of plastic waste a year into energy; which corresponds to providing electricity to nearly a million homes.

3 **Social**
Provide income to more than 240,000 street collectors around the world.

"The canton of Vaud is a region in which a large number of companies are concentrated, and which encourages the development of innovative projects. Although our main role is to encourage and promote regional economic development, we also pay particular attention to the positioning and values of the organisations and institutions we support. Like Solar Impulse, Solar Stratos and Planet Solar, the Race for Water Foundation combines the following elements: a strong sense of being rooted in the canton of Vaud, but with huge potential to reach out internationally around issues related to sustainable development. In this respect, we fully recognise the added value generated by projects focusing on the promotion of new clean technologies, especially when they emanate from Vaud's Hautes Ecoles (elite universities). The canton of Vaud, through the Department of Economy and Sport (DECS), is proud to contribute as a "Donator Supporter" to the successful development of the Race for Water Foundation's projects."

Philippe Leuba
Head of the Department of Economics and Sport of the Canton of Vaud

4

ADVANCING ENERGY TRANSITION

"The Race for Water Foundation is demonstrating that a zero-emissions future is not a utopia - it is already becoming reality. UN Environment is proud to support the round-the-world Odyssey in this innovative vessel. This quest will demonstrate the power of renewable energies and stimulate the search for new solutions to conserve our ocean from plastic pollution."

Erik Solheim
Director of the United Nations Environment Program (UNEP)

Keenly aware that plastics are not the only type of pollution facing the ocean, Race for Water is committed to energy transition. "For this new Odyssey we are sailing a vessel powered only by clean energies: solar, wind and hydrogen," Marco Simeoni says. It is essential to demonstrate that sailing with clean energy is possible and that energy transition is a reality.

The sources of energy on board

Solar

Race for Water has 500m² of *Sunpower* solar panels, totalling 38,000 photovoltaic cells. Located on the upper deck of the catamaran and on the two detachable wings, this energy source can supply 93 kWh and power the engine at an average speed of around 5 knots.

Hydrogen

Race for Water and Swiss Hydrogen SA have integrated on board a unit for producing hydrogen from seawater. It contains: 25 cylinders of hydrogen at 350 bar to allow storage of approximately 200kg of hydrogen, which will be converted into more than 2,600 kWh of electricity, i.e. 4 times the electrical storage contained in the batteries (745 kWh). The hydrogen makes it possible to be self-sufficient for six days at a speed of 5 knots.

SWISS HYDROGEN

The kite

Skysails have developed a new-generation traction kite with a surface area of 40m², which extends to a height of 150m, the equivalent of 500m² of sail on the sea or 200 kW of propulsion. It is an innovative and efficient invention, managed automatically, that will double the speed of the vessel under certain conditions and greatly enhance self-sufficiency.

SkySails YACHT

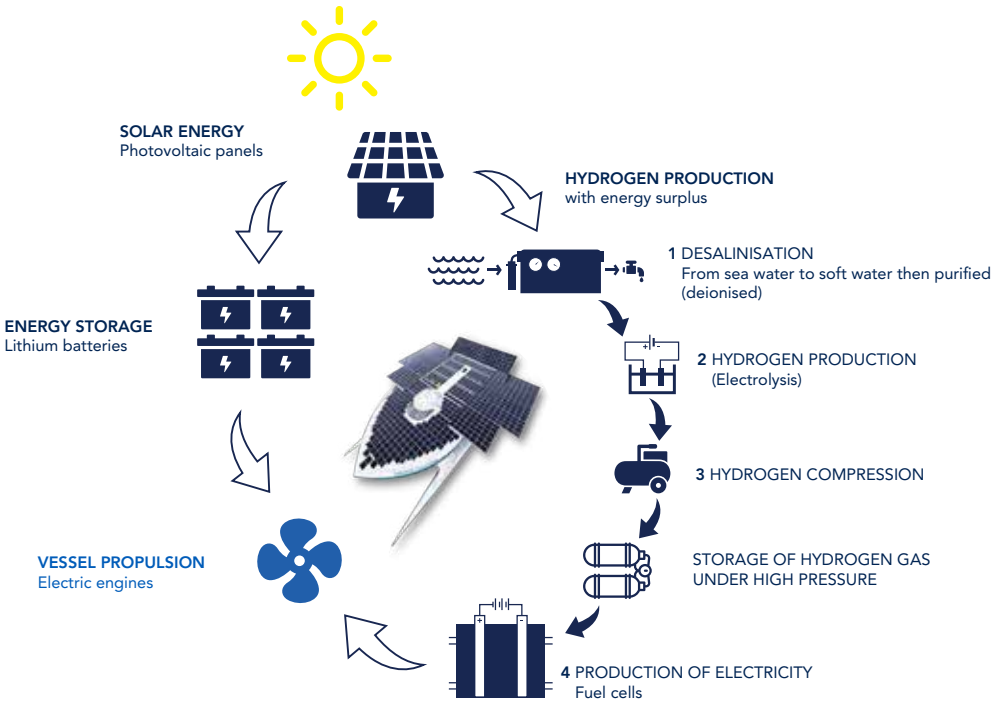
The future: the energy mix

Producing energy from solar panels is a proven technology. However, there are still limitations with batteries. The current models are not able to store energy over several weeks without some wastage. Moreover, they are bulky and heavy, with a lifespan limited to about 5 years.

The hydrogen, equipped with its fuel cell, enables efficient storage of electrical energy. While sailing, solar energy is used on the one hand to recharge the batteries to power the boat at night and on the other hand to directly power the engines of the ship and provide power for life on board during the day. When the boat is not sailing, surplus solar energy is used to produce hydrogen. When the wind allows it, the kite pulls the ship, which in turn relieves the solar, thus allowing it to be used to create hydrogen with the surplus electrical energy. The hydrogen can then be converted into electricity through the fuel cell system that will power the engines or recharge the batteries.

How the hydrogen and its fuel cell works

1. Seawater is pumped, desalinated and stored on board.
2. This fresh water is then purified before being electrolysed thanks to the surplus photovoltaic energy available.
3. The electrolyser produces hydrogen at 50 bar, which is then dried, compressed at 350 bar, and then stored in specially dedicated cylinders. Nearly 200kg of hydrogen can be stored in this way.
4. The hydrogen will be reconverted to electricity through the two 30 kW fuel cells, as required. These fuel cells maintain the charge level of the batteries or directly power the electric engine (propellers).



"As a specialist in hydrogen technologies, Swiss Hydrogen is proud to be putting its know-how and experience at the service of ocean conservation. Beyond supplying our technology, we are passionately committed to the cause being championed by Race for Water. Our hydrogen solution designed for the *Race for Water* vessel aims to demonstrate to the maritime community that clean-energy propulsion is now a viable alternative. Hydrogen technology is now mature, reliable and sustainable, both on land and at sea."
Alexandre Closset, president of Swiss Hydrogen SA

Commercially available technologies

We have chosen to develop solutions based solely on existing technologies in collaboration with commercial companies. Our solutions are therefore exploitable by those who, like us, wish to advance energy transition.

"I am pleased to be able to back another Swiss project that symbolises energy transition in a tangible way. The propulsion of the *Race for Water* vessel, based on the mix of solar, hydrogen and traction kite, will leave its mark in the history of our clean future. This solution, proposed by Race for Water, is at the cutting edge of innovation, but remains accessible to all because they have chosen to base it on commercially available technologies."
Bertrand Piccard, founder of the Solar Impulse project

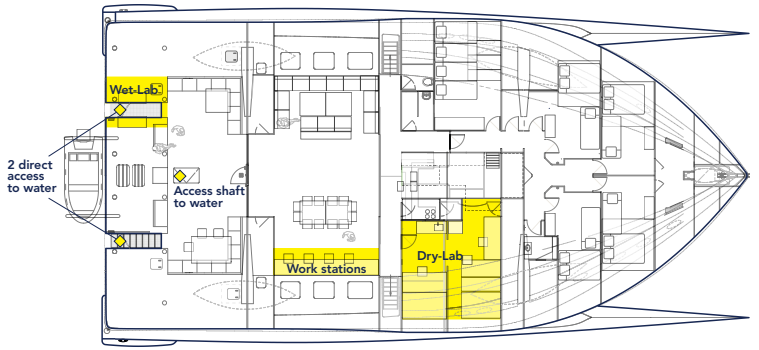
A model for islands

Islands, which are particularly affected by plastic pollution, are currently completely dependent on fossil fuels. It is only thanks to the oil brought by container ships at huge expense that they can produce the great majority of their electricity. "The *Race for Water* vessel, which operates solely on energy from the sun, water and wind, is an energy transition model for islands that have the same natural resources," Marco Simeoni says. "Moreover, throughout the 2017-2021 Odyssey, the vessel will promote a technology capable of transforming plastic waste into energy, thus providing an additional source for the energy mix."

5

CONTRIBUTING TO SCIENTIFIC RESEARCH

Adapted for scientific expeditions, the vessel, *Race for Water*, was completely redesigned in 2016 to provide optimal working conditions on board. Thanks to its 90m² dedicated to research, its stability and its energy self-sufficiency, this vessel enables teams of five to seven researchers, as well as students to travel on board.



The attributes of the *Race for Water* vessel

1. Silent propulsion, convenient for the observation of marine fauna.
2. Low-speed travel, suitable for taking samples and measurements.
3. Absence of contamination by fuel or noise emissions when sampling.
4. Two points of direct access to the sea from the boat's aft deck: provide easy access for sampling.

The layout

More than 90m² of flexible workspace.

Optional wet laboratory and winch for offshore sampling and processing in close proximity.

Independent air-conditioned dry laboratory on board, equipped with a fridge, freezer and potentially an oven.

Large common working space with various fully-equipped workstations.

Stairs with a platform for 2 divers.

Other equipment on board

A 4.5m rib, with 40cv engine

Three sets of diving equipment (suits + tanks)

Navigation systems & software

Station BATOS-Météo France

High-resolution GPS localisation

Seawater temperature measuring equipment

The scientific partners for 2017

JPI Oceans

From 2017, research teams from the European program, JPI Ocean, will take part in the Odyssey and will use the vessel, *Race for Water*, to carry out part of their studies. Established in 2011, JPI Ocean is a strategic program coordinating marine research, which is open to European member states and associated countries. Among the joint initiatives launched by JPI Ocean, the "Ecological Aspects of Microplastics" program brings together 4 projects around microplastics including EPHEMARE and WEATHER-MIC.

EPHEMARE

Directed by Professor Ricardo Beiras (University of Vigo, Spain), the EPHEMARE project studies the ecotoxicological effects of microplastics on marine ecosystems (pelagic and benthic).

Team: Mr Ricardo Beiras and other scientists (up to 7: Vigo University (Spain), Marche University (Italy) and Bordeaux University (France)) will travel on board *Race for Water* to take samples.

Sampling: Water, plankton

Sampling area: Around Bermuda archipelago and Caribbean region

WEATHER-MIC

The WEATHER-MIC project, led by Dr Annika Jahnke (UFZ Leipzig, Germany) and Dr Hans Peter H. Arp (NGI Norway), aims to study the aging of microplastics in the marine environment in order to better understand their interactions.

Team: Mr Hans Peter Arp and other scientists (up to 4) will travel on board *Race for Water* to take samples.

Sampling: Sediments, water, plankton

Sampling area: Caribbean region (Cuba, Bahamas etc.)

Plankton Planet

The Plankton Planet project runs studies taking the pulse of plankton biodiversity and the health of our ocean on appropriate spatial-temporal scales through innovative oceanography and sailing volunteers. Supported by researchers from the CNRS and the Tara-Océans team, citizen sailors harvest marine plankton during their trips. These samples are then analysed by international experts in oceanography.

Project Coordinators: Colomban de Vargas (Research Director at Roskoff and 'Plankton Planet' (Project Director)), and Calixte Berger (Manager of the Plankton Planet project)

Team: Up to 6 scientists on board for 3 to 4 weeks. Project to be implemented - 2017 (field missions planned for 2018)

Nature of the study: Using the imaging capabilities on board *Race for Water*

Area of study: Oligotrophic zone

"Several partners of the European research project, EPHEMARE, on microplastics (16 scientific partners from 10 different countries), including ours at the University of Bordeaux, are involved in the new Odyssey expedition being led by the Race for Water Foundation.

Thanks to the *Race for Water* vessel, we will be able to study the effects of microplastics on marine species in the Bermuda and Caribbean areas. Our interest in collaborating with Race for Water is twofold. On the one hand, to have access to environments in which you cannot take samples without a boat. On the other hand, this vessel should make it possible to raise awareness among as many people as possible about the conservation of the ocean, what we do as researchers in our laboratories, and the implementation of tangible solutions."

Jérôme Cachot
Professor in ecotoxicology, University of Bordeaux

"The collaboration with the Race For Water Foundation began as part of the pilot project (2015-2016) of our Plankton Planet program. It was the first citizen biological oceanography program, based on the mass sequencing of DNA extracted from plankton communities, the largest network of planetary life that produces half our oxygen and regulates our climate.

Building on our first partnership, and given our mission, we were attracted by the new vessel acquired by the Foundation, which is 100% energy self-sufficient and has been completely refurbished to welcome scientists on board.

The vessel, *Race For Water*, has everything needed for plankton imaging in-situ in an optimal environment, which would allow us to obtain unique images of excellent quality. The space devoted to science will mean laboratory imaging instruments of very high quality can be taken on board. In addition, the way *Race For Water* has been configured makes it a fantastic educational tool to showcase the wonderful world of plankton to high school and university students, an essential part of Plankton Planet's endeavour."

Calixte Berger
Progamme Manager, Plankton Planet

Leading educational science projects

Knowing that change will be driven through by younger generations, the Foundation hopes that the vessel will be a place of exchange between scientists and students.

Projects are currently being developed with schools so that students can come to learn on the vessel in collaboration with researchers. The aim is to enable as many students as possible to engage with leading scientists during the whole period of this Odyssey.

6
RAISING AWARENESS

While traveling around the world, the Race for Water Foundation hopes that *Race for Water* will be a venue for meetings and exchanges. We are mobilising the general public and opinion leaders around the extreme urgency of ocean conservation, especially plastic pollution and marine traffic emissions. We will educate as many people as possible through our traveling exhibitions, documentaries, public actions and mediation efforts.

"As an Ambassador for the Foundation and sponsor of the Race for Water, I am committed to ocean conservation and advancing energy transition. As a sportsman, I am convinced that sport has its role to play in this essential transition towards a clean future. The Paris 2024 bid for the Olympic and Paralympic Games will be inspired by the same spirit driving Race for Water's visionary and innovative projects."
Tony Estanguet, Co-Chairman of the Paris 2024 Olympic Games Bid Committee and Race for Water Ambassador

Our eco-friendly actions

At every opportunity, we give the example of small simple actions that we can all do on a daily basis.

1. II do not use disposable plastic bags whenever possible.
2. I choose packaging made from renewable resources.
3. I keep a reusable bag handy.
4. I do not throw cigarette butts or other plastic waste on the floor or in the toilet.
5. I have a reusable water bottle.

7

THE GOVERNANCE OF THE FOUNDATION

Board

Marco Simeoni
President

Gilles
Robert-Nicoud

Angela de Wolff

Alain Nicod

Francis Valdvogel

Advisory board

Franklin
Servan-Schreiber

Philippe Sarasin

Jean-Laurent
Bourquin

Alexandre Closset

Éric Sarasin

General director

Serge Pittet

Our Ambassadors


Zep


Tony Estanguet


Gérard d'Aboville


Virginie Faivre


Stève Ravussin


Carine Camboulives


Sarah Laura Peyrel


Piru Huke (Mama Piru)


Claude Thélier


Aurélien Ducroz


Michel Desjoyeaux


Eric Loizeau


Manu Bouvet


Atsuko Quirk


Anne Richard


Loïc Forrestier


Thomas Coville


Alan Roura

Our partners

Official and technologic partners

SWISS HYDROGEN

ETIA

SkySails YACHT

Official supporters

ONE CREATION
Think Sustainable

VAUD

Institutional and scientific partners

IUCN

UN environment

JPI OCEANS

WEATHER-MIC

EPHEMARE

Official suppliers

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Seaside Cellars
~ Keep our Seaside Clean ~

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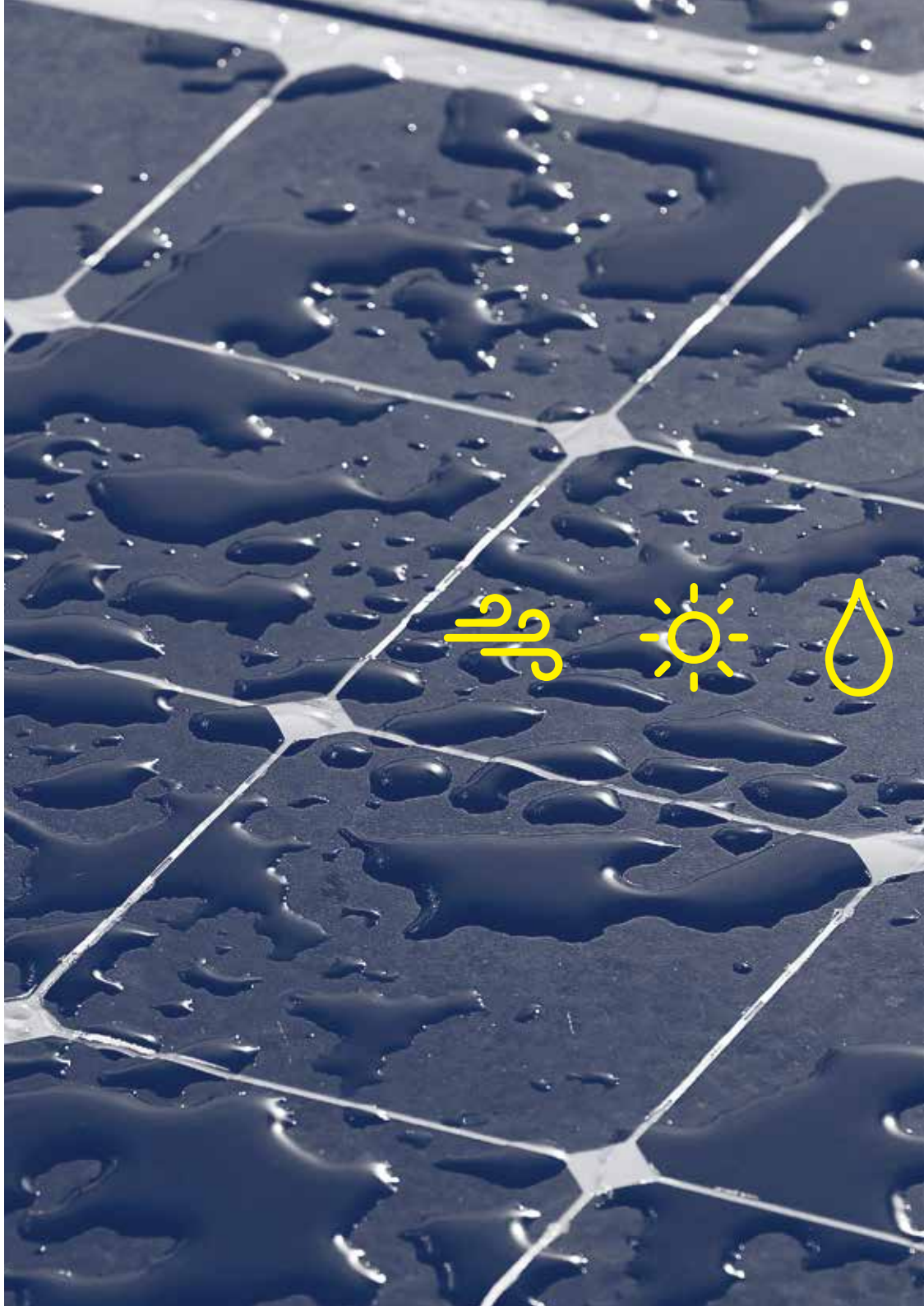
THALÈS



#R4WO

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A FOUNDATION TO PRESERVE WATER