



facian
~One innovation at a time~

Social Background and Motivation

In the past 65 years, plastic production worldwide has spiked from 2 million tons to over 300 million tons annually (4). Very little plastic is recycled, resulting in several million tons of plastic entering the ocean each year, harming the environment and marine life. In order to alleviate the problem of the debris in the ocean, our primary focus is collecting floating plastic, which includes polypropylene (PP), polyethylene (PE), and expanded polystyrene (EPS) (5).

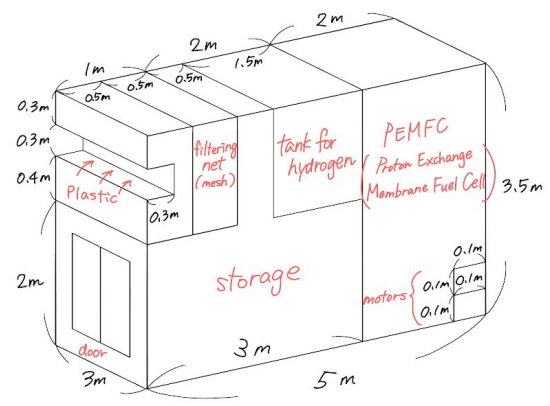
Target Customer

Our target customer is the local governments of Japan in the coastal regions, until we can expand to countries such as China as our product gains funds to promote and produce our product on a grander scale.

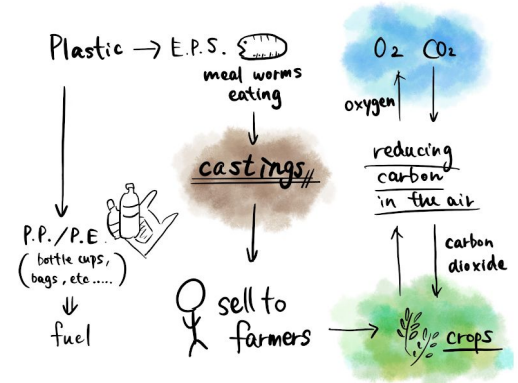
Product and System Details

Aquaficent is a two-part system; the collecting of plastics and the separating and processing of plastics. PP, PE, and EPS plastics are collected by the machine, by taking in plastics on and near the surface of the water and disposing of all water that got sucked in. To elucidate, Aquaficent takes advantage of the ocean's current, which sweeps plastics into the 3 meter wide opening of the machine, making the collection process eco-friendly and energy-efficient. Created from aluminized steel which floats, this machine is 3 1/2 meters high, 5 meters long, and 3 meters wide, and propels itself around

using motors.



After collection, the plastics are transported to the main body of the Aquaficent, a facility where the plastics are sorted into two sections located on shore, then processed. Aquaficent takes care of PP and PE plastics collected, which are pure hydrocarbons, by sending them to Plastic to Fuel companies to convert our plastic into fuel. The process is environmentally friendly, since the plastics are shredded and then melted in an oxygen-free vacuum chamber, so it does not require combustion that releases toxins (2). Since the EPS cannot be converted into fuel, it is instead processed by mealworms, a type of worm that eats plastics and turns them into castings (1). The castings produced is sold to farmers, to be used for growing their crops, further aiding the environment by turning carbon dioxide from the air into oxygen.



Aquaficent is powered by a system that first splits seawater into liquified hydrogen (H2) and oxygen (O2). The two elements



are then combined in a process called PEMFC (Proton exchange membrane fuel cell) to produce energy, and releases water as the only waste product, making this process extremely eco-friendly. This source produces more than 5 times the energy of solar power, and is more cost-effective, hence it is a better option than other renewable sources.

Competition

Our main competition is a company called The Ocean CleanUp, which utilizes the wind and current to round up plastics near the Great Pacific Garbage Patch (3). However, this system is currently out of commission, because it failed to gather plastic waste. Moreover, the company takes the plastic gathered and recycles it to make products. In contrast, our company transforms the plastic using eco-friendly methods, and the end product ties directly into helping the environment, rather than make products that will in time, be thrown away and continue the cycle of waste instead of finding a sustainable solution, unlike the Aquaficient.

Marketing Strategy

We created 150 Aquaficient systems for the first year, of which only the part that collects plastic is rented out to Japan’s coastal governments that have the worst ocean litter problems for 1~2 months until the majority of their plastic is collected, and then we rent to other governments in Japan. We take care of all the collected plastic, so it is unnecessary for governments that are renting our product to worry about what to do with the plastic collected, by using the system that categorizes the PP and PE plastics from the EPS plastics that is owned by our company. Our advertisement is through Facebook, as well as directly asking governments in Japan who are in coastal areas whether they would like to utilize our product.

Financial Plan

By using aluminized steel, PEMFC fuel cells, the EPS sorting machine, worms, and motors our unit cost became 2,723,836 yen. Our production cost will decrease because we will only be making 50 more facilities per year but continue renting out the 150 facilities we already have. We will be earning more profit from the castings that the mealworms produce as well as the plastic we sell to fuel companies. We will be profiting by the second year and will be paying back loans in the second and third year.

Amount in JPY (per 1000 JPY)	Year 1	Year 2	Year 3
1.Revenues	33,522	446,965	558,732
Product/Service	245,144	326,859	408,574
Unit Sold	150	200	250
Unit Price	1,634	1,634	1,634
2. Other profits	79	106	158
Other service fees	90,000	120,000	150,000
2.Production Costs	-408,575	-136,191	-136,191
Unit costs	2,724	2,724	2,724
Expenses	-5,852	-4,406	-4,415
Staff Salaries	5,824	4,368	4,368
Sales and Marketing	28	38	47
4.Profit/Loss before tax	-79,204	306,368	418,126
5.Income Tax	-23,761	-91,910	-125,438
6.Net Profit/Loss	-102,965	214,457	292,688
7.Start-up cost	-9,356	0	0
8.Free Cash Flow	-112,321	214,457	292,688
Repayment of Loan	0	-203,406	-203,406
9.Cash balance	-406,813	746,333	1,092,783

Bibliography

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2. Keiren, et al. “Plastic to Fuel.” *Insteading*, 9 Feb. 2018, insteading.com/blog/plastic-to-fuel/.
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4. Ritchie, Hannah, and Max Roser. “Plastic Pollution.” *Our World in Data*, 1 Sept. 2018, ourworldindata.org/plastic-pollution.
5. “Which Plastics Float and Which Sink in Seawater? | GRID-Arendal.” *GRID*, www.grida.no/resources/6930.