

# Plastic Waste to Energy Solution

Turn plastic waste into an energy resource for environmental, social and economic benefits.

**“By 2050 there will be more plastic than fish in the ocean”**

## Plastic Pollution

Every year, **8 to 12 million tons of plastics enter the ocean**. Beside killing millions of mammals and marine birds, by entanglement or plastic ingestion plastic pollution’s alarming impacts include the **contamination of our food-chain and of our water streams**.

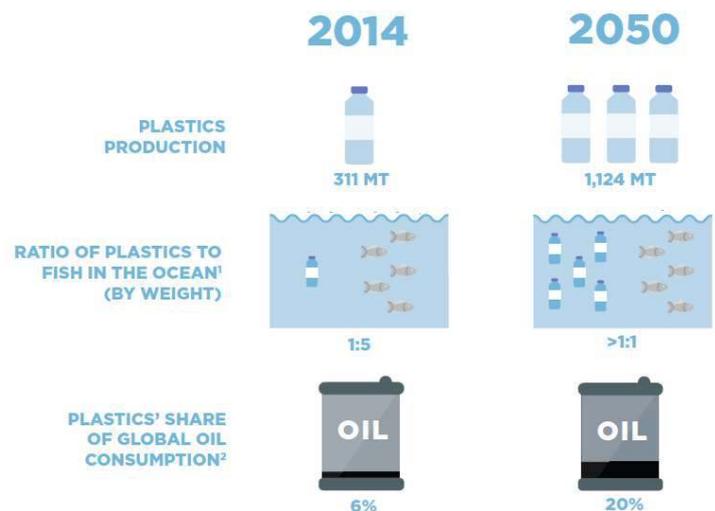
## Assessment and outcomes

### The Race for Water Odyssey 2015

The Race for Water Odyssey was an environmental expedition of 300 days which sailed across the Atlantic, Pacific and Indian Oceans to assess the state of plastic pollution and highlight its consequences on the populations within the 5 trash vortices.

The first observation was immediately clear: **plastic pollution is everywhere**. There is no 7th continent, nor plastic island, but a soup of plastic dust in the gyres. A grand-scale clean-up of the

ocean is unrealistic, land-based solutions are key to an efficient fight against plastic pollution of our seas.



World Economic Forum, Ellen MacArthur Foundation & McKinsey Center for Business and Environment, The New Plastics Economy -Rethinking the future of plastics, 2016

## “Plastic waste is the problem as well as the solution”

### Our Proposal: Turn plastic waste into a marketable energy resource

Our solution derives from by the principles of **the circular economy** and **social entrepreneurship**. We aim to **create a profitable value chain for plastic waste** in order to stop leakage into the environment and ultimately in water streams. It will benefit human health overall, underprivileged communities in particular, and provide alternatively-sourced energy.



#### / ENVIRONMENTAL OUTCOMES

- Stop the flow of waste in the streets, in nature and in our oceans
- Protect thousands of species - including humans - from death, illness or injuries
- Preserve zooplankton which produces half our oxygen

#### / ECONOMIC VALUE CREATION

- Provide a cleaner & sustainable source of energy
- Apply a long-term model which stimulates local economies like tourism & fishery
- Reduce expenditures for local authorities

#### / SOCIAL IMPACTS

- Create jobs for thousands of waste collectors
- Provide a better quality of life & health improvement for most vulnerable communities
- Educate people to change behaviors

**Together let’s race to save our water, every effort counts, get involved!**

## The technology: Biogreen® by ETIA

Biogreen® is an innovative, patented process for continuous thermochemical conversion of biomass and waste residue that allows torrefaction, pyrolysis and high temperature pyrolysis treatment of various bulk materials.

This **leading-edge technology** can recover the high calorific value of plastic litter and convert it into an energy-rich synthesized gas (syngas) applicable for the production of electricity, methane and hydrogen.

Hydrocarbons composing plastic waste naturally break apart when exposed to heat. High temperature pyrolysis in the absence of oxygen induces this breakdown that creates new products: gases, liquids and solids.

The process is based on an electrically heated screw conveyor: the Spirajoule®. Designed for advanced thermal treatment in high temperature pyrolysis conditions (up to 800°C). This technology allows perfect control of temperature and speed to **maximize plastic conversion into syngas**.

Thus, generated syngas goes through a refining process composed of different steps of filtration, scrubbing & condensation. This crucial refining step aims at eliminating dust, fine particles, tar, condensable gases, and other pollutants such as chlorine.

### What makes Biogreen® unique?

- continuous and fully automatic process
- reliable system for full control of treatment conditions
- compact, local scale solution
- polyvalent and mobile
- economical and easy to maintain

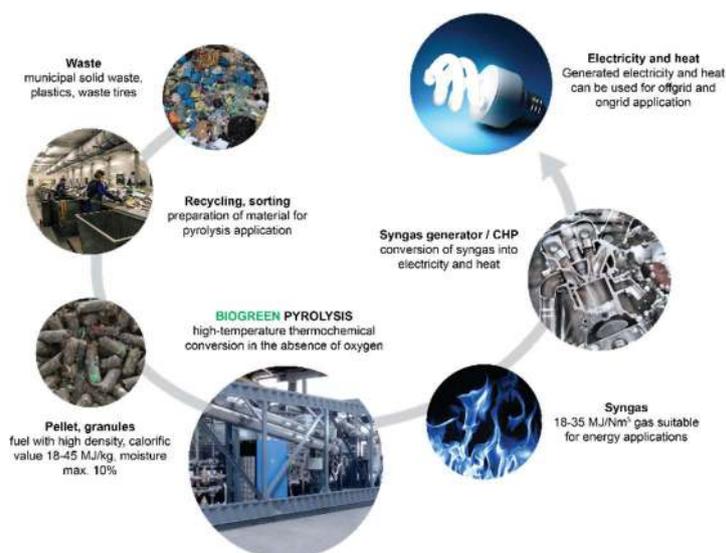
The **refined syngas** can then be used as fuel to internal combustion engine to provide electricity or simply heat. Another application consists on extracting the hydrogen or methane portion for resale purpose.

Solid and liquid residues are **optimized** as the gas proportion can reach 80%.

**Compact, modular & mobile**, the equipment can be containerized and set-up in as little as a few weeks, which makes it easy to integrate locally. Existing machines can process between 5 to 12 tonnes of plastic waste per day. A plastic waste to energy site can be set with several Biogreen® working in parallel allowing the treatment of higher capacities.

**Biogreen® meets the strictest environmental standards and is CE certified.** These small & medium capacities solutions favour decentralized waste management and energy production which are recognized for their **efficiency**, as well as their **social and environmental benefits**.

**This innovative technological approach demonstrates that remote plastic waste can be an additional resource in energy transition.**



## Pilot projects towards scalability

Currently in production, the first machine will be delivered this summer for a 6 months' testing period in order to evaluate its performances and assess its environmental footprint. In parallel, proof of concept projects are currently under study for coastal cities and remote islands to showcase the economic model and its social benefits.

By 2025, we wish our model to be replicated worldwide in order to reach sustainable impacts:

- **ENVIRONMENTAL:** Safeguard human health and species survival by materially reducing the amount of plastic waste reaching the ocean every year.
- **ECONOMICAL:** Transform more than 2 million tons of plastic waste a year into energy; which corresponds to providing electricity to nearly a million homes.
- **SOCIAL:** Provide income to more than 240,000 street collectors around the world.

## Conclusion

Joint action at the global level is urgently needed to address the perils facing our oceans. Our plastic waste to energy model aims at tackling the issue of plastic pollution at the source, by turning off the tap of plastic litter leaking into the ocean. Additionally, our projects will directly improve the health and life of local communities who are often the first victims of this worldwide issue.

**Together let's race to save our water, every effort counts, get involved!**