CIRCULAR ECONOMY

Ocean Plastic Technologies

The current situation

Humans worldwide live in a consumerist culture, one that is based on the idea of a linear economy.

What is a linear economy?

The term "linear economy" describes a system designed around the idea of "take-make-dispose." Raw materials are extracted and used to create a product which is used until it is disposed of. Value is given to producing and selling as many products as possible with little regard for the resources used to make these products or the end-of-life of these products.

1. Raw materials are extracted from the earth
2. Products are made from these materials
3. Products are thrown away

This has been shown to be unsustainable for the earth; trash piles up in landfills and ends up polluting the environment, and raw resources are mined until depletion.

The world consumes more than **100.6 billion tons** of materials every year* and the proportion being recycled is falling

Each individual uses an average of **13 tons** of materials per year*

22.4% of materials are lost to the environment each year*

More than **50%** of plastic produced is for single use purposes

2.12 billion tons of waste are discarded worldwide every year

As of June 2021, **1.79 Earths** are needed to make up for current material use and waste absorption, and this number continues to grow by the second

*NOTE: These numbers are based on raw materials extracted from the Earth, NOT what is discarded!

Linear economy, continued

A linear economy is not sustainable economically either. In the linear economy, the end-of-life of a product represents the end of its economic potential as the product (and thus, the materials used to create it) are simply disposed of and lost to a landfill or the environment. This results in products that are not made to last, and a business model is made off of the idea of "planned obsolescence".

Planned Obsolescence: When a company or manufacturer produces a product that is built to have only a limited useful life or a purposely frail design, forcing people to buy more and more products that again will not last.

Capitalist economies and consumerist cultures thrive on this, as the whole linear economy system revolves around the idea of making and selling as much product as possible. Consumers buy these poorly made products because they are less expensive, as there are more of them made and they are not high quality. These products are designed to use once, or they break easily and are hard to fix, recycle, or reuse so to replace them the consumer buys the product all over again. This occurs again and again; waste builds up and resources are depleted quickly.

1. Raw materials are extracted from the Earth
2. Products are made from these materials
3. Products are recycled or upcycled into new products, and the cycle starts again at step 2

Circular economy

A circular "loop" economy is an alternative system to the linear economy. A circular loop economy system takes products that would be considered "waste" in the linear economy and repurposes them, upcycles them, and transforms them into another product so there is less depletion of resources, less waste generated, and less waste thrown away. This system results in many benefits, including:

- **Up to 70% of material savings**
- **Dramatic reductions in carbon emissions**
- **Increased biodiversity, healthier soil (soil degradation costs $40 billion annually, worldwide)**
- **Expanded local job opportunities and economic stimulation**

Recycling of ocean plastic at an Ocean Plastic Technologies Micro Recycling Plant (MRP)

Linear Economy	Circular Loop Economy
Degrades the environment and depletes raw materials	Works to clean up and protect the environment while reducing worldwide dependence on raw materials
Encourages dependence on single-use products	Invests in quality products that will last
Depends on continual cash flow from the consumer	Saves money for the consumer
Decreases economic potential of raw materials	Revitalizes economic potential of raw materials through creation of new products with the same materials
Maximizes waste	Re-thinks waste and reduces pollution

Limits to the circular economy

Based on current society, there are limits to implementing large scale circular economy systems, most notably the affordability and availability of the recycled products. There are very few companies offering products that are made from recycled or upcycled materials; these products are thus hard to find and when found tend to be expensive. Not only are the resources used to properly recycle these materials scarce and costly themselves, but **companies can also charge as much as they want for a unique product with no competition.**

This Adidas x Parley running sneaker is made partially with recycled materials. It retails for a whopping $180 USD

It is more expensive to send a ton of trash to the recycling center than to the landfill

Mixed plastics that traditionally would need to be recycled in different ways

Recycling is not currently easy or efficient. Some of the main issues with current recycling practices 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

That's where Ocean Plastic Technologies comes in.

Ocean Plastic Technologies (OPT) has some of the greatest minds in the industry working hard to create a closed loop system that will augment the current linear economy.

OPT created a Micro Recycling Plant (MRP) system that allows for ocean, beach, and ocean-bound plastic to be collected, recycled, and turned into new products effectively and easily, on a local scale. To learn more about the OPT MRP process, click here.

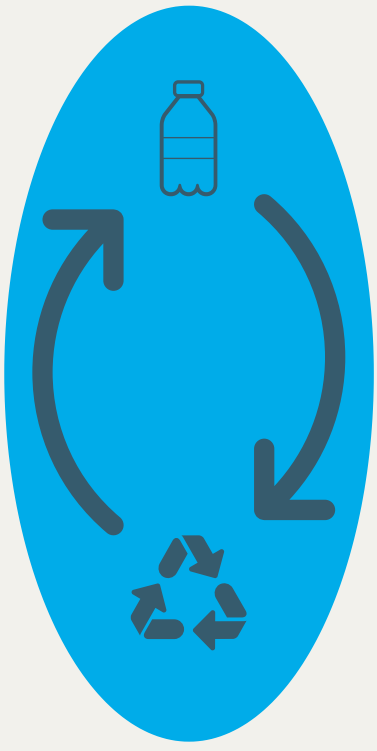
The OPT MRP

How is OPT contributing to the circular loop economy and overcoming these difficulties?

- Using the MRP to recycle plastics into useable materials closes the loop- creating solutions for manufacturers that are not made from 100% raw materials and virgin plastics
- Keeping costs low
- Increasing availability of recycled products while increasing availability of recycling facilities
- Stimulating the local economy by making sustainability a profitable business model
- Keeping raw materials from being used to depletion
- Educating the public that a closed loop system is possible
- Setting an example for other companies and recycling centers to inspire innovation and effective recycling
- Curbing pollution by centralizing recycling
- By-passing major recycling hurdles by recycling all plastics together

The OPT MRP closed loop system, broken down

1. A product is manufactured, either from raw materials and virgin plastics or from recycled materials
2. At the end of the product's life, it is recycled at an MRP
3. The recycled plastic is used to make a new product, and the cycle begins again



Looking forward

The OPT closed loop system is not meant to replace the capitalist, linear economy, nor does it depend on dismantling and replacing the consumerist society. These changes would be a huge undertaking and would not take place overnight. The OPT system is meant as an additional partnership with the current system that brings circular elements into the linear economy in a non-disruptive and sustainable way.

What could this look like in the future?

- Greater access to recycling facilities to further close the loop
- Less reliance on products that are designed to fail
- Knowledge of the lifecycle of plastic products
- Stimulation of the economy and creation of local jobs
- Better pollution management
- Material savings, increased biodiversity and soil health, reduction of carbon emissions
- Products that long outlive their material costs and work for the consumer
- **Both circular loop and linear economies co-existing to create inexpensive, high quality, long-lasting products that help fight pollution and protect 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.