USTDA
GLOBAL PARTNERSHIP FOR CLIMATE-SMART INFRASTRUCTURE

EXECUTIVE SUMMARY

RegenBiomass, Inc. (the Company) develops regenerative ocean and terrestrial biomass farms for producing valuable products as nature-based solutions for decarbonization. The Company has been retained by Belize Trade and Investment Development Service (BELTRAIDE) in cooperation with the Inter-American Development Bank (IDB) to help develop a commercial seaweed industry for Belize. The timing is providential for generating positive branding publicity employing these inherent touchstones for impact investment: sustainable ocean products; social and gender equality; combating climate change; and post-pandemic employment.

Belize has an inherent advantage for developing a seaweed mariculture industry due to its large area of pristine tropical waters that are protected inside the Belize Barrier Reef. These conditions have the potential to produce a higher quality product requiring less processing with fewer inputs required than seaweed produced in other parts of the world. This unique, natural feature creates an opportunity for establishing a global brand for high quality, sustainably produced seaweed.

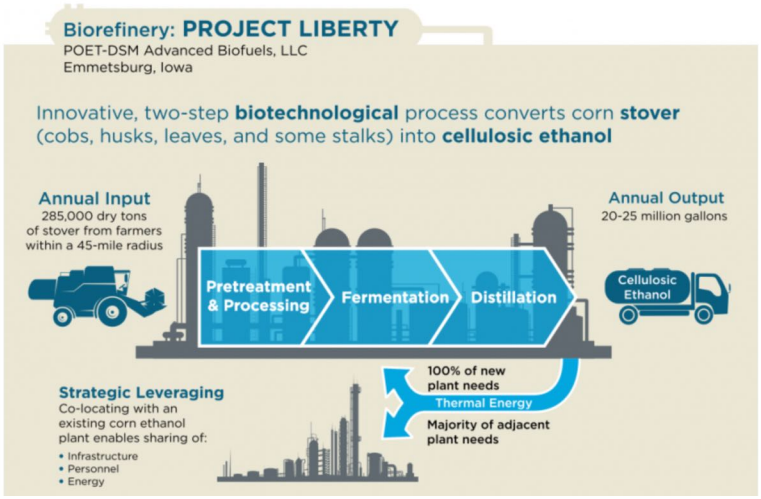
Furthermore, Belize native Eucheuma seaweed can double its biomass in two weeks, sequestering massive amounts of CO_2 as a nature-based solution for the decarbonization of our planet. The branding message is compelling for near-term export sales and impact investment by individuals, corporations and nations seeking to meet their decarbonization pledges. It would also contribute towards the recent global movement for social and environmental justice.

The Company is proposing a pilot project to demonstrate and document the feasibility of commercial scale seaweed farming in Belize. It would provide empirical data about the economics and environmental impacts that could be modeled for the expansion and scaling required for a commercial seaweed industry. The proposed pilot project, documenting the efficacy of submergible High Density Poly Ethelene (HDPE) pipes as structures for cultivation platforms for avoiding hurricanes and increasing seaweed yields, would de-risk potential investment by public and private sectors. It would also provide the scaling metrics assuring sufficient seaweed supply to prospective export market customers for accelerating the development of a Belize Seaweed Industry.

The initial targeted market for Belize's seaweed industry is nutritious and sustainable seaweed as an ingredient for the Dietary & Supplement market. However, seaweed is also a targeted regenerative biomass feedstock for sustainable non-polluting biofuels. Therefore, the Company is submitting this proposal to the USTDA for conducting applied research for processing commercial sustainable seaweed feedstocks into bioethanol that would result in exporting technology and services from the United States of America (USA).

PROJECT DESCRIPTION

The Company has partnered with POET, the world's largest ethanol producer with 33 biorefineries annually producing over 3 billion gallons of biofuels. POET has designed and built biorefineries that operate on a proprietary technology platform that provides an economic advantage in the low-margin ethanol market environment and has constructed the largest 2nd generation cellulosic ethanol plant which processes corn stover biomass.



The Company and POET are proposing to develop a 3rd generation bioethanol plant design for processing seaweed biomass farmed offshore Belize into bioethanol. This proposed project would evaluate and document the composition and unique characteristics of seaweed biomass for producing sustainable blended fuels. It would also evaluate the environmental impacts and economics of constructing seaweed biorefineries in Belize.

Low Carbon Fuel Standards (LCFS) are being adopted globally requiring fuels sold locally to steadily decline in Carbon Intensity (CI). The logistics and cost for transporting the seaweed harvest shore side for processing at Belize biorefineries are advantageous for a low CI score.

There is an immense ocean region offshore Belize that is ideal for growing seaweed not competing for arable land, precious fresh water, or requiring toxic pesticides and fertilizers. Seaweed has a unique composition as a renewable biomass feedstock due to its sugar content, lack of lignin, and its extraordinary high growth rate. Moreover, seaweed has high CO_2 sequestration capability for mitigating ocean acidification and is environmentally sustainable and regenerative for curbing carbon emissions and combating climate change.

The Company believes the competitive advantage for producing economical seaweed biomass offshore Belize will be deploying cultivation platforms constructed with HDPE pipes that are submergible as protection from storms and hurricanes, and for increasing seaweed yields and decreasing disease. The submergible capability allows the platforms to be positioned in the ocean water vertical column for optimum cultivation yields based upon temperature, sunlight, salinity, and nutrients which are critical factors for seaweed survivability and rapid growth.

Fast-growing and sustainable seaweed, unlike corn and sugar cane, does not compete with food crops as a ethanol feedstock. The theoretical sugar yield is around 80% capable of yielding 1,500 gallons of ethanol per acre which is 50% more than sugar cane and triple that of corn. Because it does not contain lignin, more of the seaweed biomass is available to produce ethanol relative to alternative biomass sources. However, the sugars in its alginate composition at 30–60% must be released for achieving the full potential from this feedstock and cannot be realized unless alginate is co-fermented. Third-generation biofuels (derived from seaweed) are predicted to become the most efficient source, giving seaweed biomass a competitive advantage for ethanol production. The water content of seaweed is higher than that of terrestrial biomass (80-85%) making it more suited for microbial conversion than for direct combustion or thermochemical conversion process, which is an alternative for land-based biomass.

OVERSEAS PROJECT SPONSOR'S CAPABILITY AND COMMITMENT

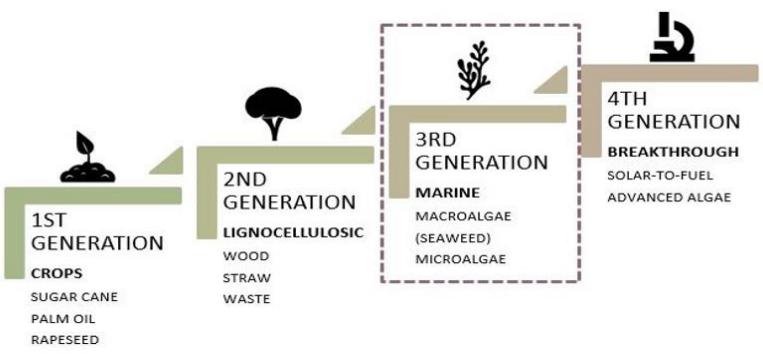
Belize's Ministry of Public Utilities, Energy and Logistics will serve as the Project Sponsor. In February 2012, the Government of Belize endorsed the National Energy Policy and Planning Framework (NEP). This document was created to assess the country's energy sector and propose a pathway for its evolution. The NEP highlighted the need for energy planning which propelled the creation of the Energy Unit. It is the administrative agent of the energy and public utilities portfolio that is responsible for planning and policymaking. This unit currently operates within the Ministry of Public Utilities, Energy, and Logistics. The Unit's main responsibility is to develop policies, strategic direction, and plans for the national energy sector as well as to oversee all matters relative to energy and the nation's public utilities.

IMPLEMENTATION FINANCING

The Company has been working with leading firms in the emerging Green Bond market for funding its project in California that will be presented for funding this project. When an issuer sells a green bond, they're making a nonbinding commitment to earmark the sale's proceeds for environmentally friendly projects. There is also an emerging market for Blue Bonds for saving the world's ocean and addressing climate change adaption. There are also about 1,500 of companies seeking investments to meet their decarbonization pledges that could be incentivized to invest in developing a seaweed industry for producing feedstock for biorefineries in Belize.

U.S EXPORT POTENTIAL

According to Zion Market Research, the global biofuel market was valued at $168 billion in 2016 and expected to reach $218.7 billion in 2022. Based on production, biofuels are categorized into first, second, and third generation. First-generation biofuels use food crops, such as soy, rapeseed, and corn. Second-generation advanced biofuels are produced from non-food crops and waste such as forest residues. Third-generation biofuels are derived from algae which is the most efficient source giving seaweed biomass a competitive advantage for biofuel production.



The third-generation biofuels market is being driven as a sustainable and clean source, produced by non-food crops with lesser concentration of greenhouse gases as compared to conventional fuels. There are significant government subsidies supporting the development of third generation advanced biofuel production and algae was included in the 2018 Farm Bill establishing U.S. farm policy through 2023 with a $867 billion budget.

The innovative technologies and services for advancing offshore mariculture and designing biorefineries for processing seaweed biomass into bioethanol developed with this proposed project would open a massive global export market for USA technologies and services. It would also help develop a pipeline of bankable projects to support sustainable infrastructure investments and foster economic growth in USA partner countries.

RELEVANCE TO USTDA'S GLOBAL PARTNERSHIP FOR CLIMATE-SMART INFRASTRUCTURE

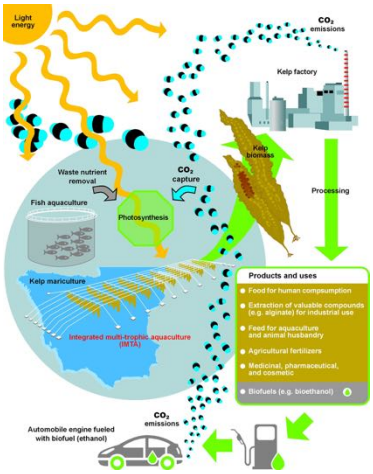
Ethanol will need to play a major role to meet the Biden administration's goal of net-zero emissions by 2050 and multi-billion-dollar projects are in the works to sequester CO_2 emitted from ethanol plants to make the fuel greener and help ensure the industry's sustainability. At least three companies recently announced partnerships with ethanol producers to capture CO_2 created during production, which would drastically

reduce the carbon footprint of refineries and the fuel. Instead of CO_2 being released into the air, it would be transported and stored underground.

Seaweed's rapid growth rate and ability to absorb vast amounts of CO_2 can help fight climate change and deacidify the oceans. Like plants on land, seaweed uses photosynthesis to absorb CO_2 and grow biomass.

Coastal marine systems can absorb carbon at rates up to 50 times greater than forests on land and globally, seaweeds are thought to sequester nearly 200 million tons of CO_2 every year.

Remarkably, Eucheuma seaweed doubles its biomass every two weeks thus sequestering massive amounts of CO_2 and mitigating ocean acidification.



TERMS OF REFERENCE FOR THE ACTIVITY

The Company intends to contract with the Integrated Bioprocessing Research Laboratory (IBRL) at the University of Illinois for initial proof of concept to confirm efficiency and costs of processing seaweed into ethanol with modern, cutting-edge technology. IBRL's unique pilot-scale capabilities also allow for scaling the technology and proving commercial readiness. The IBRL team will evaluate challenging handling and pretreatment technologies for seaweed alginate. Seaweed biomass will be harvested from Belize waters and transported via airfreight to IBRL for creating the proprietary enzyme cocktail and microorganism component.

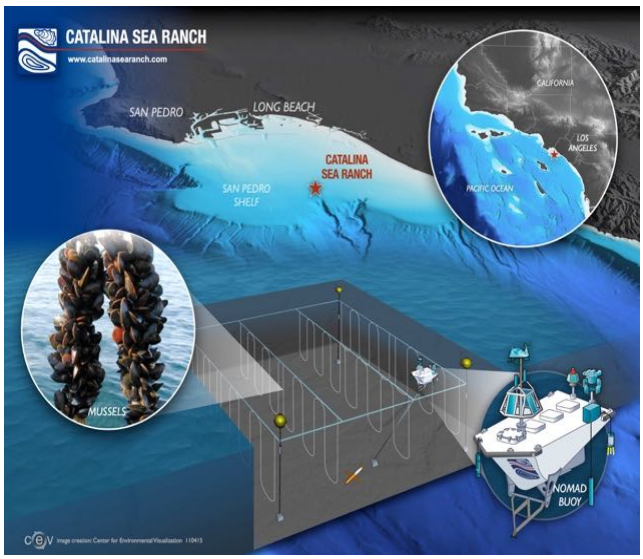
Applying state of the art methods, baseline production values will be reaffirmed through small-scale testing of 3-liter and 16-liter batches. Utilizing proven microbes *E. coli* and *S. cerevisiae,* small-scale ethanol batches will be produced at IBRL to determine yields and costs of production to form a basis for production efficiency improvement targets. IBRL testing will occur over 12 weeks, with supplemental data analysis to be completed over a subsequent 8-week period. Expected results will detail production yield by sugar type, serving as a basis for improvement for subsequent commercial scaling with a biorefinery designed by POET.

Under an $8.8 million contract awarded by the ARPA-E in 2010, Bio Architecture Lab (BAL) developed methods to convert macroalgae into ethanol. BAL scientists created a genetically modified *E. coli* and *S. cerevisiae* that had the correct cellular machinery to convert alginate to ethanol along with other sugars present. Genes were discovered for coding enzymes for alginate transport and metabolism were inserted into these chassis. The genomic integration of this ensemble, together with an engineered system for extracellular alginate depolymerization, generated a microbial platform that could simultaneously degrade, uptake and metabolize alginate. This platform enables bioethanol production directly from macroalgae with over 80% of maximum theoretical yield from its sugars.

ESTIMATED ACTIVITY BUDGET

The Company is requesting $500,000 for project preparation activities to develop a sustainable seaweed mariculture industry for producing biomass as a regenerative feedstock for producing bioethanol. The funds would also be used to manage the grant, hire subject matter experts, pay IBRL for seaweed processing to bioethanol proof of concept and pay POET for commercial scale pretreatment and biorefinery design. This project would help support Belize's post-pandemic economy recover while promoting USA jobs through exports and sustainable infrastructure to additional emerging nations reaching over $40 million. It would also reduce Belize's dependency on volatile imported fossil fuels and bring about socio-economic development with reduced negative impacts to the environment and making a significant contribution towards climate change.

U.S. FIRM'S CAPABILITIES AND COMMITMENT



The Company's management has expertise and experience with offshore mariculture having pioneered the concept in U.S. Federal waters offshore California. The technologies and lessons learned can be transferred to Belize for scaling its future seaweed industry and for potentially taking a global leadership role for seaweed mariculture.

The applied research and the technologies developed for offshore seaweed mariculture in California were supported by the $25 million MARINER Program funded by ARPA-E and would apply to seaweed nursery operations, seeding, farming, and harvesting for Belize.

The Company's Founding Board of Directors have the executive experience and relationships for developing the pilot proof of concept to subsequently scale for commercialization.

Phil Cruver is the Founder and CEO of Regenbiomass and previously was the Founder and CEO of Catalina Sea Ranch and five additional start-up companies. He has served as Principal Investigator for over $1.2 million of Federally funded R&D projects and was the Principal Investigator for the Phase 1 ARPA-E contract. Phil also founded International Dynergy, a publicly traded company that installed $50 million of wind turbine generators in Palm Springs, CA. Previously, he was the Senior Vice President and member of the Board of Directors of Auto-Train Corporation, an American Stock Exchange Company.

Adam Monroe is a founding member of Regenbiomass' Board of Directors. Adam recently retired from Novozymes, the global leader in the research, development and production of industrial enzymes, microorganisms, and biopharmaceutical ingredients. During his 16-year career at Novozymes, Adam has served as President, North Americas for 10 years and for over 6 years was Director of Supply Chain Operations, Americas. Adam successfully introduced the first genetically modified fermentation strain in the United States and managed the $200 million expansion site. He also established a global supply line of enzymes for the United States biofuels market.

POET is the world's largest biofuels producer and a leader in biorefining through its efficient, vertically integrated approach to production. Started in 1987, the company today has a network of 28 production facilities across 7 states. POET's Design and Construction team of engineers and technical professionals has been delivering innovative solutions for clients' biggest challenges for the last thirty years. It employs a wide range of engineering disciplines committed to providing creative, sustainable designs, and by having everything in-house, its teams can stay nimble and efficient, maximizing value for clients.