

The Solution to Ocean Cleanup
&
Recycling Plastic Waste-to-Energy
(Climate Change Prevention Through Ocean pH Increase)

After presenting a method of Ocean Gyre Plastic Cleanup and Plastic Waste-to-Oil to [Japan AIST](#), it was suggested to move on to gaining support in performing tests on the four-stage process. This is for interest in explaining a highly effective hydrocarbon extraction method(Plastic Waste Removal) from the ocean and also conversion into oil(Plastic Waste to Energy). I consider this very important and also coinciding with your company's current goals. The method of breaking down the plastics includes the additives Water and Crystallines. This allows for an efficient method with zero harmful byproducts and yield of hydrocarbon recovery higher than 90%.

Further Interest in Recycling of Renewable Resources into Energy Worldwide:

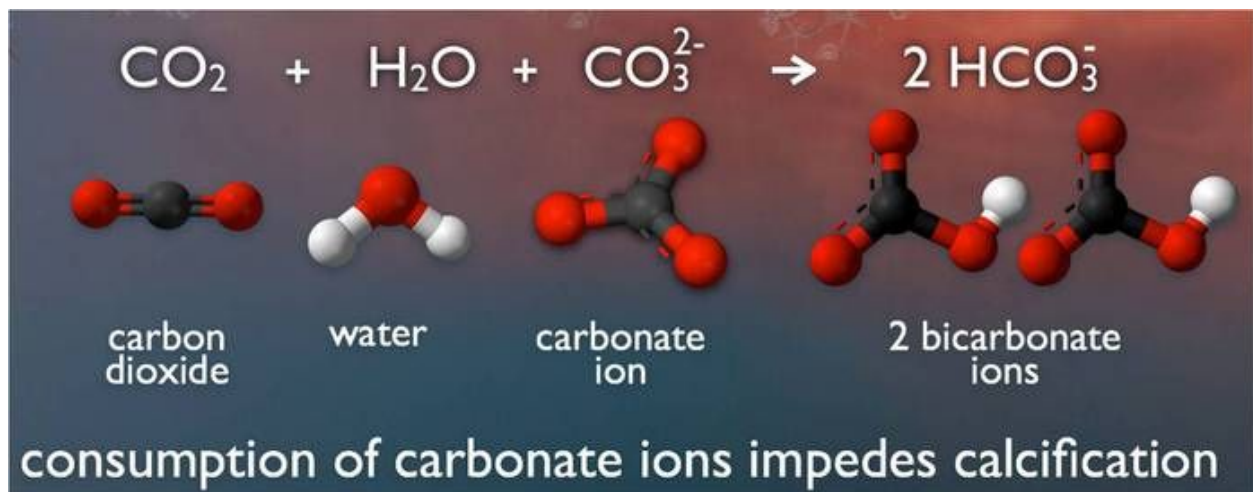
The Ocean Acidifying is a major concern to the wildlife that live therein. Phytoplankton especially, because 70% of the world's Oxygen is produced by them turning CO² into O².

Hallegraeff, Gustaaf M. 1988. *Plankton: a microscopic world*. Leiden: E.J. Brill.

Serious commitments to Sustainability would allow for more accurate accounting and efficiency of funds for Healing our Mother Earth. This would start with Ocean Gyre

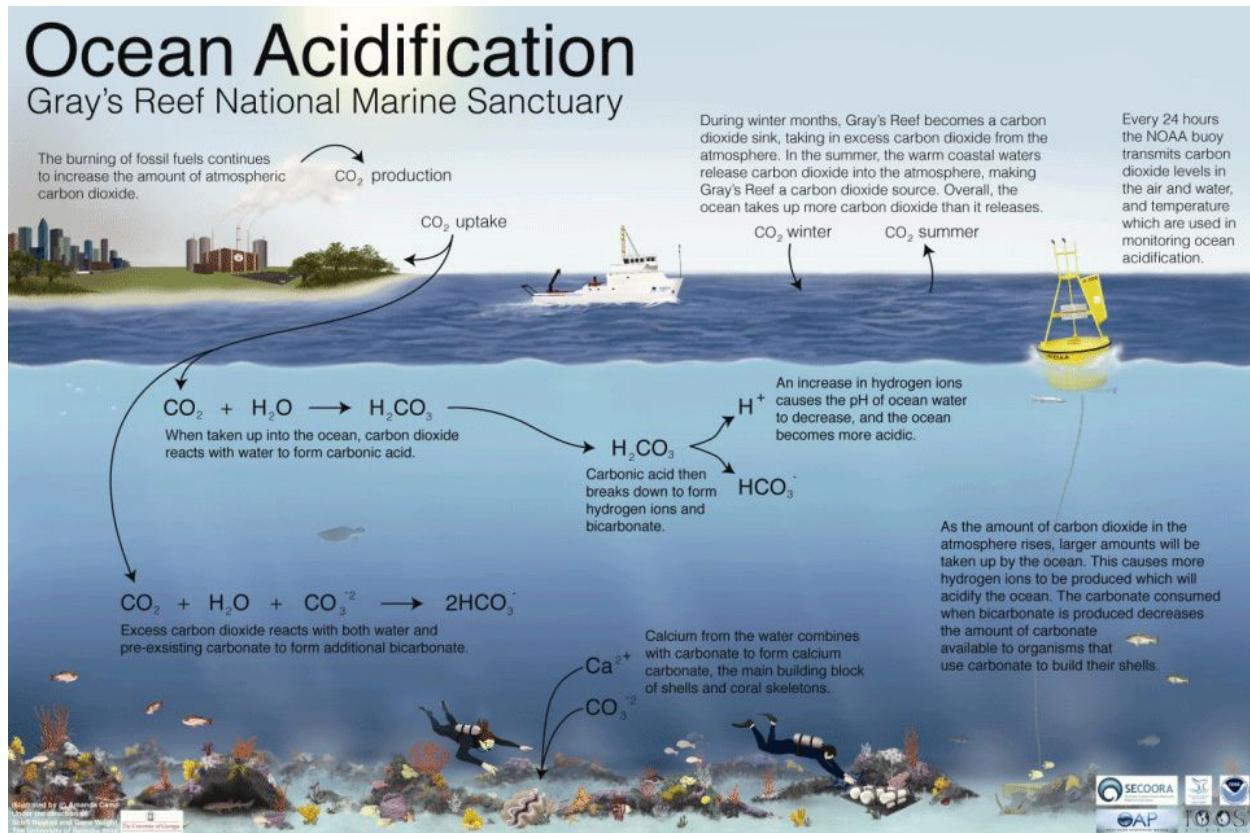
Plastic Waste Cleanup. It is believed by many reports the cause is plastic waste in the ocean that leaches out chemicals causing acidification. This has been charted since 1750 with the [CDIAC](#) showing an increase in manmade CO² accumulation and less of the total amount being absorbed by the ocean via diffusion even though it has increased the intake amount from around 25%-30% in Greenhouse Gases done by Phytoplankton. This process has been slowed down due to acidification in the ocean that includes Plastic photodegradation releasing hydrogen causing a 0.1 pH Unit drop in the last 50 years.

[How Much CO₂ Can The Oceans Take Up?](#)



Source: <https://www.pmel.noaa.gov/co2/story/What+is+Ocean+Acidification%3F>

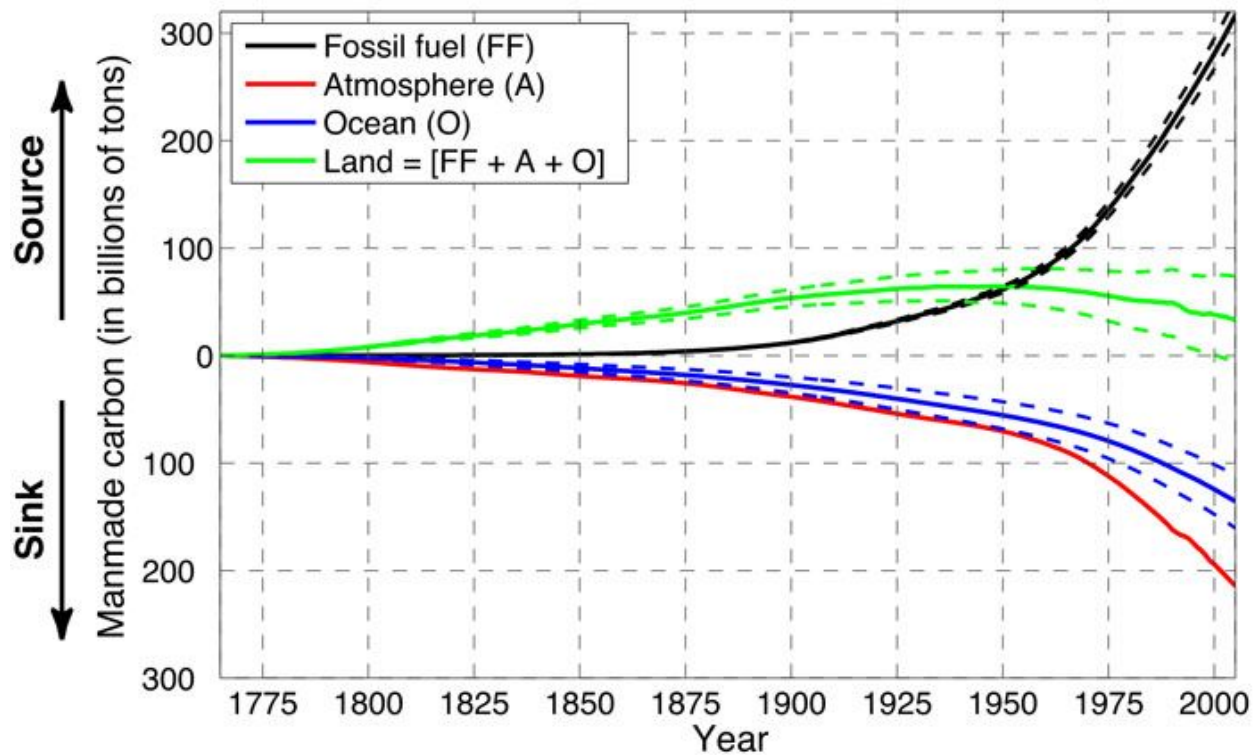
A Diagram



The Regular CO_2 emissions have not been able to defuse at previous rates since the introduction of plastic waste has accumulated.

First Year-by-Year Study, 1765-2008, Shows Proportion Declining

“The study reconstructs the accumulation of industrial carbon in the oceans year by year, from 1765 to 2008. Khatiwala and his colleagues found that uptake rose sharply in the 1950s, as the oceans tried to keep pace with the growth of carbon dioxide emissions worldwide. Emissions continued to grow, and by 2000, reached such a pitch that the oceans have since absorbed a declining overall percentage, even though they absorb more each year in absolute tonnage. Today, the oceans hold about 150 billion tons of industrial carbon, the researchers estimate--a third more than in the mid-1990s.”



Ref: <http://www.earth.columbia.edu/articles/view/2586>

For phytoplankton obtaining calcium carbonates in 8.1 pH water is a natural balance to the process, with any decrease of the ocean's pH it makes this more cycle become more energy consuming for calcifiers to attain the needed calcium carbonates from the ecosystem.

Ref: <https://fortress.wa.gov/ecy/publications/publications/1201017.pdf>

“The principal cause at the global scale is CO² emissions from human activities. The oceans have absorbed approximately 25 percent of the CO² generated by human activities since the start of the industrial age in the mid-1700s. Ocean acidification has increased 30 percent in that time. This rate of change is nearly ten times faster than any time in the past 50 million years. Ocean acidity is projected to increase by 100-150 percent by the year 2100, given the current rate of CO² emissions.”

Hedia Adelsman

Department of Ecology, Government of Washington, USA

Plastic Waste Conversion Solution:

The previous obstacle has been the issue of caking(recrystallization) catalysts in the process of hydrocarbon extraction. Avoidance of Beta Scission is a major focus resolved in the method for more efficient hydrocarbon extraction. **The process, “Da SPEED” (Dielectric Attenuating Solar Power Enhanced Electrolysis Degradation) will de-phthalate the plastic back into a hydrocarbon(C²H²) with no harmful byproducts and no high temperatures(+300 degrees Fahrenheit) imitating a reverse coding similar to that of a Baird recording infrared spectrophotometer device in a closed loop system.**

Note: this technology will also help with responsible recycling of the solar panels in production and by-products used to create them.

A study explained polycarbon substances(plastics) breakdown into hazardous chemicals. The study analyzed what happened over years to the millions of tons of plastic located throughout the world’s ocean. These scientists came to the conclusion that these plastics decomposing rates were significantly higher than usual and the toxic byproducts created saturate into the water. American Chemical Society (2009)

The Excerpt from Photodegradation and photostabilization of polymers, especially polystyrene . . .

Breaking down of Polycarbon by IR:

“Polymer degradation can be caused by heat (thermal degradation), **light** (photodegradation), **ionizing radiation** (radiodegradation), mechanical action, or by fungi, bacteria, yeasts, algae, and their enzymes (biodegradation) Feldman (2002).”

“A photodegradation process was also proposed on the basis of the IR spectrum of the photoirradiated film, which indicated the formation of peroxy radical and hydroperoxide intermediates. The photochemical reactions cause the dissociation of a polystyryl radical by creating an electrochemical excited state. The polystyryl radical is converted to peroxy radicals by reacting with oxygen. The peroxy radical undergoes chain scission and formation of carbonyl compounds. The photosensitivity has been

evaluated of plastic sheet after different exposure times (0.5, 5, 10 or 21 hr.). FT-IR analyses of photo irradiated polystyrene showed increase in absorption peaks at 1472-1475 cm^{-1} indicating the presence of ketone carbonyl groups. For polymer of hydrocarbon, oxidation must precede biodegradation. Kiatkamjornwong et al. (1999) (see Figures 11 and 12)."

Biomimicry has proven to be an effective method of Plastic Degradation:

"In recent years, the use of polymeric materials has rapidly increased, but it is well established that rapid photodegradation of these materials is possible when they are exposed to natural weathering. This review was to talk about the photodegradation and photostabilization of polymers and especially in polystyrene. The "hydroperoxide" (POOH) is the most important initiator in the photooxidative process."

<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4320144/>

"We've found that plastic in the ocean actually decomposes as it is exposed to the rain, sun, and other environmental conditions, giving rise to yet another source of global contamination that will continue into the future. The polymer polystyrene begins to decompose within one year, releasing components that are detectable in the parts-per-million range. Those chemicals also decompose in the open water and inside marine life. However, the volume of plastics in the ocean is increasing, so the decomposition of products remain a potential problem. Decomposing plastics are leaching potentially toxic chemicals like bisphenol A into the seas, possibly threatening ocean animals, and us. Threats to the marine environment are of chemical and physical dangers."

Dr. Katsuhiko Saido

Conflicts in Past Ocean Waste Removal Attempts Resolved:

Lyrical Clause research has figured out what's able to remedy removal of plastic waste from the ocean. The main goal is to start the PCAA (PhysicoChemical Aquatic Apparatus) through mobility in the trash gyres, this could efficiently collect the marine debris from the ocean allowing the pH balance to restore back to 8.1 on its own! This flowthrough contraption works with a technology that is non-disruptive to the marine

ecosystem via biomimicry and advancements used in another industry that has grossed over \$700 billion in marketplace uses in the last five(5) years.

The Importance of Phytoplankton Being as Productive as Possible

“As the ocean’s primary producers diversified and spread, atmospheric oxygen increased to roughly the level of today, setting the stage for aquatic animals and plants to make the transition onto land. Seasonal phytoplankton blooms still account for over half the photosynthesis and subsequent atmospheric oxygen production on Earth. It’s hard to believe, but we owe every breath we take to a biological product of marine animals mostly invisible to the naked eye. While we may think of photosynthesis as the life process of land plants, algae and a variety of other microscopic organisms called phytoplankton had been using photosynthesis long before terrestrial plants appeared. These organisms that reduce carbon dioxide and produce oxygen are generally known as primary producers, a term indicative of their role in creating the necessary environment for more complex life to flourish.”

Source: <http://oceanexplorer.noaa.gov/facts/oceanproduction.html>

<p>Phase I: 6-8 months - Plastic Waste to Energy performance test on Degradation(Dα SPEED)</p>	<p>Phase II-III: 1 year to 18 months - The total needed to build the three (3) prototypes and do beta testing is \$9,000,000.00 (USD). Beginning production of Dα SPEED Pilot facilities. Start production of Ocean Cleanup array(PCAA) for launching into the Plastic Trash Gyres.</p>
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Currently we are discussing an MOU with Japan AIST that can conclude the preliminary test(Phase 1) for a budget of \$990,000.00(USD). I have a business plan explaining the market growth potential and benefit to our environment/society this will have once initiated all the way to completion of technology adaptation.

International Cooperatives

Over twenty countries are on board with this effort that are displayed below and can provide the necessary documents showing this via a confidentiality agreement.



Team:

Lyrical Clause, LLC(Rafiei El Enterprises) - Able to come up with a method that can be practical for reducing pollution in the ocean. Responsible for the prototype Da SPEED and PCAA building/testing of the process of recycling plastic waste into oil(BioDiesel).

Gray Design - Co-Designing of concepts

Nedship Group - Co-Engineering of N.A.M.E. and Structural Integrity tests

Japan AIST - Performs/Confirms proper cetane value tests and analysis to market demand Engineering the adaption for Ocean Cleanup

Libra Group - Utilizing Waste-to-Fuel units for transportation and residential needs

Sun Machinery - Broker of Salvaged Marine Vessels to be retrofitted with Da SPEED

ECOWAS - Producing Sustainable Infrastructure Projects for the West African Communities

GHB Light Rail - PPA for powering Light Rail transportation stations

throughout the U.S. and West Africa

Please let me know your opinion or suggestions on the matter?

Dirahn Gilliams

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