

Your partner in carbon footprint and fuel costs reduction



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We are becoming leaders enabling solutions for fuel consumption and emissions reduction.

- A Corporation headquartered in San Juan, Puerto Rico.
- Developer of new technologies aiming at emissions and fuel consumption reductions of 20-25% by:
 - Improving hydrocarbon fuels efficiency by increasing its heat transfer capabilities.
 - Reduce Green House Gases due to cleaner/more complete fuel combustion
- Is a licensor of intellectual property in fuel enhancement, emissions reduction, and fuel cleaning.
- Re-Synth technologies comply with ASTM and ISO standards.
- Patented processes

Our Aim is to help our clients to comply with current environmental regulatory requirements while reducing fuel consumption costs

The United Nations are heavily pushing towards regulation to aggressively reduce Green House Gases(GHG). The initiatives include but are not limited to the following:

Reduction in CO₂ emissions by 20% for the year 2023.

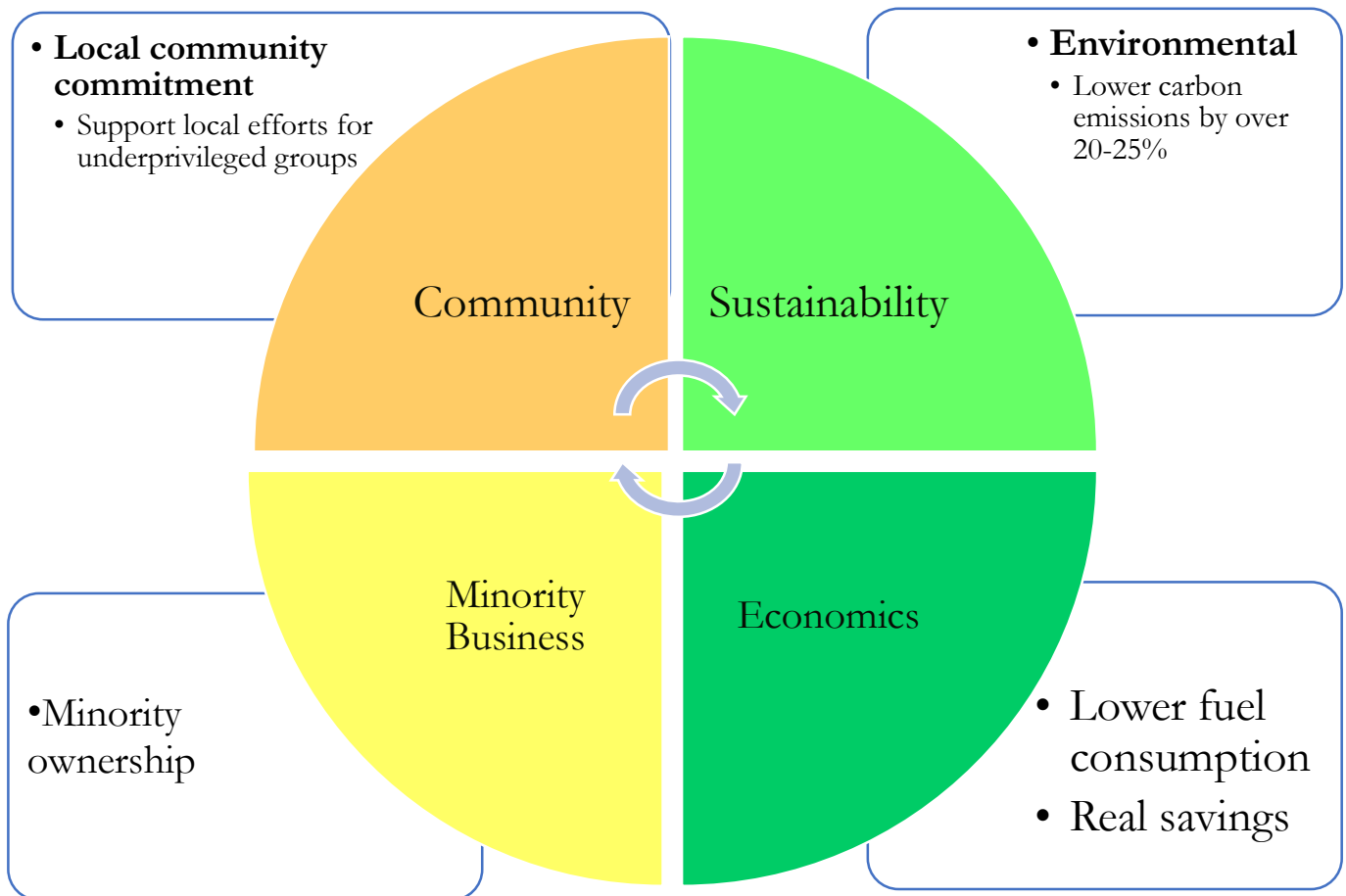
Reduction in CO₂ emissions by 40% for the year 2030.

Reduction in CO₂ emissions by 70% for the year 2050.

Substitution of vehicles to 100% electric for the year 2050.

Current clean energy alternatives like LNG only reduces CO₂ emissions by 20%. On the other hand, in the extraction process 2% is lost. LNG is mostly methane which is 30 times worse than CO₂ as a GHG.

Our Corporate responsibility policy addresses publicly recognized social concerns



Our Patented fuel treatment process allows us to:

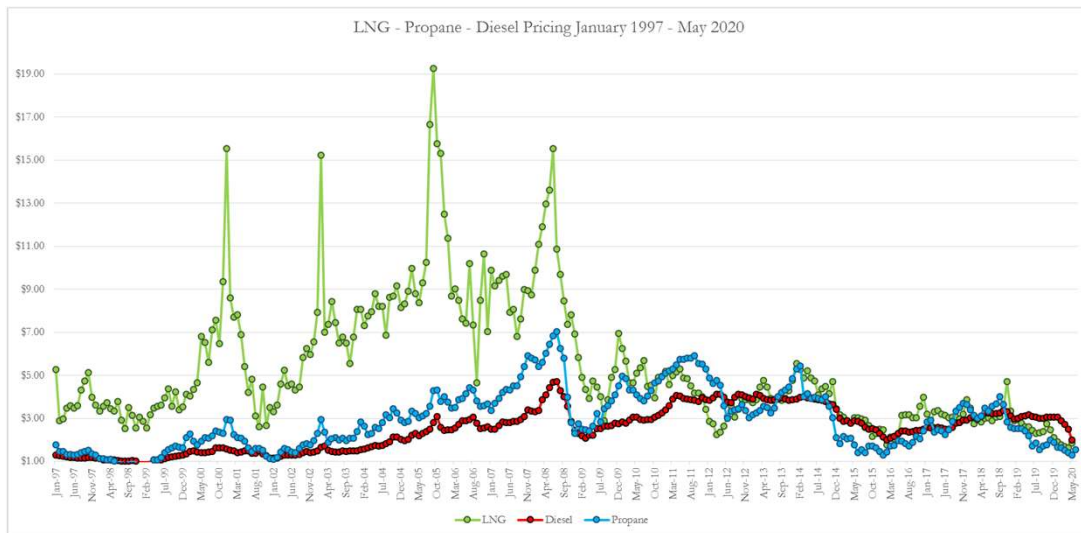
- Reduces fuel consumption of 20-25% in the following fuels:
 - D2-D6
 - Bunker
 - Fuel Oil
 - MDO
 - IFO 180-380
- Improves fuel brake thermal efficiency
- Reduces the carbon emissions footprint
 - CO_x and NO_x emissions
 - Particulate Matter
 - Soot

ReSynth clients immediately benefit from our fuel improvement technology

- Comply immediately with UN/IMO 2023 emissions standards.
- Reduce fuel consumption by 20-25%.
- Reduced carbon print and Green House Gases:
 - NO_x up to 75%
 - CO_x up to 30%
 - Particulate Matter up to 85%
 - Soot up to 81%
- No change required to existing engines.
- Minimum or no CAPEX equipment purchase.
- Eliminate the need to use expensive fuels or;
- Changing fuels which could lead to increase cost in fuel and lubrication.
- In the case of engines with scrubbers, reduce SO_x by 20-25%, thus extending the life of the scrubbing liquid.

How can you benefit from our fuel improvement technology?

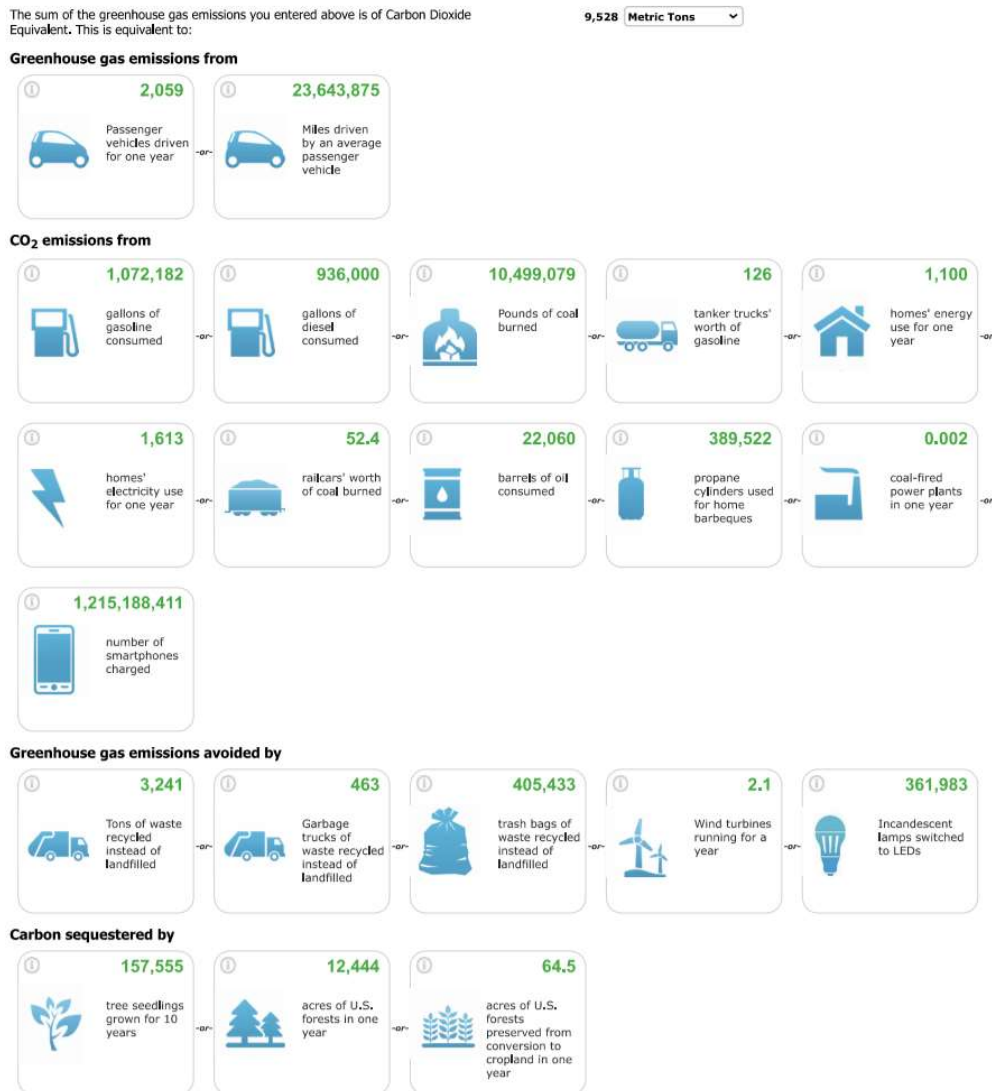
- Avoid price volatility of alternative fuels.



- Assuming a client with a consumption of 13,000 gallons of fuel per day, the effect of implementing our fuel enhancement technology would be as follows:
 - 20% reduction in consumption will translate to 2,600 gallons a day.
 - The net saving will be a split between Re-Synth and the client at a 50/50 ratio.
 - At \$2 per gallon, the net saving for the client will amount to \$2,600 per day.
 - At a run rate of 360 days per year, this translates to \$936,000.
- ReSynth also offers hedging for our long term contract clients.

What is the **environmental foot print reduction** from using our fuel improvement technology?

- A consumption of 13,000 Gallons per day, and a run rate of 360 days equates to an annual consumption of 4,680,000 Gallons.
- A 20% reduction in fuel is equivalent to a consumption reduction of 936,000 Gallons.
- 936,000 gallons of fuel saved is equivalent to CO2 emissions reduction of 9,528 Metric tons each year





Technologies for a better environment

Fuel Improvement

Our process is USPTO patented



US009050578B2

(12) **United States Patent**
Gonzalez et al.

(10) **Patent No.:** **US 9,050,578 B2**
(45) **Date of Patent:** **Jun. 9, 2015**

(54) **SULPHUR AND METALS REMOVAL PROCESS FOR FUELS THROUGH THE USE OF A MULTI-STAGE ULTRASOUND APPARATUS WITH THE ADDITION OF METHYLATE AND WATER/FLUORIDE MIX IN MULTIPLE SEPERATE STAGES**

(52) **U.S. CL.**
CPC *B01J 19/008* (2013.01)
(58) **Field of Classification Search**
None
See application file for complete search history.

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Miguel Jimenez, Zipaquira
Cundinamarca (CO); **Luis Fernando Gutierrez**, Manizales (CO)

(56) **References Cited**

U.S. PATENT DOCUMENTS

2008/0119421 A1* 5/2008 Tuszynski et al. 514/34
2010/0124583 A1* 5/2010 Medoff 426/2
2013/0011887 A1* 1/2013 Dayton et al. 435/131

* cited by examiner

Primary Examiner — Tam M Nguyen

(72) Inventors: **Carlos Jose Gonzalez**, Cayey, PR (US);
Miguel Jimenez, Zipaquira
Cundinamarca (CO); **Luis Fernando Gutierrez**, Manizales (CO)

(57) **ABSTRACT**

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 102 days.

The present invention provides a novel system and method for sulphur and metal removal from crude oil and all liquid fuel fractions to biofuels by means of ultrasonic cavitation to enhance chemical reactions of said contaminants with sodium or potassium methylate and a water/fluoride mix in separate stages obtaining a solid form which is filtered out by the use of a centrifuge system. The resulting fuel is molecularly stable and cleaner than regular fuels.

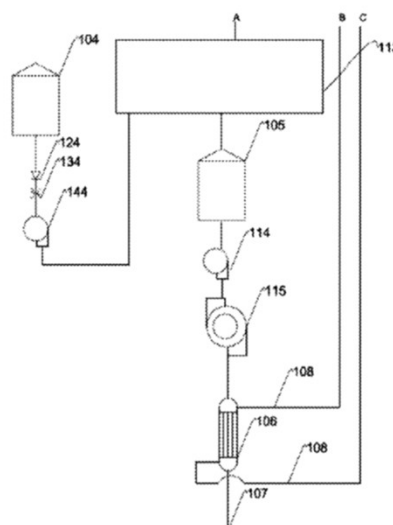
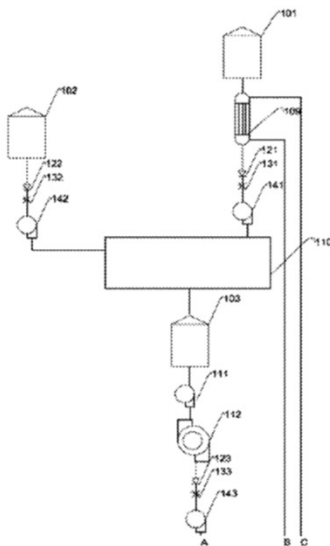
(21) Appl. No.: **14/059,446**

(22) Filed: **Oct. 22, 2013**

(65) **Prior Publication Data**
US 2015/0112111 A1 Apr. 23, 2015

(51) **Int. Cl.**
B01J 19/00 (2006.01)

19 Claims, 9 Drawing Sheets

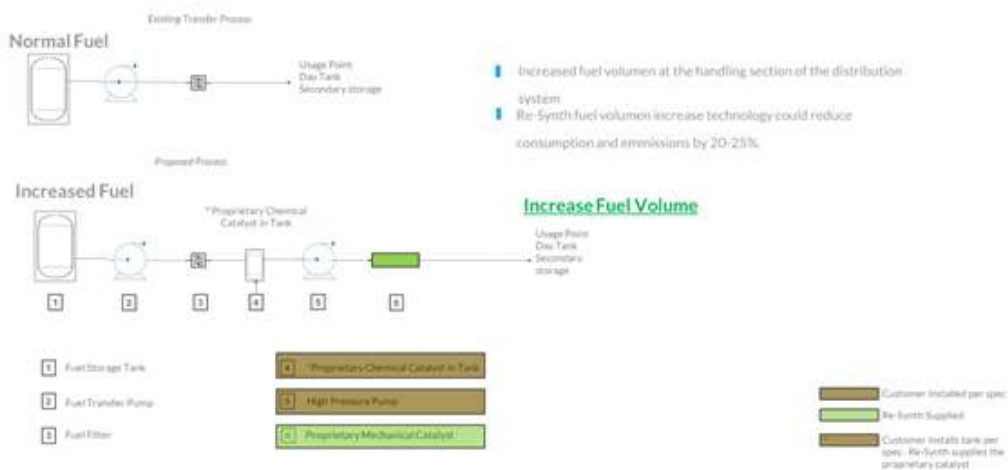


How does it work

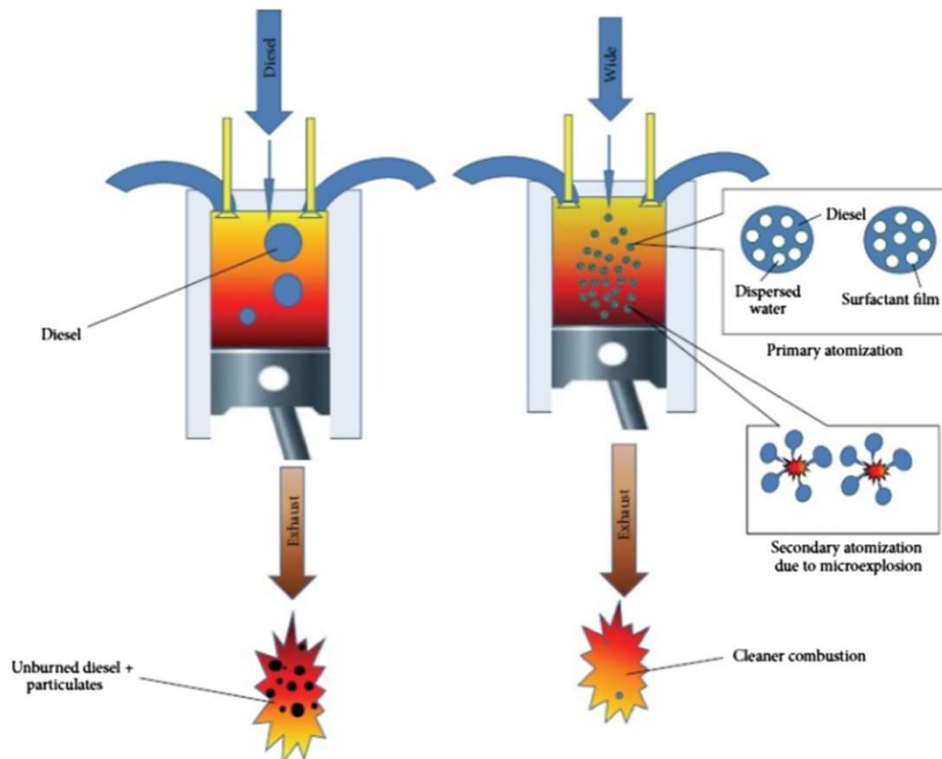
Re-Synth obtains fuel improvements by using our patented technology ROMO. This process increases fuel volume by adding a cost-effective additive resulting in:

- Reduction of 20-25% on fuel consumption while maintaining the engine efficiency.
- Reduction of NO_x, CO_x, Particulate Matter & HC emissions.
- Unlimited commercial applications including but not limited to:
 - Aircraft turbines
 - Boilers
 - Marine engines
 - Electrical generation engines (turbines)
 - Others

Re-Synth's process to increase fuel volume ROMO



Fuel Emulsion - Micro-Explosion Operating principles

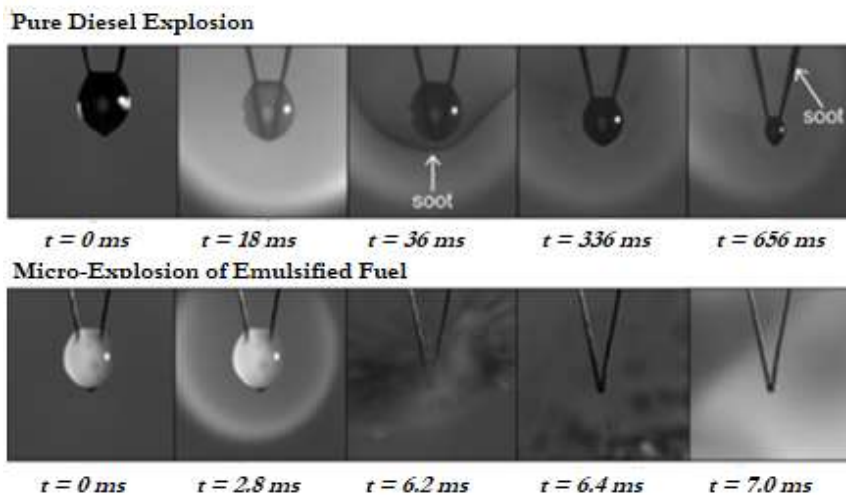


- Suspended emulsion particles reach their superheated stage faster than the fuel and create expansion breakup during the combustion, forming very fine particles.
- Re-Synth process controls: the emulsion composition, size of dispersed emulsion particle and droplet size. The in-line system maintains the correct pressure and temperature to ensure the right combustion conditions, reducing fuel consumption and emissions.
- This effect is achieved by applying our patented chemical and mechanical process ensuring the right combustion conditions.

Several studies confirm emulsion use as an effective catalyst for emissions and fuel consumption reduction

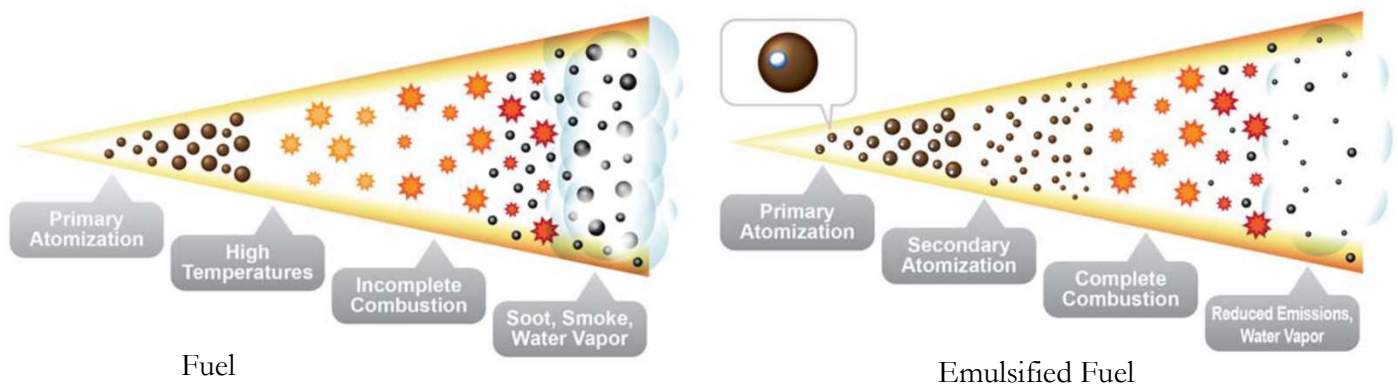
- Lesser formation of soot and Particulate Matter (PM) indicate more efficient combustion.
- There were reported reductions in soot emission by 81% with WOE emulsion.
- The reduction in soot and PM due to the better mixing and enhanced atomization caused by micro-explosion behavior of emulsion fuel.
- In addition to the observations from our on hand experience, we will present the results of two different studies performed by the following entities:
 - International Association for Sharing Knowledge and Sustainability – (IASKS)
 - Division of Marine Engineering, Mokpo National Maritime University of Mokpo Korea and the Department of Mechanical and Shipbuilding Convergence Engineering, Pukyong National University, Korea.
 - Published by the Molecular Diversity Preservation International and Multidisciplinary Digital Publishing Institute – (MDPI)

Principles of fuel emulsion efficient combustion



- Re-Synth's enhanced fuel causes a micro-explosion ninety times (90X) times faster than ordinary diesel. From $t=656\text{ms}$ to $t=7\text{ms}$.
- Compare pure diesel vs enhanced fuel from Re-Synth. Note how soot levels decrease and almost disappear between pure diesel and emulsified fuel.

Fuel Emulsion - Brake Thermal Efficiency Improvement



Source provided by Alternate Petroleum Technologies

- Brake Thermal Efficiency improves due to an ignition delay when the emulsion expands and vaporizes causing the micro-explosion.
- Ignition delay leads to a higher heat release rate, higher fuel burning in the pre-mixed stage and better BTE.
- Increase in flame propagation speed and flame-lift-off length with emulsion fuel, promotes better mixing of air-fuel mixture and results in complete combustion.

Ongoing Projects

- Re-Synth is installing our technology in the electricity production arena by enhancing fuels to several private electricity generators in the Dominican Republic.
- Our IPs is enhancing fuels for the production of hot water and steam generation in boilers for several hotel chains in Punta Cana, Dominican Republic.
- At the Dominican Republic, several food manufacturing boilers have reduced their consumption and emissions.
- Local boilers for the Puerto Rican pharmaceutical, food industry and asphalt companies are scheduled post COVID.
- Re-Synth is negotiating with several shipping companies to install our technology to comply with IMO 2023 and reduce costs.
- Our systems are installed in the Mexican transportation and asphalt industry since July 2020
- We are currently in conversations to license our technology in the mainland USA, Argentina, Spain, Colombia, Ecuador, Chile and Jamaica.
- As for Regulatory Vesting, we have the blessing from the US EPA and US Coast Guard for implementing our technology.



Emulsions Capable Equipment Manufacturers



ReSynth Emulsion Chemical Characteristics

Physical and Chemical Descriptions	Result	Test Method (ISO)	Test Method (ASTM)	
Flash point (°C/°F)	69.0 / 156	ISO 2719	D93	
Specific Gravity	0.8877	ISO 3675	D1298	
Copper strip corrosion	1a	ISO 2160	D130	
Lubricity, HFRR @ 60°C	270	ISO 12156	D6079	

The Team

- Re-Synth International and its subsidiaries have been supported by a team of experienced professional individuals which have helped in so many ways to raise investment, licensing opportunities, and develop our corporate structure as well as our technologies and know how. We are very grateful for their contributions to our organization.
- Mr. Carlos Gonzalez, CEO/CSO of Re-Synth International, has a successful track record in various engineering businesses, including successful startups in biofuels, value engineering, as well as fuel and water treatment. He has received awards for innovation, environment, and public service. His patents for improving hydrocarbon fuels of excess carbon, sulfur, and metal impurities are the basis for profitable manufacturing of ULSD diesel, aviation gas, and other clean fuels from recycled raw materials including old tires, plastics, and heavy fuels like IFOs.
- Mr. Antonio Colón, COO was an auditor and business consultant with Arthur-Andersen. He managed engagements assessing governmental compliance and loophole analysis on procurement processes. He led the valuation and acquisition of several companies throughout Latin America. He lived in Venezuela and Argentina. He developed a tax credit low income housing project. For seven years he managed an electricity investment fund. The markets included ERCOT, PJM, MISO, NYISO and NEISO. He manages a fund to offer PR tax incentives to non-US investors.

The Team

- Mr. Boris Blancovich has a combined chemical process engineering background, his steady growth in engineering management, all cemented in a regulatory foundation of safety, environmental, GxP guidelines and equipment reliability. He specializes in Engineering Facilities organization in 2008 supporting and Managing Utilities and Facilities while also developing his skills as a Reliability Engineer. His contributions included the Plant Maintenance Optimization initiative, the Planning/Scheduling of activities for a hybrid organization, the justification of an optimized financial budget while also maintaining success performance indexes in Compliance.

He had continued to progress into Maintenance Management roles, Reliability consulting services and Enterprise Facilities Management. Through these experiences Boris has closely worked, guided and trained Pharmaceutical as well as government water and power utilities to transform their maintenance management and execution in the future.

Mr. Blancovich earned his B.S. degree in 1998 with a Major in Chemical Engineering, he earned in Professional Engineering License in 2003, passed the Certified Maintenance Reliability Professional test in 2014, became a Reliability Centered Maintenance Practitioner/instructor in 2014 and passed the Certified Reliability Leader examination in 2016.

Other Re-Synth Memos

Please refer to Re-Synth Technical Memo for a complete detailed write up of our technology.

Please refer to Re-Synth IMO 2023 Compliance Memo for a detailed write up on how Re-Synth technology could help your company comply with the IMO requirements.

Please refer to the Re-Synth LNG, Diesel and Propane Fuel Change Memo for a complete write up on how Re-Synth Technology could be a better alternative to switching fuels.