

High-Speed Public Policy for Algae-Based Biofuel as a Viable Energy Alternative

Improving Florida-China Relations Through Sustainable Collaboration

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Introduction

With Florida's rising population and skyrocketing energy consumption, a noose hangs around the neck of the state's energy supply as it inches closer to a breaking point. Florida's residential electricity demand is one of the highest in the nation.¹ Census data indicate that Florida remains one of the fastest-growing states of the past decade, adding 2.8 million people.²

Creating sustainable energy alternatives is no longer just trendy, but imperative. U.S. Senator Bill Nelson (D-FL) introduced legislation in the 2011 congressional session to extend a tax incentive program to algae-based biofuel producers, an incentive that is already afforded other cellulosic biofuel producers.³ Senator Nelson's legislation seeks to curb dependence on foreign oil through S. 748, the Algae-Based Renewable Fuel Promotion Act of 2011.⁴ The language of the companion House bill is straightforward: "To amend the Internal Revenue Code of 1986 to expand the definition of cellulosic biofuel to include algae-based biofuel for purposes of the cellulosic biofuel producer credit and the special allowance for cellulosic biofuel plant property."⁵ This bill should be considered a momentous stepping-stone to more energy options for Americans.

Technology for the production of energy from algae is proliferating. Considering the short life span of algae and its replication capacities—and the high-return on investment for algae-based biofuel—the energy possibilities are limitless. Yet, the technology remains stagnant and underdeveloped in certain respects. The potential for algae-based biofuel will not be fully realized without considerable political will and scientific expertise. This paper will explore whether algae-based biofuel is a viable alternative energy option and how the proposed federal tax incentive and other

governmental and educational programs could help propel its development.

No current regulation exists specifically with respect to algae-based biofuel as it falls under the broad category of cellulosic biofuels. This paper suggests public policy imperatives in Florida, in concert with the proposed algae-based biofuel tax credit, to address the economic issue of having this renewable energy alternative become sustainable and less costly in order to encourage its use on a broader scale. Floridians cannot do it alone. Policy-makers in Florida and in China—a country also making strides in the algae-based biofuel sector—will need to work together. Other U.S. states might take a lesson from Florida and view China as a natural strategic partner.

Algae-Based Biofuel: Ripe for Harvesting

In 2008, CNN lauded algae-based biofuel as "the ultimate in renewable energy."⁶ In the past, algae-based biofuels have been eyed with suspicion in the U.S. and justifiably so, but that perception is changing as the technology evolves. Recent reports on algae-based biofuels offer mixed conclusions. Mary Rosenthal, who leads the 170-member Algal Biomass Organization ("ABO"), believes algae-based biofuels could be cost competitive with oil in 7 years. Rosenthal tells *Solve Climate News*, "We're hoping to be at parity with fossil-fuel based petroleum in the year 2017 or 2018, with the idea that we will be at several billions of gallons."⁷ The University of California at Berkeley's Energy Biosciences Institute ("EBI") reports that "it would take a decade of testing to determine if algae companies can produce affordable biofuels in mass quantities."⁸ With present technology, algae-based biofuels are cost prohibitive. Costs per barrel of algae biofuel range from \$140 a barrel to \$900 per

barrel.⁹ Authors of the EBI report, Nigel Quinn and Tryg Lundquist of the Lawrence Berkeley National Laboratory ("LBNL"), conclude, "Algae oil production will be neither quick nor plentiful—ten years is a reasonable projection for the R&D to allow a conclusion about the ability to achieve relatively low-cost algae biomass and oil production, at least for specific locations."¹⁰

After a ten-year hiatus, even the U.S. government is stepping up research and development for algae-based biofuel. The federal government and the private sector have recognized that the location of algae processing plants is crucial. For example, operations next to carbon-producing power plants, or manufacturing plants, could sequester the CO₂ that is created and use those emissions to help grow the algae, which need CO₂ for photosynthesis.¹¹

In *Earth: The Sequel*, Fred Krupp, President of the Environmental Defense Fund, and staff member Miriam Horn, delve into the issues of algae-based biofuel with such clarity and conviction that even the strongest skeptics would be persuaded that algae-based biofuels are a sustainable energy option. Space constraints prevent a detailed elaboration as to the science of synthesizing algae into fuel, but this book is absolutely spectacular in laying out the wonder of what the authors dub "voracious algae."¹² These microscopic, single-cell creatures are "high-energy orioles ideal for making biodiesel—producing 30 times more vegetable oil per acre than sunflowers or rapeseed—and are rich in carbohydrates that can become ethanol and proteins for animal feed."¹³ Algae also filter air pollutants and neutralize acids "in splitting nitrogen oxides—precursors to smog—into harmless nitrogen and oxygen."¹⁴ In fact, they are the "world's most efficient converters of carbon dioxide to oxygen and biomass."¹⁵ From a scientific perspective,

algae are ideal for production as biofuel because they “don’t need to leaf, flower, produce seeds, or bear fruit.”¹⁶ Algae consume carbon dioxide and divide it.¹⁷

The largest caveat in large-scale algae biofuel production is “finding the right strain of algae that will produce reliably—and cheaply—at high yields.”¹⁸ The goal is to “at least double biomass and oil productivity through strain selection and genetic modification.”¹⁹ ABO’s head, Mary Rosenthal, who spent more than twenty years in corporate work, dismisses “any suggestion that the technology may not be poised for prime time.”²⁰ Rosenthal insists that the “technology is mature. We’re going through the same nascent issues of any emerging industry—where you’re going from lab to pilot, from pilot to scale.”²¹ More than one hundred startups are working towards harnessing algae as a cost-effective, sustainable biofuel.²² With bold innovators and investors, algae-based bio-

fuel could be the greatest energy invention since the light bulb.

Tax Incentives Under the Algae-Based Renewable Fuel Promotion Act Of 2011

Initially the author sought to explore policy options for wind energy in her home state of Florida, but research and written correspondence with the offices of U.S. Senator Marco Rubio (R-FL) and Florida legislator Scott Plakon (R)²³ suggested that wind as an alternative energy option in Florida should be given limited credence despite the state’s vast shoreline and peninsular geography. Florida’s natural coastline is, however, conducive for algae-based bio-fuel production. Working with federal, state, and municipal bodies, algae is ripe for picking and being converted to biofuel in Florida.

The tax incentive legislation introduced

by Senator Nelson would go a long way towards encouraging development of the scientific and business methodology required to make the vision for this renewable energy a reality. During a 2010 trip to southwest Florida to tout the Algae-Based Renewable Fuel Promotion Act of 2011, Senator Nelson emphasized that algae-based fuels can help reduce America’s dependence on foreign oil and also create new jobs in a weak economy.²⁴ “I want you to succeed and I want you to succeed big time,” Nelson told executives.²⁵ The tax incentive would amount to \$1.01 per gallon of biofuel produced using algae and would cost \$500,000 before it expired in 2013, Nelson said.²⁶ The tax break would place algae-based biofuel producers on equal tax footing with competitors who use cellulose to produce fuel and are already taking advantage of the credit.²⁷ Algenol, an algae-based biofuel producer in Ft. Myers, Florida, plans to construct a pilot produc-



tion plant on forty acres in Lee County where the company already has its offices and research labs.²⁸ Algenol executives applauded the proposed legislation.

Industry insiders are concerned that the tax incentive legislation can take the prospects for algae-based energy only so far. Experts hope for longer-term commitments from the government with respect to tax incentives and for industry support by way of trade and commerce.

Tax Incentives for Energy Production

Security of energy supply presents a number of issues. The Organisation for Economic Co-Operation and Development ("OECD") was created pursuant to Article I of the Convention signed in Paris in 1960 and enacted in 1961 to effectuate economic progress among member nations on a global platform. OECD's three primary policies are designed: (1) "to achieve the highest sustainable economic growth and employment and a rising standard of living in Member countries, while maintaining financial stability, and thus to contribute to the development of the world economy;" (2) "to contribute to sound economic expansion in Member as well as non-member countries in the process of economic development;" and (3) "to contribute to the expansion of world trade on a multilateral, non-discriminatory basis in accordance with international obligations."²⁹

The International Energy Agency's report *Taxing Energy: Why and How* indicates that OECD countries have "a continuing concern about security of energy supply, which . . . include[s] energy security defined as self-sufficiency, wartime capability, minimization of adjustment lags, reduced import dependency (especially oil dependency), and price stability."³⁰ The report states:

The externalities and inefficiencies that exist in energy pricing can be corrected or reduced by taxes. Such remedial taxes should be effective, equitable, and without unintended side effects.

. . . Where externalities and inefficient pricing occur, however, attacks can be used deliberately to alter investment,

production and consumption in such a manner as to reduce the inefficiencies and external cost. In this case the tax is not neutral, but nonetheless desirable from society's point of view.³¹

While the Algae-Based Renewable Fuel Promotion Act of 2011 provides tax incentives to algae-based biofuel producers, the tax incentive is in some respects a tax disincentive to traditional energy producers like oil and gas. Innovative tax strategies such as those embedded in the Act could revolutionize how alternative energy is now viewed, making algae biofuel an energy sector mover and shaker.

Florida-China Collaboration to Improve Sustainable Technology and Business

In order for the tax incentive for algae-based biofuel producers to cement algae-based biofuel as a sustainable energy resource, there must be collaboration with the international community. Given the influx of Chinese businesspersons and businesses in parts of Florida—namely Tampa, Miami, and Orlando—the state would be well served to create and foster a stronger relationship with China and its constituents.

In the "new" China, engineers developing biofuel technologies are more mindful of the rural poor and those living in the countryside. The Chinese excel in engineering and harvesting energy from natural resources other than simply petroleum, natural gas, and coal. China's future economy and its burgeoning population depend on its ability to develop better alternatives to fossil fuels. Sustainable energy is not just another rogue idea in China. Sustainable energy is at the center of China's future and continued growth. The year 2030 is projected as the year China will trump all nations in terms of its economy and growth. Right now it is on pace to do so. In *Pow-ering China's Development: The Role of Renewable Energy*, Eric Martinot and Li Junfeng write:

It is likely that China will meet and even exceed its renewable energy development targets for 2020. Total

power capacity from renewables could reach 400 gigawatts by 2020, nearly triple the 135 gigawatts existing in 2006, with hydro, wind, biomass, and solar PV power making the greatest contributions.

Achieving these outcomes will depend on domestic industry development, the availability of skilled personnel, technology cost reductions, continued aggressive government policy, appropriate pricing levels, and allowance for distributed power generation by electric utilities. Given China's strong commitment to becoming a world leader in renewable manufacturing, as well as concerns about energy security, power shortages, air pollution and climate change, the future of renewable energy in China appears bright.³²

By forging a deeper alliance with China over trade missions and energy policies, Florida could quite possibly help preserve its own rustic beauty, meet growing energy demands and hopefully usher in a new era in the development of sustainable energy in the United States. Former U.S. Representative and 1978 gubernatorial candidate Lou Frey founded the Lou Frey Institute of Politics and Government at the University of Central Florida. He often coordinates educational programs with former Florida Governor and U.S. Senator Bob Graham and other leading legislators, policy-makers and legal experts. In the past, the Lou Frey Institute has conducted symposiums on alternative energy and China. The Spring 2011 Symposium was entitled, "The U.S. & China: What does the Future Hold?" The Center would be an excellent forum to discuss further public policy possibilities for enhancing and developing algae-based biofuel as a sustainable energy and for encouraging cooperation with the Chinese. Florida universities could take the lead in research with funding from private companies like Algenol and the state and federal governments. In fact, the University of Florida, Florida State University, the University of Central Florida, the University of Miami, and the University of South Florida already have exchange programs with Chinese uni-

versities and think tanks to further research.

In October 2007, the Greater Tampa Chamber of Commerce, in conjunction with the Chinese Chamber of Commerce, conducted a trade mission to the Chinese cities of Guangzhou, Beijing, and Shanghai.³³ Since 2007, xenophobic public policies have forestalled some business initiatives between Floridians and the Chinese. Now would be an excellent time to reinvigorate those halted efforts. To end the dependence on foreign oil will require Floridians to be willing to work with foreign nationals, businesses, and universities to gain the technological expertise, business acumen, and scientific know-how to rid Florida of its addiction to foreign oil.

Conclusion

In energy regulation, as in the law, there are no easy answers. With scientific expertise and political willpower, algae biofuels are ripe for harvesting in the energy sector. Federal tax incentives could be game-changers for algae-based biofuel technology in terms of developing a long-term energy strategy that reduces high energy prices and our dependency on foreign oil without harming Florida's environment or coastal economy. Even if this appears to be a case of "easier said than done," Floridians have their backs against the wall in the energy sector. With its population rate continuing to rise, Florida has no option but to consider algae-based biofuel. ■

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