MICRO RECYCLING PLANTS

Ocean Plastic Technologies

RECLAIM, RECYCLE, RECOVER

Reclaim, Recycle, Recover: Ocean Plastic Technologies is tackling the issue of ocean plastic pollution head-on by collecting and repurposing ocean plastic into sturdy and clean products using their micro recycling plants (MRPs).

introduction

THE PROBLEM WITH PLASTICS

Let's face it: the current worldwide recycling system is broken.

The profit-based, energetically expensive, and complicated system that is currently in place is failing; only 9% of plastic waste that is recyclable ends up actually being recycled. The inefficient recycling process results in plastics ending up where they don't belong, most notably in the ocean; about 8 million tons of plastic enter the ocean yearly.

only **9%** of plastic waste is recycled

approximately **8 million tons** of plastic enter the ocean yearly

Some of the issues with the current recycling system include:

- Contamination of batches of recyclables (by un-clean plastics or non-recyclable items) results in large batches getting thrown away before the recycling process
- Some plastics are recyclable but are too small for traditional material recycling facilities (MRFs)
- Different plastic polymers and products need to be recycled in different ways, and the sorting process is complicated
- Some recycling systems depend on incineration, which releases toxins into the air and results in carbon emissions

*Why can't we just stop producing plastic?

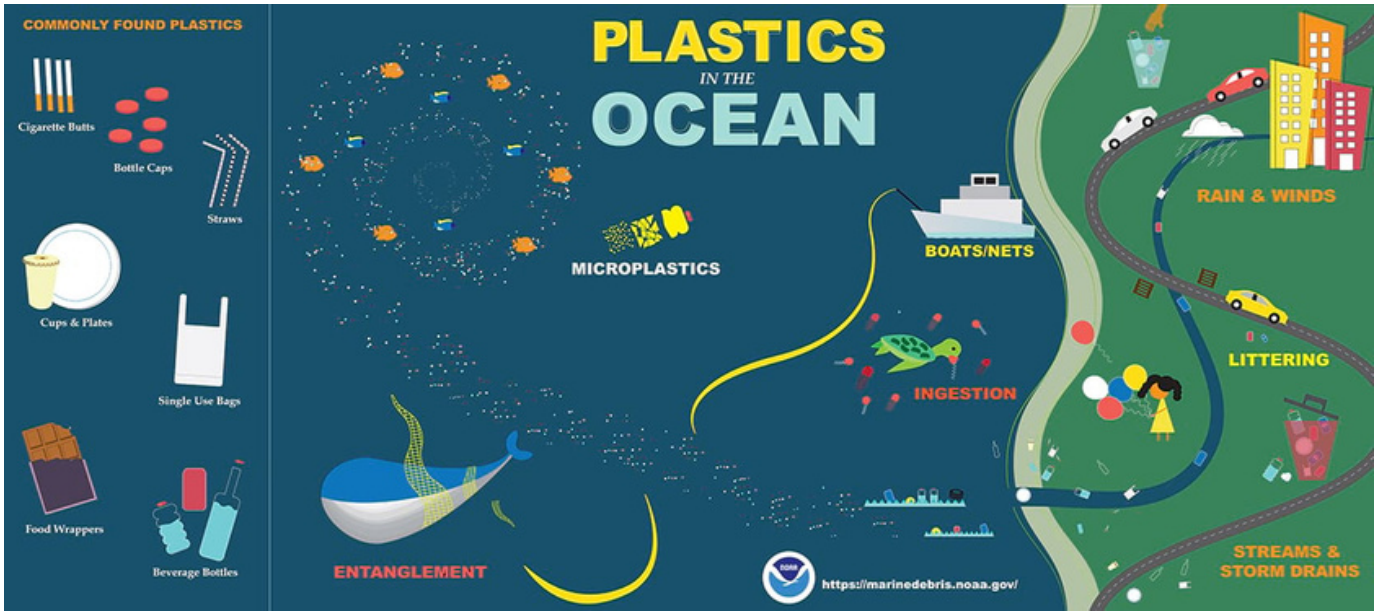
While this may seem like a great idea, plastic has many important uses in the medical, technological, and scientific fields as well as many others. Virgin plastics make medical procedures simpler and safer. Technology and science rely on plastic for advancements in innovation. Doing away with all plastic production, as tempting as it may seem, is not actually simple, efficient, or reasonable.

introduction, cont'd

PLASTICS IN THE OCEAN

More than half of plastic pollution is more buoyant than water and exists in the surface ocean until it breaks down into fragments called microplastics. Plastics on the surface cause a number of problems, including blocking sunlight and inhibiting photosynthesis, entangling marine species, and ultimately killing organisms. The resulting microplastics also cause a variety of issues in the environment, most notably getting stuck in the digestive tract of vital marine organisms like coral and fish and causing massive die-off. This has implications on human life as well, with plastics entering human bodies through seafood consumption.

Microplastics float amid Sargassum weed in Fort Lauderdale, Florida



88% of the ocean surface is polluted with plastic

73% of all beach litter is plastic

About 8.3 million pieces of microplastic exist per cubic meter of ocean water

A garbage truck's worth of plastic enters the ocean every minute

This issue is complicated, and to solve it a combination of preventive measures at the source of the plastic as well as ocean clean-up will be necessary.

THAT'S WHERE THE OCEAN PLASTIC TECHNOLOGIES MICRO RECYCLING PLANT MODEL COMES IN.

The MRP is similar to the traditional MRF, but drastically scaled down and simplified.

Ocean, beach, and ocean-bound plastics are collected from the environment by locals.

The collected garbage as well as industrial plastic waste is brought to the mobile, small-scale Ocean Plastic Technologies Micro Recycling Plant for recycling.

THE PROCESS, BROKEN DOWN

Ocean Plastic Technologies (OPT) makes recycling easy and efficient.

The MRP process

1. Plastic trash is collected by the local community on coasts, near rivers, and from consumers and commercial enterprises in the area

2. This trash is brought to a local OPT MRP

3. Plastic is sorted by quality, then plastic type, then color, then it is cleaned and processed either partially or fully at the MRP

5. The resulting products from both processes re-enter the supply chain, and the process begins again

4a. Mixed, damaged, contaminated, and non-recyclable plastics are shredded and mixed with non-recyclable glass to make driveway pavers, construction blocks, and more

4b. Clean, "good" plastics are cleaned, rolled, and granulated and re-sold back into the supply chain by grade and color

ADVANTAGES OF THE MRP MODEL

The decreased size of the MRP showcases a number of advantages over the MRF model

- Increased localization: because MRPs take up less space and are portable, they can in turn be more numerous. MRPs can be placed strategically for:
  - Convenience of recycling- people do not have to travel long distances to recycle properly
  - Local collection, sorting, and processing at the source is best
  - Identification of plastic type (ocean, beach, or ocean-bound plastic)
- More cost-effective than the traditional MRF model
- Ease of recycling- all plastics can be recycled in the same place
- Stimulation of the local economy because they provide jobs and thus assistance within the communities they serve. These also provide education about proper recycling practices, leading to better recycling overall
- Reduction of the carbon footprint of the overall recycling process
- Support of the plastics industry by turning sustainability into a profitable business model
- Support innovation when dealing with waste plastics
- Reimagining the linear economy by creating a closed loop route for plastics

All in all, the OPT MRP model is the much more efficient model for handling ocean reclamation efforts than the traditional MRF model

- **Preventing plastic pollution buildup in oceans and coastal ecosystems**
- **Supporting plastic production- not eliminating plastic usage, but rethinking it**
- **Generation of a circular economy**
- **Providing recycling and pollution education to the next generation of eco-warriors**
- **As an added bonus, the use of MRPs are an entrepreneurial venture by OPT, empowering women and other underrepresented communities**
  - **OPT has a Women of Waste (WOW) program that is currently being implemented well in South Africa**
  - **Underprivileged people are also being supported by the MRPs in South Africa, as they are being paid to collect ocean plastic**

looking forward

WHAT WILL THIS LOOK LIKE IN THE FUTURE?

What will this model look like as we expand?

The South Africa OPT model is adaptive, scalable, and efficient.

Conversations are already starting in America that will emphasize the roll of veterans and other underrepresented communities, giving priority and empowerment to these groups.

In Europe, Asia, Oceana, and beyond, there will be continued emphasis on prioritizing the underprivileged.

OPT and the MRP model are crucial for three main reasons.

- **Saving the ocean while supporting people over profit**
- **Removing plastic waste from the environment and beginning to reverse the ocean plastic crisis**
- **Generating a circular economy and increasing creativity while saving the planet**

appendix

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about the author

Emma Wightman is a graduate of Nova Southeastern University with a Master's degree in Marine Environmental Science and she holds a bachelor's degree in Marine Biology with a minor in Sustainability from Roger Williams University. She has a passion for travel, research, public outreach, education, and sustainability, with a focus on plastic pollution. Her soon-to-be published master's research involved analyzing seawater for microplastic quantity and composition, likely sources of these plastics, and the effects this plastic pollution has on the ocean environment. Determining the source of the discovered plastic allowed her to work toward curbing the influx of waste into coastal Florida waterways and allowed her to fully understand the scope of the plastic pollution problem. All of this has led her to realize the vital need for substantial changes to waste prevention and reduction, as well as resource management. Her other research includes water quality analysis with the Florida Department of Environmental Protection, husbandry of Astrangia poculata (Northern Star Coral), and a six week-long transatlantic temperature and phytoplankton comparison study in which she lived, worked and studied aboard the S. V. V. Corwith Cramer, a 134' tall ship. In 2017, she received the prestigious "Sustainability" award from Roger Williams University and has since worked as a consultant to those who wish to make their corporation, event, or lifestyle more sustainable. She is an avid writer, is passionate about research, and loves the ocean.