LSU Journal of Energy Law and Resources

Volume 3
Issue 1 *Fall 2014*

11-1-2014

Bayou Fuel

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INTRODUCTION

Imagine a journey along the Mississippi River, one similar to Mark Twain's in the late 1800s.[1] Twain described the sight of antebellum plantations lining the river road as resembling a "spacious street."[2] As Twain's eyes rolled through the rows of sugarcane melting into the horizon over a century ago, he may have beheld a key to the United States' quest toward an energy-independent future. Every President since Richard Nixon has called for America to lessen its reliance on foreign oil.[3] Progress began in the renewable fuels sector in 2007, when President George W. Bush enacted the Renewable Fuel Standards Program (RFS) to increase the supply of alternative renewable fuels.[4] Today, the RFS seeks to significantly reduce greenhouse gas emissions through the use of renewable fuels, reduce the amount of petroleum imported, and encourage the development and expansion of our nation's renewable fuels sector.[5]

More recently, President Barack Obama recognized "with only [two] percent of the world's oil reserves, oil isn't enough. This country needs an all-out, all-of-the-above strategy that develops every available source of American energy strategy that's cleaner,

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1. Craig Guillot, *River Road Plantations*, LA. TRAVEL, http://www.louisianatravel.com/river-road-plantations (last visited Sept. 29, 2014).

2. MARK TWAIN, LIFE ON THE MISSISSIPPI 140 (2006).

3. *Blueprint for a Secure Energy Future*, THE WHITE HOUSE 3 (Mar. 30, 2011), http://www.whitehouse.gov/sites/default/files/blueprint_secure_energy_future.pdf, archived at http://perma.cc/L6RQ-2W3M [hereinafter WHITE HOUSE BLUEPRINT].

4. *Bush Administration Establishes Program to Reduce Foreign Oil Dependency, Greenhouse Gases*, ENVTL. PROT. AGENCY (Apr. 10, 2007), http://yosemite.epa.gov/opa/admpress.nsf/8822edaadaba0243852572a000656841/9f276d4de20fe075852572b9005cb19c!OpenDocument, archived at http://perma.cc/BVP3-PMQN (stating that the "program is based on a trading system that provides a flexible means for industry to comply with the annual standard by allowing renewable fuels to be used where they are most economical."). *See Bush Delivers Speech on Renewable Fuel Sources,* WASH. POST (Apr. 25, 2006, 12:01 PM), http://www.washingtonpost.com/wp-dyn/content/article/2006/04/25/AR2006042500762.html, archived at http://perma.cc/T8PU-YPT2 (President Bush saw America's addiction to oil as a national security concern and believed ethanol to be an economic booster for rural communities).

5. *Renewable Fuel Standard (RFS)*, ENVTL. PROT. AGENCY, http://www.epa.gov/otaq/fuels/renewablefuels/, archived at http://perma.cc/PZ2V-GVDM (last visited Oct. 1, 2014).

cheaper, and full of new jobs."[6] Although creating new energy laws, regulations, and policies is difficult, the United States has a strong precedent of achieving scientific and technological advances.[7] In the 20th century, "U.S. investment became a concerted effort to promote both the advancement of science through academia and American global economic competitiveness."[8] Consistent with this legacy, it is imperative for the United States to secure energy independence.

The United States' interest in renewable energy began with the 1973 energy crisis. In response, the United States created the Department of Energy.[9] The Department of Energy sought to deliver a comprehensive and competitive energy plan, with a strong focus on both implementing durable, high-risk research and developing energy technology.[10] However, the interest in renewable energy was short-lived once the energy crisis ended and the price of crude oil decreased.[11] While several other countries adhered to and implemented inventive plans to decrease dependence on oil imports, America remained dependent on foreign oil, and in recent years, the price of gasoline has jumped to roughly four dollars a gallon across the nation.[12]

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6. *Remarks by the President in the State of the Union Address*, THE WHITE HOUSE (Jan. 24, 2012, 9:10 PM), http://www.whitehouse.gov/the-press-office/2012/01/24/remarks-president-state-union-address, archived at http://perma.cc/725Y-YRF9.

7. *See* John Roach, *Eight Great American Discoveries in Science*, NBC NEWS, http://www.nbcnews.com/id/38158710/ns/technology_and_science-science/t/eight-great-american-discoveries-science/#.UlH2N2RUO3M, archived at http://perma.cc/R2Z2-WP6Q (last visited Oct. 1, 2014) (discussing the chronology of US research milestones, including Benjamin Franklin's research and invention of the lightning rod, the invention of the Internet, and the integration of technology that brought about the 1969 moon landing).

8. Michael J. Malinowski, *Government Rx–Back to the Future in Science Funding? The Next Era in Drug Development*, 51 U. LOUISVILLE L. REV. 101,102 (2012).

9. Peter Z. Grossman, *U.S. Energy Policy and the Presumption of Market Failure*, 29 CATO J. 295, 295 (2009); *A Brief History of the Department of Energy*, DEP'T OF ENERGY, http://energy.gov/management/office-management/operational-management/history/brief-history-department-energy, archived at http://perma.cc/KM8K-T4BX (last visited Oct. 1, 2014).

10. *Energy Crisis (1970s),* HISTORY, http://www.history.com/topics/energy-crisis, archived at http://perma.cc/XD7H-X9QC (last visited Oct. 1, 2014) (noting that energy efficiency waned, and imports increased and that "[c]ountries such as Great Britain, Germany, Switzerland, Norway and Denmark placed limitations on driving.").

11. *Id.*

12. *U.S. Imports of Crude Oil*, ENERGY INFO. ADMIN., (Sept. 29, 2014), http://www.eia.gov/dnav/pet/hist/LeafHandler.ashx?n=PET&s=MCRIMUS1&f=A,

The nation's renewed interest in lessening its dependence on foreign oil presents Louisiana with a tremendous opportunity to transition its sugarcane legacy into a biofuel future. The Louisiana Legislature recognized this opportunity by passing Louisiana Revised Statute 3:3761 in 2008, which states that "feedstock other than corn" is a preferred biofuel.[13] Under the statute, grants are made available to biofuel makers to purchase blending pumps and a biofuel-powered vehicle.[14] However, this legislation does not provide the adequate incentives for sustainable biofuel initiatives, and therefore does not motivate the technological advances needed to produce ethanol from a non-corn based source.

This Comment proposes that Louisiana introduce law and policy that positions the state to play a major role in establishing energy independence through implementation of a sustainable and forward-thinking sugarcane ethanol policy. Specifically, this Comment concludes that Louisiana should enact a policy that focuses on supporting the historical sugarcane industry by allowing sugarcane farmers to apply their expertise to an innovative sugar-to-ethanol production process. After reviewing the history of Louisiana sugarcane and biofuels in Part I, Part II of this Comment will discuss the current alternative fuel policies of Louisiana and the federal government. Part III discusses Brazil's world-leading sugarcane ethanol production and Proálcool policies that shaped the country's position as the global leader of sugarcane ethanol production. Part IV will propose a legislative policy fix that will enable Louisiana to build a sustainable sugarcane ethanol industry, allowing farmers to not only maintain sugar production, but also produce ethanol and generate bioelectricity.

I. THE FIELD-TO-PUMP STRATEGIES

In recent years, both businesses and consumers have demonstrated interest in biofuels derived from agricultural

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archived at http://perma.cc/624K-Z6YD (graph demonstrates sharp increase of US oil imports, post 1973). The worldwide response to the energy crisis saw countries such as Australia ceasing to heat oil, thus making oil based heaters outdated, and instead sought to use natural gas as a heat source. *Id.* Many European countries implemented limits on the amount of driving. *Id.* Brazil implemented a large project entitled "Proálcool" (pro-alcohol), which focused on mixing ethanol and gasoline for use in automobiles. *See infra* Part III.A. Brazil sustained its 1970s Proálcool project and is no longer forced to heavily rely on foreign oil. *See infra* Part III.B.

13. LA. REV. STAT. ANN. § 3:3761(B)(1) (2011).

14. LA. REV. STAT. ANN. § 3:3763 (2011).

products.[15] Corn ethanol production has experienced a rapid growth in production in the Midwest, but not without significant drawbacks. Corn ethanol production generates significant greenhouse gas emissions and forces farmers to sacrifice critical feedstock in order to produce ethanol from corn.[16] Under the Environmental Protection Agency's (EPA) 2014 RFS proposal, the advanced biofuel volume of the nation's fuel use should make up approximately 2.20 billion gallons, with the United States relying on Brazilian imports to meet this goal.[17] Although the federal government has recognized the need for the United States' sugar industry to transition into biofuel production,

> U.S. sugar producers are a little more tempered in the economic prospects for sugar-to-ethanol. Selling refined sugar is still their primary business and the opportunity costs of converting it to ethanol are still such that the market for sugar is more profitable. There is a general sentiment that policies to increase ethanol production from sugar should augment, but not replace, current United States sugar policy.[18]

Louisiana's iconic sugarcane industry puts the state in a position to make a major contribution to the resolution of this problem.

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15. John Schoen, *Rising oil prices spark interest in biofuels*, NBC NEWS (Aug. 25, 2005, 3:24 PM), http://www.nbcnews.com/id/7549534/ns/business-oil_and_energy/t/rising-oil-prices-spark-interest-biofuels/#.UlH4gWRUO3M, archived at http://perma.cc/MQN6-XHVJ.

16. *See* Jonathan Specht, *Raising Cane: Cuban Sugarcane Ethanol's Economic and Environmental Effects on the United States*, 36 ENVIRONS ENVTL. L. & POL'Y J. 171, 191 (2013); Arnold W. Reitze, Jr., *Biofuels–Snake Oil for the Twenty-First Century*, 87 OR. L. REV. 1183, 1208 (2008).

17. *EPA Proposes 2014 Renewable Fuel Standards, 2015 Biomass-Based Diesel Volume*, ENVTL. PROT. AGENCY (Nov. 2013), http://www.epa.gov/otaq/fuels/renewablefuels/documents/420f13048.pdf, archived at http://perma.cc/53BN-YVMZ; David Brough, *Brazil sugar, ethanol exports at peaks – ISO*, REUTERS (Jan. 8, 2013, 1:11 PM), http://www.reuters.com/article/2013/01/08/brazil-sugar-ethanol-idUSL5E9C8A9S20130108, archived at http://perma.cc/RFV4-77VZ (noting that in 2012 the U.S. imported 2.050 billion liters of sugarcane ethanol from Brazil).

18. James Jacobs, *Ethanol from Sugar,* DEP'T OF AGRIC., http://www.rurdev.usda.gov/rbs/pub/sep06/ethanol.htm, archived at http://perma.cc/C253-TYLS (last visited Oct. 1, 2014).

A. Louisiana's Sweet Secret

Louisiana is generally known as an oil and gas state.[19] Scientists have found that Louisiana possesses the proper amount of sediments, temperature, and timing of geologic events to produce the necessary hydrocarbons for oil and gas exploration.[20] In 2013, oil and gas production in Louisiana reached over 56 million barrels of crude oil and over two billion cubic feet of natural gas.[21] The oil and gas industry employs over 1.8 million people in the state and generates approximately $1.5 billion per year in revenue.[22]

Louisiana is also the oldest sugarcane producing state in the United States.[23] Sugarcane has played a vital role in Louisiana's history and economy for more than two centuries, and is commonly considered to be Louisiana's most important crop.[24]

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19. *See Profile Overview,* ENERGY INFO. ADMIN., http://www.eia.gov /state/?sid=LA, archived at http://perma.cc/9RDH-4RKG (last visited Oct. 1, 2014) (Louisiana is fourth in the United States for energy production). *See also Rankings: Crude Oil Production, June 2014 (thousand barrels),* ENERGY INFO. ADMIN., http://www.eia.gov/state/rankings/?sid=US#/series/46, archived at http://perma.cc/D9RT-Q9F6 (last visited Oct. 1, 2014) (Louisiana is ranked number nine).

20. *History of Oil & Gas in Louisiana and the Gulf Coast Region*, LA. DEP'T OF NATURAL RES., http://dnr.louisiana.gov/assets/TAD/education/BGBB /6/la_oil .html, archived at http://perma.cc/L63N-ET32 (last visited Oct. 1, 2014).

21. *Louisiana State Crude Oil Production*, LA. DEP'T OF NATURAL RES. (Sept. 19, 2014), http://dnr.louisiana.gov/assets/TAD/data/facts_and_figures /table01.htm, archived at http://perma.cc/JB6-GA23; *Louisiana State Natural Gas Production*, LA. DEP'T OF NATURAL RES. (Sept. 19, 2014), http://dnr.louisiana .gov/assets /TAD/data/facts_and_figures/table09.htm, archived at http://perma .cc/J59C-U9T9.

22. *See Louisiana Nonagricultural Employment*, LA. DEP'T OF NATURAL RES. (Sept. 19, 2014), http://dnr.louisiana.gov/assets/TAD/data/facts_and _figures/table 37.htm, archived at http://perma.cc/SJ9D-5ML6; *Louisiana State Total Mineral Revenue*, LA. DEP'T OF NATURAL RES. (Sept.19, 2014), http://dnr.louisiana .gov/assets/TAD/data/facts_and_figures/table31.htm, archived at http://perma.cc /8BN9-FJZB.

23. *From Louisiana Sugar Cane Fields to Your Sugar Bowl*, AM. SUGAR CANE LEAGUE, http://www.amscl.org/Images/Interior/sugar%20industry%20 pamphlet/from%20louisiana%20sugar%20cane%20fields.pdf, archived at http: //perma.cc/M36N-LZGM (last visited Oct. 1, 2014). *See* HOSSEIN SHAPOURI & MICHAEL SALASSI, THE ECONOMIC FEASIBILITY OF ETHANOL PRODUCTION FROM SUGAR IN THE UNITED STATES 7 (July 2006), *available at* http://www.usda .gov/oce/reports/energy/EthanolSugarFeasibilityReport3.pdf, archived at http://per ma.cc/87M8-4CV5 (noting that sugar cane is a tropical crop that is planted and harvested in Hawaii, Florida, Louisiana, and Texas).

24. *History of Sugarcane in Louisiana*, LSU AGCENTER (Mar. 6, 2014, 1:22 PM),

During the antebellum period, most of America's sugar came from Louisiana.[25] As Mark Twain observed more than a century ago, sugar plantations blanket the iconic landscape of Louisiana, with sweeping fields along many stretches of Louisiana's highways.

Etienne de Bore first successfully produced sugarcane in Louisiana in 1795.[26] His first crop produced 100,000 pounds of sugar, which sold for 12.5 cents per pound with 50 cents per gallon of molasses, for a profit of $12,000.[27] After the Louisiana Purchase, Anglo-Americans joined the sugar industry. However, nine years later a period of decline took place in the industry.[28] The Civil War brought another downturn in the Louisiana sugar industry due to the dwindling slave labor force.[29] The sugar industry then began adapting to steam, gasoline, and electricity in order to sustain production.[30] After the Great Depression and World War II, research programs were established in all areas of sugar production by the various agencies involved in Louisiana.[31] This research enabled Louisiana to maintain sugar harvests at the level achieved in the tropics.[32]

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http://www.lsuagcenter.com/en/crops_livestock/crops/sugarcane/Cultural+Practices/History+of+Sugarcane+in+Louisiana.htm, archived at http://perma.cc/Q3U2-HKRF.

25. *Id. See also* Virginia Mescher, *"How Sweet it is!"*: *A History of Sugar and Sugar Refining in the United States*, RAGGED SOLDIER 4, http://raggedsoldier.com/sugar_history.pdf, archived at http://perma.cc/YQ65-ASCX (last visited Oct. 1, 2014) (noting that in 1802 Louisiana produced 2500 tons of sugar and became the largest producer of sugar in the US); Ian McNulty, *Louisiana has sweet spot for sugar*, WWNO (Jan. 20, 2011, 12:22 AM), http://wwno.org/post/louisianas-sweet-spot-sugar, archived at http://perma.cc/BG52-RDMC.

26. *History of Sugarcane in Louisiana*, *supra* note 24.

27. Dr. Charley Richard, *200 Years of Progress in the Louisiana Sugar Industry*, AM. SOC'Y OF SUGAR CANE TECHNOLOGISTS, http://www.assct.org/louisiana /progress.pdf, archived at http://perma.cc/XE2Z-JND2 (last visited Oct. 1, 2014).

28. *Id.*

29. *Id.*

30. *Id.*

31. *Id.* Programs allowed for efficient horizontal mills that were larger than animal powered mills. Also further notes that the research programs must continue for "[e]fficiency and to overcome the numerous issues facing the industry including environmental regulations." *Id.*

32. Kenneth Gravois, *Louisiana's Sugarcane Industry*, LSU AGCENTER (May 27, 2014, 11:32 AM), http://www.lsuagcenter.com/en/communications/publications/agmag/Archive/2001/Fall/Louisianas+Sugarcane+Industry.htm, archived at http://perma.cc/VK6E-2C9D (noting the research in breeding efforts "revolutionized Louisiana's sugar industry not only with yields up to

Today, Louisiana is the nation's second largest producer of sugar, and the industry contributes $2 billion to the state's economy annually.[33] Sugarcane is the primary row crop product produced in Louisiana, with over 400,000 acres across 22 Louisiana parishes. [34] As of 2012, 475 sugar farms produced over 14 million gross tons of sugar, with crops valuing over $900 million and employing approximately 27,000 workers.[35] The state has seen an increase in sugar output from a new refining process that cuts the time required to separate the sugar from mud and uses a unique trough device to keep air out, reducing overall production time while yielding more sugar.[36] Despite the high volume of production, the industry's long-term future is in jeopardy because of the infusion of cheaper alternatives on the world markets, such as sugar derived from sugar beets.[37] Sugar beets, sugarcane's biggest rival, have been adapted to wide-ranging climatic conditions and are currently the primary source of America's sugar production.[38] In 2006, sugar beets made up almost 59% of sugar production.[39] The remaining percentage was sugarcane, which only grows in tropical or sub-tropical conditions.[40] Sugar beets now account for approximately 58% of America's sugar output while sugarcane has fallen to about 40%.[41] Due to the rising prominence

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25% higher than other varieties but also with the ability to provide additional annual cuttings of stalks").

33. *History of Sugarcane in Louisiana*, *supra* note 24; *Info Louisiana*, LA. DEP'T OF AGRIC., http://doa.louisiana.gov/about_economy.htm, archived at http://perma.cc/WK57-VPCM (last visited Oct. 1, 2014). Florida is the number one sugarcane producing state. *See* SHAPOURI & SALASSI, *supra* note 23, at 2.

34. Michael E. Salassi, *Economics of sugarcane production: What does it take for this industry to survive?*, LSU AG CENTER (July 15, 2008, 1:49 PM), http://www.lsuagcenter.com/en/communications/publications/agmag/Archive/2008/Spring/Economics+of+sugarcane+production+What+does+it+take+for+this+industry+to+survive.htm, archived at http://perma.cc/U6TM-NYMW; *History of Sugarcane in Louisiana*, *supra* note 24.

35. Salassi, *supra* note 34. *History of Sugarcane in Louisiana*, *supra* note 24 (indicating that yields range from 30 to 50 tons per acre, with 180 to 240 pounds of sugar from each ton of cane).

36. Billy Gunn, *Refining the Process*, THE ADVOCATE Jan. 7, 2014, at 1B (also noting that mud "is one of the enemies at sugar mills").

37. Jacobs, *supra* note 18.

38. A.W. Cattanach et al., *Sugarbeets*, ALT. FIELD CROPS MANUAL, http://www.hort.purdue.edu/newcrop/afcm/sugarbeet.html, archived at http://perma.cc/X5DV-BRZ5 (last visited Oct. 1, 2014) (demonstrating that sugarbeets can be grown in cold weather states such as Colorado, as well as warmer states such as Texas). *See also* Jacobs, *supra* note 18.

39. *See* Jacobs, *supra* note 18.

40. *Id.*

41. *Id.*

of sugar beets, a viable solution is necessary to sustain Louisiana's iconic sugarcane industry.

B. Biofuels Began Ford Tough

Biofuels are produced from the same distillation and fermentation process that produces alcohol,[42] and biofuel production dates back more than 300 years.[43] In the 17th century, biofuels were commonly used in alcohol-burning stoves, moonshine production, and lamps.[44] The biofuel industry in the United States began in 1908 after the introduction of the Ford Model T, an automobile that ran on both petroleum and ethanol.[45] Henry Ford declared ethanol the "fuel of the future" for the American economy.[46] Ford once opined that "the world is waiting for a substitute for gasoline . . . . The day is not far distant when, for every one of those barrels of gasoline, a barrel of alcohol must be substituted."[47] Ford believed biofuels could unify farming and industry because crop waste from farming could be used to fuel the factories that produced farming equipment and automobiles.[48]

Before World War II, Standard Oil marketed a 25% ethanol fuel blend. Over 18 million gallons of ethanol were produced in Standard Oil's Kansas ethanol plant, in which Ford was an investor.[49] The ethanol industry lost support after World War II because of the advances in petroleum technology.[50] However, once the energy crisis of the 1970s began, so did the rebound in the ethanol market. By the end of the 1970s the United States faced

42. *How Ethanol is Made*, RENEWABLE FUELS ASS'N., http://www.ethanolrfa.org/pages/how-ethanol-is-made, archived at http://perma.cc/8EW7-BXAH (last visited Oct. 1, 2014).

43. *A brief history of biofuels, from the Civil War to today*, HEMMINGS DAILY (July 10, 2013, 8:00 AM), http://blog.hemmings.com/index.php/2013/07/10/a-brief-history-of-biofuels-from-the-civil-war-to-today/, archived at http://perma.cc/WY6C-NYVN [hereinafter HEMMINGS DAILY].

44. *Id.*

45. *Ethanol Fuel History*, FUEL-TESTERS, http://www.fuel-testers.com/ethanol_fuel_history.html, archived at http://perma.cc/6CTW-DHSW (last visited Oct. 1, 2014).

46. *Id.*

47. HEMMINGS DAILY, *supra* note 43.

48. *Id.* (noting the company, Agrol, had a 10% ethanol blend, with 2,000 stations in the Midwest and believed that oil companies attempted to sabotage the operations).

49. Christine C. Benson, Note, *Putting Your Money Where Your Mouth Is: The Varied Success of Biofuel Incentive Policies in the United States and the European Union*, 16 TRANSNAT'L L. & CONTEMP. PROBS. 633, 636 (2007).

50. *Id.*

double-digit unemployment,[51] and an oil shortage resulting from rationing in response to the ongoing oil embargo causing prices of gasoline to skyrocket.[52] Federal incentives for the ethanol industry began under the Carter administration, leading to the construction of 100 corn ethanol production plants.[53] The ethanol industry could have been slowed again by several clean air and environmental protection acts passed in the 1990s,[54] but petroleum companies began using ethanol as an octane booster,[55] leading to the production of four million gallons of ethanol per year by the end of the 1990s.[56]

The growth in the United States ethanol industry has been attributed to the government policies that promote the production and use of biofuels.[57] Incentives such as tax credits for motor fuels and small ethanol producers, import duties, and state government initiatives help make ethanol production more cost effective.[58] The significant resurgence in biofuels has occurred mainly because of the RFS under the original 2005 United States Energy Policy Act.[59] According to the RFS, 36 billion gallons of renewable fuel must be blended into transportation fuel by 2022.[60] Certain percentages of renewable fuels blended into petroleum must either be renewable, cellulosic biofuel, biomass-based diesel, or

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51. Malinowski, *supra* note 8, at 107. *See Household Data Annual Averages: Employment Status of the Civilian Noninstitutional Population, 1941 to Date*, DEP'T OF LABOR (2012), http://www.bls.gov/cps/cpsaat01.pdf, archived at http://perma.cc/J4NR-8688.

52. Alan S. Blinder, *The Anatomy of Double-Digit Inflation in the 1970s, in Inflation: Causes and Effects* 261, 270–71 NAT'L BUREAU OF ECON. RES. (1982), http://www.nber.org/chapters/c11462.pdf?new window=1, archived at http://perma.cc/LW2V-QV54. *See also Oil Embargo, 1973-1974*, DEP'T OF STATE, OFFICE OF THE HISTORIAN (Oct. 31, 2013), http://history.state.gov /milestones/1969-1976/oil-embargo, archived at http://perma.cc/UM7K-QBDV.

53. HEMMINGS DAILY, *supra* note 43.

54. *See* Letter from Jim Wells, Dir. Energy, Resources, and Science Issues to Sen. Tom Harkin, 20–25 (Sept. 25, 2000), *available at* http://www.gao.gov /new.items/rc00301r.pdf, archived at http://perma.cc/8PSQ-4N4P (charts denoting the various policies and results of their enactments).

55. 7 DAVID J. MUCHOW & WILLIAM A. MOGEL, ENERGY LAW AND TRANSACTIONS SCOPE IV-227 (LexisNexis Matthew Bender ed. 2009) (defining octane boosters as additives in "gasolines to control engine pre-ignition or 'knocking' by slowing combustion rates").

56. *Id*.

57. *See* Jacobs*, supra* note 18. *See also* 40 C.F.R. 600.008 (2013).

58. *See* Jacobs, *supra* note 18.

59. *Renewable Fuel Standard (RFS) Program*, ALT. FUELS DATA CTR., http://www.afdc.energy.gov/laws/390, archived at http://perma.cc/96LF-W68H (last updated June 4, 2014). Before the amended 2007 Act.

60. *Id.*

advanced biofuel.[61] These categories are non-exclusive, thus overlap is possible.[62] Renewable fuels must be produced from renewable biomass, substitute transportation fuel, or heating oil, and must lower greenhouse gas emissions by 20%.[63]

Advanced biofuel is any renewable fuel, other than ethanol derived from corn, that achieves a 50% greenhouse gas emissions reduction.[64] Biomass-based diesel is a renewable transportation fuel that attains a 50% greenhouse gas emissions reduction.[65] It is a diesel fuel alternative formed from nonpetroleum resources, which meets the requirements of a fuel additive as established by the EPA.[66] The 36 billion gallon RFS standard has caused federal policy to shift toward encouraging the production of more cellulosic biofuel, while moving away from corn ethanol.[67] However, production is lagging because cellulosic biofuels are more expensive to generate than corn ethanol.[68] Cellulose, predominantly indigestible to humans, is an organic compound found in plant life.[69] Cellulosic biofuel is produced from lignocellulose, which is a material made from the mass of plants.[70] The ethanol is commonly created from wood, grass, and non-edible plant portions.[71]

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61. *Id.*

62. Brent J. Hartman, *Global Food: Do We Have What It Takes To Reinvent The U.S. Food System?: The Renewable Fuel Standard: Food versus Fuel?* 65 ME. L. REV. 525, 530 (2013).

63. *Id.*

64. 42 U.S.C. § 7545(o)(1)(B)(i) (2012). *See also* 42 U.S.C. § 7545(o)(1)(B)(ii) (The types of fuel that meet this criteria are ethanol from cellulose, sugar, starch, waste material, biomass-based diesel, biogas, and butanol.).

65. 42 U.S.C. § 7545(o)(1)(D).

66. 42 U.S.C. § 13220(f)(1)(A).

67. Amanda Paulson, *U.S. Eyes Shift Away From Corn Ethanol*, CHRISTIAN SCI. MONITOR (May 1, 2008), http://www.csmonitor.com/Business/2008/0501/p03s03-usec.html, archived at http://perma.cc/DNW5-35BQ. (noting President Bush's remark that "The solution to the issue of corn-fed ethanol is cellulosic ethanol."). *See also*, *Rethinking Ethanol*, N.Y. TIMES, May 11, 2008, at 11L (noting that the goal should be "not just to stop the headlong rush to corn ethanol but to use the system to bring to commercial scale promising second-generation biofuels - cellulosic ethanol derived from crop wastes, wood wastes, perennial grasses.").

68. Matthew Wald, *A Fine for Not Using a Biofuel That Doesn't Exist*, N.Y. TIMES, Jan. 10, 2012, at B1; Mike Orcutt, *U.S. Will Be Hard-Pressed to Meet Its Biofuel Mandates*, TECH. REVIEW (May 9, 2012), http://www.technologyreview.com/news/427874/us-will-be-hard-pressed-to-meet-its-biofuel-mandates/, archived at http://perma.cc/HE6R-NB33.

69. Hartman, *supra* note 62, at 535.

70. 42 U.S.C. § 7545(o)(1)(E) (2012).

71. *Id.*

Due to the various shortcomings in cellulosic biofuels, many in the petroleum industry have pursued production of other types of biofuels.[72] In 2012, the EPA labeled sugarcane ethanol as an advanced biofuel to make up for the ethanol shortage.[73] However, the EPA did not state the current or prospective availability of sugarcane ethanol in the United States.[74] In *API v. EPA*, the American Petroleum Institute objected to the EPA's 2012 projections of cellulosic biofuels and the EPA's refusal to adjust the advanced biofuel volume for 2012.[75] The EPA argued that setting the projections lower could result in a depressed cellulosic market, and certain considerations were given to select industries in order to meet the yearly projections.[76] Yet, nothing under the RFS suggests special considerations for the promotion of industry growth.[77] The court found that the RFS called for a projection for which the EPA was not required to provide support.[78] The EPA's explanation of the projections need only be reasonable, not quantitative, because "an agency may base a standard or mandate on future technology when there exists a rational connection between the regulatory target and the presumed innovation."[79] Based on the court's reasoning, an opportunity exists for sugarcane ethanol to make an impact in assisting the industry in meeting the RFS standards. However, concerns remain about the sustainability of biofuels created from feedstock and their effect on food prices.

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72. *See* Kevin Bullis, *The Cellulosic Ethanol Industry Faces Big Challenges*, TECH. REVIEW (Aug. 12, 2013), http://www.technologyreview.com/news/517816/the-cellulosic-ethanol-industry-faces-big-challenges/, archived at http://perma.cc/A74B-CXSF. Cellulosic-ethanol production has been delayed by technical challenges. Cellulosic biofuels could reduce oil consumption, but the technology requires government support to develop. *See, e.g.*, *Biofuels*, NAT'L GEOGRAPHIC (Oct. 2007), http://ngm.nationalgeographic.com/2007/10/biofuels/biofuels-text, archived at http://perma.cc/ZK7F-Y5WS (making fuel from plant material other than food: cornstalks, prairie grasses, fast-growing trees, or even algae).

73. 706 F.3d 474, 481 (D.C. Cir. 2013) (EPA set standard for ethanol made from wood and waste to be used as fuel for transportation. Court rejected the quota set and suggested sugarcane imports be used to make up for the difference. This comment focuses not on the imports, but the idea that the US set in place a stronger ethanol policy.). *See also* Wald, *supra* note 68.

74. *API*, 706 F.3d at 481.

75. *Id.* at 476.

76. *Id.* at 478.

77. 42 U.S.C. § 7545(o)(7)(D)(i) (2012).

78. *API*, 706 F.3d at 481.

79. *Id.* at 480.

C. Food versus Fuel

The food versus fuel debate centers on the degree to which the use of agricultural foodstuffs for ethanol increases the price of food. In many countries where the main ingredients of certain types of biofuels are heavily consumed, food prices have soared.[80] Studies have shown that biofuel production can be increased without increasing acreage, which can cause a detrimental impact on food supply and prices if done solely for ethanol production.[81] In 2008, a global food crisis began as food prices around the world increased to their highest levels in over 50 years.[82] Scientists at the Food and Agriculture Organization of the United Nations found a causational link between the global food shortage and biofuel production.[83] The scientists reached this conclusion by studying crops that would be suitable for food supply, namely corn and soy, and finding that they were being heavily used to produce biofuels.[84] Despite this, a number of scientists and agriculturalists counter this argument and consider it a myth.[85] Meanwhile, Brazil

80. *See, e.g.*, Amar Toor, *Is Ethanol Starving Africa?*, THE VERGE (Sept. 19, 2013, 3:30 PM), http://www.theverge.com/2013/9/19/4748986/are-biofuels-starving-africa-food-versus-fuel-debate, archived at http://perma.cc/YUG2-UZ8Y (noting that the "premise that biofuel production diverts resources away from traditional agriculture."); Elisabeth Rosenthal, *Rush to Use Crops as Fuel Raises Food Prices and Hunger Fears*, N.Y. TIMES, Apr. 7, 2011, at A1 (indicating that "experts suggest that [countries] should revise their policies so that rigid fuel mandates can be suspended when food stocks get low or prices become too high"); Kay McDonald, *Paying more for food? Blame the ethanol mandate*, CNN (Aug. 20, 2012), http://edition.cnn.com/2012/08/20/opinion/mcdonald-corn-ethanol/index.html, archived at http://perma.cc/NW22-9D4P (arguing that the ethanol mandate is too high and should be adjusted to maintain food prices in the US). *See also* Paulina Calfucoy, *Opportunities and Challenges: The Brazilian Experience in Building a Sustainable and Competitive Biofuel Industry*, 30 WIS. INT'L L.J. 558, 564 (2012).

81. *Food Prices Crisis of 2007-2008: Lessons Learned*, DEP'T OF STATE (March 3, 2011), http://www.state.gov/r/pa/prs/ps/2011/03/157629.htm, archived at http://perma.cc/7TNN-U4RH.

82. Melissa Powers, *King Corn: Will the Renewable Fuel Standard Eventually End Corn Ethanol's Reign?*, 11 VT. J. ENVTL. L. 667, 686 (2010).

83. *Id.*

84. *Id.*

85. *See* John M. Urbanchuk, *The Renewable Fuel Standard and Consumer Food* Prices, ABF ECON. 2 (June 2, 2013), http://ethanolrfa.3cdn.net/281d77a62939896ba8_8nm6bevpj.pdf, archived at http://perma.cc/T6AL-YWE4 (stating that "[a] careful examination of food price inflation measured by the Consumer Price Index indicates that retail level food prices have increased at a slower rate since the RFS took effect than during the comparable five years before the RFS."). *See also* Mackinnon Lawrence, *Despite Evidence, Food Vs. Fuel Fight Continues*, FORBES (July 11, 2013, 4:14 PM), http://www.forbes.com/sites/pikeresearch/2013/07/11/despite-evidence-food-vs-fuel-fight-continues/, archived

is the first country to have an established sustainable biofuel process, and its sugarcane ethanol production has not contributed significantly to the increase in food prices.[86] In Brazil, sugarcane farming has increased by 92% in the last ten years, as annual crops and commercial forestry have undergone a strong expansion in the same time period.[87]

D. Oh, That Shucks

Converting corn to ethanol places a significant toll on water quality, air quality, and wildlife habitat.[88] Moreover, corn is an "input-intensive crop" that requires large amounts of water, fertilizers, pesticides, and herbicides in order to grow sufficiently.[89] Many of the chemicals used to aid corn growth can also run off and contaminate the water supply.[90] Furthermore, corn production leads to loss of soil resulting from constant and intensive soil tilling.[91]

Corn-based ethanol is produced via two production methods: dry milling and wet milling.[92] Dry milling occurs when the entire kernel or starchy grain is ground into flour.[93] This is referred to as "meal" and is processed without separating the various component parts of the grain.[94] Wet milling occurs when the grain is soaked,

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at http://perma.cc/KQJ3-TN83 (denoting that "[h]igh oil prices, rapidly expanding global demand for agricultural commodities, speculation in commodity markets, and expansionary U.S. monetary policy all play a role.").

86. Donald Mitchell, *A Note on Rising Food Prices*, THE WORLD BANK 9 (July 2008), http://www-wds.worldbank.org/external/default/WDSContentServer/WDSP/IB/2008/07/28/000020439_20080728103002/Rendered/PDF/WP4682.pdf, archived at http://perma.cc/ER6K-WU6C.

87. Andre Meloni Nassar & Marcelo Moreira, *Evidences on Sugarcane Expansion and Agricultural Land Use Changes in Brazil*, INST. FOR INT'L TRADE ORG. 6 (June 12, 2013), http://sugarcane.org/resource-library/studies /evidences_on_sugarcane_expansion_and_agricultural_land_use_changes_in_brazil_1206.pdf, archived at http://perma.cc/7FUH-MVUF.

88. Powers, *supra* note 82, at 683.

89. *Id.* at 684.

90. *Id.* (further noting that nitrogen fertilizers run off and can cause dead zones, which kill organisms in low oxygen areas).

91. *Id.*

92. *How Ethanol is Made*, *supra* note 42 (explaining both the wet and dry milling method of producing ethanol). "Ethanol production requires only the starch portion of a corn kernel. The remaining protein, fat, fiber and other nutrients are returned to the global livestock and poultry feed markets." *Id.*

93. *Id.*

94. *Id.*

or 'steeped,' in water and diluted in sulfurous acid.[95] The basic method of production for both wet and dry milling includes first extracting the starch portion of the kernel and leaving the cornstalk.[96] Second, the starches are then separated and converted to sugar via enzyme application.[97] Next, the starch portion is extracted from the kernel leaving the cornstalk and is then heated via fossil fuels for the fermentation and distillation of the alcohol.[98]

Although American farmers have developed relatively efficient methods of corn ethanol production, it is considered that the detrimental environmental effects of the wet milling method of corn ethanol production could outweigh its benefits.[99] Theoretically, biofuels should be 'carbon-neutral' because of the amount of carbon dioxide released during combustion.[100] However, the conversion of corn into ethanol involves additional cooking because of the application of enzymes.[101] Corn ethanol is more expensive to make and produces less energy than sugarcane ethanol.[102] Corn-based ethanol only reduces greenhouse gas emissions by approximately 30% to 38%.[103] Corn also has the highest pesticide and herbicide input for every 10,000 square meter.[104] Overall, compared to sugarcane, corn offers lower ethanol yields per unit of land, and is costlier to produce than sugarcane ethanol.[105]

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95. *Id.*
96. *How Ethanol is Made*, supra note 42.
97. *Id.*
98. *See id.* (also noting that in the wet milling process "[t]he starch and any remaining water from the mash can then be processed in one of three ways: fermented into ethanol, dried and sold as dried or modified corn starch, or processed into corn syrup.").
99. *See id.*
100. Powers, *supra* note 82, at 669 (citing *Biodiesel Basics*, UNION OF CONCERNED SCIENTISTS, http://www.ucsusa.org/clean_vehicles/smart-transportation-solutions/cleaner_fuels/ethanol-and-other-biofuels/biodiesel-basics.html#.VChVj0vN4fk, archived at http://perma.cc/3Q49-XNF2).
101. Jacobs, *supra* note 18.
102. David W. Monsma & John A. Riggs, *A High Growth Strategy for Ethanol*, ASPEN INST. 7 (2006), http://www.aspeninstitute.org/sites/default/files/content/docs/ee/FINALEthanolText.pdf, archived at http://perma.cc/Y36K-GB6Z.
103. INT'L ENERGY AGENCY, BIOFUELS FOR TRANSPORT: AN INTERNATIONAL PERSPECTIVE 53, 61 (2004) [hereinafter BIOFUELS FOR TRANSPORT] (greenhouse gas emissions from carbon dioxide are decreased by 92% in the sugarcane ethanol production).
104. *See* Powers, *supra* note 82, at 684; Regulation of Fuels and Fuel Additives: Changes to Renewable Fuel Standard Program, 74 Fed. Reg. 25,101(proposed May 26, 2009) (to be codified at 40 C.F.R. pt. 80).
105. *Id.*

E. How Sweet It Is!

A world where sugar is preferable to vegetables may seem unimaginable. Yet, ethanol produced from sugar has a number of advantages when compared to corn-based ethanol. The majority of the ethanol produced in the world comes from sugar-based feedstock.[106] The benefits of sugarcane ethanol are seen mainly in the production process, economics, and environmental impacts. Sugarcane can be grown on various types of soil.[107] The crop can be grown successfully in lighter soils if there is proper irrigation and in heavier soils with proper drainage;[108] however, sugarcane develops best on well-drained soils.[109] Climate plays a significant role in the productivity of sugarcane, as the crop remains on the field for almost one year.[110] Sugarcane must endure the changing climatic conditions of the seasons and requires specific weather conditions during different growth phases.[111] Sugarcane's active growth phase requires weather conditions that are long and warm with bright sunshine, high humidity, and adequate rainfall favorable for vegetative growth.[112] During the ripening phase, weather conditions for two to three months should consist of warm days, cool-dry days and nights, and clear skies favorable to sucrose accumulation.[113]

Sugar-to-ethanol is also the least complicated method of ethanol production.[114] The process begins with cutting the cane bagasse (stalk) and removing the sugar from the bagasse through crushing, soaking, and chemical treatment.[115] Next, the cane is heated from crushed cane or bagasse, and the sugar is converted to alcohol by fermentation and distillation, which is the same method used for all forms of ethanol.[116] Overall, the process is shorter because sugarcane is already a sugar, and thus there is no need to remove starches and oil.[117]

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106. BIOFUELS FOR TRANSPORT, *supra* note 103, at 35.
107. *Sugarcane, Soil and Climate*, IKISAN, http://www.ikisan.com/Crop%20Specific/Eng/links/ap_sugarcaneSoil%20and%20Climate.shtml, archived at http://perma.cc/7R64-AAGQ (last visited Oct. 1, 2014).
108. *Id.*
109. *Id.*
110. *Id.*
111. *Id.*
112. *Id.*
113. *Sugarcane, Soil and Climate, supra* note 107.
114. *Id.*
115. *Id.*
116. *Id.*
117. Braddock A. Massey, *Pour Some Sugar On Me: How Importing and Supporting Sugarcane Ethanol Production Will Not Only Make Friends, But*

Another major advantage of sugarcane ethanol production are the benefits produced as byproducts: filter mud, molasses, electricity, and heat.[118] Filter muds from the cane juice can be used as animal feed, cane wax, and fertilizer.[119] Molasses can be used during alcohol production for the chemical industry, and bagasse can be used to generate electricity and heat, or as a second-generation biofuel.[120] In Brazil, energy derived from the bagasse is placed into the electrical grid to power refineries instead of burning fossil fuels.[121] The most encouraging development for sugar-to-ethanol production is linked to the advances in cellulosic technologies—specifically for sugarcane—due to its broader cellulosic properties.[122]

Sugarcane-based ethanol is often cited as the exception to most forms of biofuels because it does not increase greenhouse gas emissions or intensify global warming.[123] Converting sugar to ethanol only requires a yeast fermentation process[124] and the overall energy needed to convert sugar into ethanol is about half that used for corn.[125] Consequently, the overall process of generating sugarcane ethanol is shorter than the process for corn ethanol, the fossil energy required is lower, and thus the emissions of greenhouse gases are also much lower.[126] Sugarcane ethanol production reduces greenhouse gases by 90% when compared with

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Save America From an Addiction to Foreign Oil or Why the United States Should Remove the Tariff on Sugarcane Ethanol, 14 DRAKE J. AGRIC. L. 199, 216 (2009).

118. BIOFUELS FOR TRANSPORT, *supra* note 103.

119. Aziz Elbehri, et al., *Biofuels and the sustainability challenge*, FOOD & AGRIC. ORG. 17 (2013), http://www.fao.org/docrep/017/i3126e/i3126e.pdf, archived at http://perma.cc/DWA4-356C.

120. *Id. See also Bioelectricity*, SUGARCANE.ORG, http://sugarcane.org/sugarcane-products/bioelectricity, archived at http://perma.cc/9MJS-HEFW (last visited Oct. 1, 2014).

121. Massey, *supra* note 117, at 217; Thomas L. Friedman, *The Energy Harvest*, N.Y. TIMES, Sept. 15, 2006, at A25. This factor is a huge difference and advantage as compared to corn ethanol, which relies on fossil fuels in the fermentation and distillation process, thus emitting more fossil fuels.

122. Jacobs, *supra* note 18.

123. Nicola Colbran & Asbjorn Eide, *Exploring How Today's Developments Affects Future Generations Around the Globe: In This Issue: Global Food & Agriculture: Biofuel, The Environment, And Food Security: A Global Problem Explored Through A Case Study Of Indonesia,* 9 SUSTAINABLE DEV. L. & POL'Y 4, 5 (2008).

124. Jacobs, *supra* note 18.

125. *Id.*

126. *Ethanol*, SUGARCANE.ORG, http://sugarcane.org/sugarcane-products/ethanol, archived at http://perma.cc/DS5R-7K8G (last visited Oct. 1, 2014).

gasoline production.[127] The EPA determined that sugarcane ethanol cuts carbon dioxide emissions by more than 60%.[128]

The Clean Air Act identifies tropospheric ozone as one of six "criteria pollutants" considered detrimental to human health.[129] Tropospheric ozone is a greenhouse gas that, when prevalent in the atmosphere, can cause both respiratory problems and premature deaths.[130] Sugarcane ethanol improves public health by not degrading the air quality or decreasing ozone formation.[131] In a case study of Sao Paulo, Brazil, results showed that replacing gasoline with sugarcane based ethanol saved 875 lives, prevented 12,500 hospital visits, and saved the government over $190 million.[132] This is especially relevant to Louisiana, as asthmatics in the state face a higher probability of death compared to those nationwide.[133] The Sao Paulo case study indicates that switching from gasoline to sugarcane-based ethanol could improve the public health of Louisiana.[134] The overall economic, environmental, and energy benefits of sugarcane ethanol in comparison to corn-based

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127. *Greenhouse Gas Reductions*, SUGARCANE.ORG, http://sugarcane.org/sugarcane-benefits/greenhouse-gas-reductions, archived at http://perma.cc/EJ3Q-37XJ (last visited Oct. 1, 2014).

128. *Id. See also Calculating Greenhouse Gas Savings*, SUGARCANE.ORG, http://sugarcane.org/sugarcane-benefits/greenhouse-gas-reductions/calculating-greenhouse-gas-savings, archived at http://perma.cc/MK2R-7FGT (last visited Oct. 1, 2014) (noting that in California, air regulators have classified sugarcane ethanol as a low-carbon fuel under the state's Low Carbon Fuel Standard).

129. Brian Hubbell, et al., *Health-Related Benefits of Attaining the 8-Hr Ozone Standard*, NAT'L INST. OF HEALTH (Oct. 7, 2004), http://www.ncbi.nlm.nih.gov/pmc/articles/PMC1253713/pdf/ehp0113-000073.pdf, archived at http://perma.cc/Q982-YUUP.

130. Jennifer Woodward, *Turning Down The Heat: What United States Laws Can Do To Help Ease Global Warming*, 39 AM. U.L. REV. 203, 211–12 (1989); MARKUS AMANN, ET AL. HEALTH RISKS OF OZONE FROM LONG-RANGE TRANSBOUNDARY AIR POLLUTION, 11–15 (2008), *available at*, http://www.euro.who.int/__data/assets/pdf_file/0005/78647/E91843.pdf, archived at http://perma.cc/CX72-D8JJ.

131. *Improved Public Health*, SUGARCANE.ORG, http://sugarcane.org/sugarcane-benefits/improved-public-health, archived at http://perma.cc/HN7Z-F2J4 (last visited Oct. 1, 2014).

132. Paulo Saldiva, et al. *Ethanol and Health*, SUGARCANE.ORG 100, http://sugarcane.org/resource-library/books/Ethanol%20and%20Health.pdf, archived at http://perma.cc/LP6H-NAYX (last visited Oct. 1, 2014).

133. *Asthma Prevention and Management Program*, LA. DEP'T OF HEALTH & HOSP., http://new.dhh.louisiana.gov/index.cfm/page/596, archived at http://perma.cc/Z73R-JKWB (last visited Oct. 1, 2014) (indicating that Louisiana is within the 25% of states with asthma related deaths, with about 200,000 Louisiana adults having asthma). "Asthma severity places a burden on the healthcare system and also results in a loss of productivity due to the inability to work during episodes of acute exacerbations." *Id.*

134. *Id.*

ethanol can make a substantial impact toward attaining the United States' goal of energy independence.

II. PUBLIC POLICY: "GROWING AMERICA'S FUEL"

The United States is currently producing 12 billion gallons of biofuels per year, predominantly from corn ethanol. However, the country is not yet on a trajectory to reach the Congressional mandate's goal of 36 billion gallons by 2022.[135] The RFS places a 15 billion gallon cap on corn ethanol production as part of the new 36 billion gallon target for 2022.[136] This cap creates an opportunity for the development of other forms of cellulosic and advanced biofuels. However, farmers remain cautious about getting into the industry, demonstrating a need to reconsider incentives.

A. Federal Ethanol Subsidies

Federal ethanol subsidies began with the Energy Tax Act of 1978.[137] The Energy Tax Act imposed an increased tax on automobiles that failed to meet certain fuel efficiency standards.[138] Fuels that were gasoline blends of at least ten percent alcohol were exempted from the tax.[139] The tax exemption was raised again under the Tax Reform Act of 1984.[140] One of the more recent major drivers of United States ethanol production was the Volumetric Ethanol Excise Tax Credit, a subsidy that offered a 51 cent per gallon credit on ethanol blended with gasoline.[141] The subsidy was a major benefit for corn producers, and many

135. *Growing America's Fuel: An Innovation Approach to Achieving the President's Biofuels Target*, THE WHITE HOUSE 1 (2008), http://www.whitehouse.gov/sites/default/files/rss_viewer/growing_americas_fuels.PDF, archived at http://perma.cc/EFP7-LJSR [hereinafter *Growing America's Fuel*].

136. *Id.*

137. Energy Tax Act of 1978, Pub. L. No. 95-618, 92 Stat. 3174 (1978) (codified in scattered sections of 26 I.R.C.).

138. *Id.*

139. Massey, *supra* note 116, at 207; Alan A. Troy, *Ethanol in Louisiana*, LA. DEP'T OF NATURAL RES. (Nov. 3, 1993), http://dnr.louisiana.gov/assets/docs/energy/altfuel//ethanol_1993.pdf, archived at http://perma.cc/E7ND-P6G2.

140. Tax Reform Act of 1984, Pub. L. No. 98-369, 98 Stat. 494 (codified as 26 I.R.C. § 40 (2006)).

141. I.R.C. § 6426(b)(2)(a)(i) (West Supp. 2013) (signed in 2004 by President Bush under the American Jobs Creation Act.).

Midwestern States benefitted economically and politically.[142] After three decades, all ethanol subsidies expired in 2011.[143]

Production mandates were enacted because of the rising oil prices in the 2000s. President George W. Bush called for additional ethanol development and signed the 2005 Energy Policy Act.[144] This Act mandated production of five million gallons of ethanol by 2012.[145] The immediate impacts of this policy were the rise in ethanol investments and the construction of ethanol plants—the majority of which were strictly corn ethanol facilities.[146] In 2007, over 100 ethanol-distilling plants in the United States had the ability to produce over seven billion gallons of ethanol.[147] The original 2005 Act was amended in 2007 under the Energy Independence and Security Act to significantly increase the projected amount of ethanol production under the RFS.[148]

B. The Federal Renewable Fuels Standards Program

The RFS seeks to increase the amount of renewable fuels blended with transportation fuel.[149] The RFS is crucial in supporting the development of advanced biofuels and drives investment in the industry.[150] The program requires 36 billion gallons of non-starch biofuels in the national supply by 2022.[151] The RFS also strives to reduce greenhouse gas emissions from renewable fuels, reduce petroleum imports, and encourage the

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142. *Rethinking Ethanol*, *supra* note 67.

143. Robert Pear, *After Three Decades, Tax Credit for Ethanol Expires*, N.Y. TIMES, Jan. 2, 2012, at A11.

144. Energy Policy Act Of 2005, 109 P.L. 58, 119 Stat. 594. *See Energy for America's Future*, WHITE HOUSE ARCHIVES, http://georgewbush-whitehouse.archives.gov/infocus/energy/, archived at http://perma.cc/QFY4-DXFV (last visited Oct. 1, 2014).

145. *See Energy for America's Future*, *supra* note 144.

146. *Id.*

147. *Id.*

148. Energy Independence and Security Act of 2007, Pub. L. No. 110-140, 121 Stat. 1492 (2007); Bruce A. McCarl & Fred O. Boadu, *Bioenergy And U.S. Renewable Fuels Standards: Law, Economic, Policy/Climate Change And Implementation Concerns*, 14 DRAKE J. AGRIC. L. 43, 49 (2009).

149. *Renewable Fuel Standard (RFS) Program*, DEP'T OF ENERGY, http://www.afdc.energy.gov/laws/law/US/390, archived at http://perma.cc/5NNR-PLL9 (last visited Oct. 1, 2014) (created under the Energy Policy Act of 2005 and enhanced by the Energy Independence and Security Act of 2007 (EISA)).

150. *The Renewable Fuel Standard: Timeline of a Successful Policy*, BIOTECHNOLOGY INDUS. ORG. (Jun. 29, 2012), http://www.bio.org/articles/renewable-fuel-standard-timeline-successful-policy, archived at http://perma.cc/E8MV-96MY.

151. *Id.*

development and expansion of the United States' renewable fuels sector.[152] Achieving the goals of the RFS should also achieve substantial progress toward energy security and independence.[153]

Refiners and importers must meet the RFS requirements of the renewable volume obligations, which the EPA sets annually. Although the renewable volume obligations are based on congressional mandates, the EPA may adjust them depending on the production levels of renewable fuels.[154] Refiners and importers are allocated a renewable volume obligation for the four categories of ethanol—renewable, cellulosic biofuel, biomass-based diesel, or advanced biofuel—based on the amount of renewable fuel produced, multiplied by the EPA's annual percentages for each fuel category.[155] Ethanol producers must register with the EPA and are issued renewable identification numbers.[156]

Since the creation of the RFS, ethanol production has risen to 13 billion gallons as of January 2012—a 240% increase from January 2005.[157] While the biotechnology applications for cellulosic and other advanced biofuels are new and expensive, the EPA's implementation ensures that if the industry can produce the biofuels, there will be a market and calculable price support for them.[158] Currently, there are over 70 biorefineries across North America with research and development teams studying and improving the technology of biofuels.[159] Meanwhile, the EPA has created incentives for the achievement of high quality advanced biofuels.[160]

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152. *Renewable Fuel Standard*, ENVTL. PROT. AGENCY, http://www.epa.gov/otaq/fuels/renewablefuels/index.htm, archived at http://perma.cc/6BCN-LU6C (last visted Oct. 1, 2014).

153. Hartman, *supra* note 62, at 526.

154. *See* 40 C.F.R. § 80.1407 (2013).

155. *Id*.

156. *See* 40 C.F.R. § 80.1425. *See also* 40 C.F.R. § 80.1401; 40 C.F.R. § 80.1406(b). The identification numbers are 38 digit codes representing a volume of renewable fuel.

157. *See Renewable Fuels Ass'n, Statistics*, RENEWABLE FUELS ASS'N, http://www.ethanolrfa.org/pages/statistics#C, archived at http://perma.cc/5KHN-MGEM (last visited Oct. 1, 2014) (calculating the percent increase by subtracting the 2005 amount of 3,904 million gallons produced from the 2012 amount of 13,000 million gallons produced, which equals a difference of 9,396 million gallons, and then dividing that result by the 2005 amount, which equals a percent increase of 240.7%).

158. *Renewable Fuel Standard: The Stable Policy Investors Are Looking For,* BIOTECHNOLOGY INDUS. ORG. (Apr. 28, 2011), http://www.bio.org/articles/renewable-fuel-standard-stable-policy-investors-are-looking, archived at http://perma.cc/9VCV-GAS2.

159. *Id.*

160. *Id.*

C. Federal Programs and Incentives

On May 5, 2009, President Barack Obama issued a Presidential directive establishing the Biofuels Interagency Working Group, chaired by the Secretaries of Agriculture and Energy and the Administrator of the EPA.[161] The Presidential directive laid the groundwork for a policy development process that would aggressively accelerate the development of advanced biofuels.[162] The directive seeks to develop a comprehensive biofuel market program,[163] identify new policies, support next-generation biofuels, and increase sales of flexible fuel vehicles.[164] The Biofuels Interagency Working Group includes a marketing component for retail efforts to raise awareness of the benefits of biofuels.[165]

The Biofuels Interagency Working Group's policy hinges on a focused supply chain approach that assures all phases of development.[166] The policy directive underscores that not all biofuel conversion systems are well understood; therefore, the directive seeks to develop an understanding of the commercial feasibility to produce sustainable and viable ethanol markets.[167] The program aims to support rural communities by minimizing transaction costs as an incentive for biofuel production.[168] This objective also addresses the economic, environmental, and social issues that arise when attempting to create new markets and investments.[169] The Obama Administration supports a stronger and more robust supply chain, with its core focus being to increase America's biofuel production, which has been considered an endorsement of cellulosic biofuels.[170] Along with this endorsement

161. Press Release, Office of the Press Sec'y, The White House, President Obama Announces Steps to Support Sustainable Energy Options (May 5, 2009), *available at* http://www.whitehouse.gov/the_press_office/President-Obama-Announces-Steps-to-Support-Sustainable-Energy-Options, archived at http://perma.cc/48JX-ZV6Q [hereinafter White House Press Release].

162. Biofuels and Rural Economic Development, 74 Fed. Reg. 21,531, 21,532 (May 7, 2009).

163. *Id.*

164. White House Press Release, *supra* note 161.

165. *Id.* A key aspect as to why ethanol has not been widely considered in many states, including Louisiana, could be because citizens have not been educated on its benefits and economic impact.

166. *Growing America's Fuel, supra* note 135, at 4.

167. *Id.* at 7.

168. *See id* at 1.

169. *Id.* (explaining that the objective represents an attempt to avoid the food versus fuel problem).

170. *See id.* at 1; Sean Charles Starr, *Sweet Rewards: How U.S. Trade Liberalization and Penetration of Brazilian Ethanol into the U.S. Market Can Stimulate America's Domestic Economy and Strengthen America's International*

of cellulosic ethanol, an incentive that acts as a counterpart is critical to the success of sustainable cellulosic ethanol development.

One such incentive is the Advanced Biofuel Feedstock Incentive, also known as the Biomass Crop Assistance Program (BCAP). Created by the 2008 Farm Bill, the BCAP seeks to reduce the financial risks for producers who voluntarily grow biomass feedstock at a new scale,[171] as well as lay the foundation for greenhouse gas emission reduction and the expansion of renewable fuels.[172] The BCAP was also "established to overcome a classic chicken-and-egg challenge," because there is a need for steady and sustainable biomass crops, but many types of crops need time to grow.[173] This incentive allows farmers to grow their first harvest when they are not yet receiving profits from the harvest,[174] and provides financial assistance to landowners and operators that establish, produce, and deliver biomass feedstock crops for advanced biofuel production facilities.[175] Overall, the farmers or producers can receive a 75% reimbursement of the cost to begin a biomass feedstock crop.[176]

Influence, 8 DEPAUL BUS. & COM. L.J. 275, 296 (2010). *See also* Keith Johnson, *Next Gen Biofuel: Verenium's Riva on Cellulosic Ethanol's Challenges*, WALL ST. J. (May 7, 2009, 10:14 AM), http://blogs.wsj.com/environmentalcapital/2009/05/07/next-gen-biofuel-vereniums-riva-on-cellulosic-ethanols-challenges/, archived at http://perma.cc/HBW2-DC3Z (noting that the stock market reacted to the Biofuels Interagency Working Group as an endorsement of cellulosic ethanol).

171. *See* 7 C.F.R. § 1450 (2014); *BCAP Fact Sheet*, DEP'T OF AGRIC. (May 2011), http://www.fsa.usda.gov/Internet/FSA_File/bcap_update_may2011.pdf, archived at http://perma.cc/6Y74-B2LM.

172. *BCAP Fact Sheet*, *supra* note 171, at 1.

173. *Biomass and Biofuels: BIO Briefs Congress on Impact of USDA Bioenergy Programs*, BIOTECHNOLOGY INDUS. ORG. (June 9, 2011), http://www.bio.org/articles/biomass-and-biofuels-bio-briefs-congress-impact-usda-bioenergy-programs, archived at http://perma.cc/KHR6-A467. *See BCAP Fact Sheet, supra* note 171 (denoting that the RFS "requires 21 billion gallons of non-corn-starch biofuels in the national fuel supply by 2022 and new types of biomass feedstocks must be available to meet this requirement; many bioenergy crops need several years to become established and many bioenergy facilities need several years to reach commercial scale.").

174. *See BCAP Fact Sheet*, *supra* note 171. The eligible crops include swtichgrass, miscanthus giganteus, fast-growing woody poplar, jatropha, algae, energy cane, camelina or pongamia.

175. *Advanced Biofuel Feedstock Incentives*, DEP'T OF ENERGY, http://www.afdc.energy.gov/laws/law/US/10292, archived at http://perma.cc/D8XC-PH9U (last visited Oct. 1, 2014).

176. *Id.*

The BCAP provides two categories of assistance to farmers.[177] The first category provides matching funding which may be available for delivery of feedstock to qualified biomass conversion facilities.[178] The second category provides annual payments to producers who enter into contracts to produce biomass crops within the BCAP project areas.[179] To qualify for matching payments, the crops must be harvested directly from the land and are only available for materials sold at fair market value.[180]

The BCAP studies have shown that the program can significantly advance the transition from corn ethanol to cellulosic ethanol.[181] Under the BCAP, Louisiana sugarcane farmers could use the bagasse from the cane to make ethanol.[182] This method would allow sugarcane farmers to continue sugar production and also benefit from the production of ethanol.[183] As an added benefit, the bagasse could also serve as the power source for ethanol production.[184] Many Louisiana sugar mills have the unique problem of an abundance of bagasse and opt to either sell or burn the waste. Alternatively, the mill operators could instead use the bagasse for the production of cellulosic ethanol and as a renewable energy source.[185] If Louisiana were to implement any of these

177. *Energy Programs – BCAP*, DEP'T OF AGRIC. (June 6, 2013, 3:57 PM), http://www.fsa.usda.gov/FSA/webapp?area=home&subject=ener&topic=bcap, archived at http://perma.cc/YJ6G-Y479.

178. *Id.* (indicating that "[q]ualified biomass conversion facilities produce heat, power, biobased products, or advanced biofuels from biomass feedstocks.").

179. *Id. See BCAP Project Area Information*, DEP'T OF AGRIC., (Mar. 22, 2012, 10:08 AM), http://www.fsa.usda.gov/FSA/webapp?area=home&subject=ener&topic=bcap-pjt, archived at http://perma.cc/ZB8D-ZTPJ (BCAP project areas are specific geographic areas where producers may enroll land to grow specified biomass crops).

180. *BCAP Fact Sheet, supra* note 171.

181. Madhu Khanna et al., *The Renewable Energy Legislation Puzzle: Putting The Pieces Together: Land Use and Greenhouse Gas Mitigation Effects of Biofuel Policies*, 2011 U. ILL. L. REV. 549, 579 (2011).

182. Robert Rapier, *Why Sugarcane Bagasse is the Most Promising Pathway for Cellulosic Ethanol*, ENERGY TRENDS INSIDER (Aug. 17, 2012), http://www.energytrendsinsider.com/2012/08/20/why-sugarcane-bagasse-is-the-most-promising-pathway-for-cellulosic-ethanol/, archived at http://perma.cc/WNP4-4XBG.

183. *Id. See* Letha Dawson & Raj Boopathy, *Cellulosic Ethanol Production From Sugarcane Bagasse Without Enzymatic Saccharification*, 3 BIORESOURCES 452, 452–53 (2008), http://www.ncsu.edu/bioresources/BioRes_03/BioRes_03_2_0452_Dawson_B_Cellulosic_Ethanol_Bagasse.pdf, archived at http://perma.cc/GUJ4-JC2U.

184. Specht, *supra* note 16, at 190–91.

185. John Snell, *Louisiana sugar mill turns power company into customer*, WVUE-FOX 8 (Dec. 12, 2012, 7:38 PM), http://www.fox8live.com/story/20331457/louisiana-sugar-mill-turns-the-power-company-into-a-customer, archived at http://perma.cc/M94A-RD23.

federal initiatives for sustainable sugarcane ethanol, it would be necessary to establish a forward-thinking conservation and harvesting plan. Implementing any of these initiatives would further Louisiana's reputation as an energy producer, and would also position the state as a leader in renewable energy.

D. Louisiana's Ethanol Progression

Louisiana's public policy efforts to encourage ethanol production and use began with the Louisiana Gasohol Act of 1979, which exempted gasohol from the state gas tax.[186] Gasohol is a mix of gasoline and ethyl alcohol for use as engine fuel.[187] The legislation was supported as an advantage to the state's sugarcane industry because molasses was used as the feedstock.[188] Louisiana's high tax exemption attracted out-of-state producers, which prompted the legislature to amend the act, providing that, to qualify for the exemption, the ethanol has to be produced in Louisiana from crops grown in Louisiana.[189] At the height of the gasohol movement, 18 ethanol plants were planned in Louisiana, and production rates were estimated between one million and 100 million gallons per year.[190]

After a legal challenge, the tax exemption was eliminated and the Louisiana Legislature enacted the Agricultural Industrial Incentive Fund (AIIF).[191] The AIIF was implemented in September 1986 and provided subsidies, financed by the state gasoline tax, directly to in-state gasohol producers.[192] After a weak economy and much disapproval, the 1987 regular session amended the subsidy program and reduced the total subsidy.[193] Once the subsidy funds were depleted in January 1988, ethanol plants closed, and in

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186. LA. REV. STAT. ANN. § 30:1301 (2007); *Ethanol in Louisiana*, *supra* note 134.

187. NEW OXFORD AM. DICTIONARY 717 (3rd ed. 2010).

188. *Ethanol in Louisiana*, *supra* note 139.

189. *Id.*

190. *Id.*

191. *Id.* The plaintiffs filed suit against the state for a declaration that AIIF violated the Commerce and Equal Protection Clauses by limiting tax exemptions in favor of gasohol only to gasohol made with alcohol distilled in Louisiana from agricultural products grown within the state. *See* Archer Daniels Midland v. McNamara, 544 F. Supp. 99 (M.D. La. 1982).

192. *See Ethanol in Louisiana, supra* note 139 (explaining that "[t]he amount of the subsidy was equal to the previous tax emption of $1.60/gallon of ethanol. Of this, $0.30 was to be paid to the growers and $1.30 to the ethanol producers.").

193. *Id.* (noting that the total subsidy was appropriated to only $15.1 million).

1989, Louisiana removed the ethanol subsidies that had once spurred investors.[194] At this point, the outlook for the state's ethanol future was bleak.[195]

According to the current structure of the Louisiana Gasohol Act, renewable energy is in the public interest of Louisiana.[196] The Act seeks to encourage private investment in the development of biofuels to reduce reliance on foreign fuel sources and to maintain Louisiana's role as a major energy producer for the nation.[197] The Act further aims to maintain the sugarcane industry, while also using sugarcane and other additional fruits of Louisiana agriculture for energy sustainability.[198]

Louisiana Revised Statute 3:3761 states that "the development of an advanced biofuel industry in Louisiana is a matter of grave public necessity and is vital to the economy of Louisiana."[199] The Legislature seeks the development of an advanced biofuel formed from a "feedstock other than corn" to expand the United States' and Louisiana's fuel supply.[200] Under Louisiana Revised Statute 3:3761, there are eight criteria that non-corn based advanced biofuels must meet in order to achieve the "field-to-pump" strategy.[201] The legislation requires an exclusively Louisiana-harvested crop capable of producing 600 gallons of ethanol per acre, and requires no more than 50% of the water required to grow corn.[202] The feedstock must also be tolerant to high temperatures, be drought resistant, and able to grow on various soil types.[203] The most important criteria are the requirements of one-third of the nitrogen and one-half of the energy for growing corn and producing ethanol.[204] Because of this legislation, Louisiana has an

194. *Id. See* Bryan Crouch & Manfred Dix, *Ethanol*, LA. DEP'T OF NATURAL RES. 1 (Dec. 2007), http://dnr.louisiana.gov/assets/docs/energy/newsletters/2007/2007-12_topic_2.pdf, archived at http://perma.cc/7VR-JLWY (explaining that Louisiana began subsidizing ethanol in 1979, by exempting it from the state's gasoline tax. In 1986, the exemption was dropped for subsidies paid directly to the producers.); Bob Moser, *A New Day for Ethanol in Louisiana: Ethanol grows up,* THE ADVERTISER, Nov. 1, 2007, at 1A.

195. *See Ethanol in Louisiana, supra* note 139.

196. LA. REV. STAT. ANN. § 30:1301 (2007).

197. *Id.*

198. *Id.*

199. LA. REV. STAT. ANN. § 3:3761(A) (2011).

200. LA. REV. STAT. ANN. § 3:3761(B)(1).

201. *Id.*

202. *Id.*

203. *Id.* Sugarcane meets criteria of the legislation by being a Louisiana harvested crop that is capable of growing in various soil types and tolerant to high temperatures.

204. *Id.* Sugarcane meets the criteria of the legislation by being a Louisiana harvested crop that is capable of growing in various soil types and tolerant to

opportunity to expand the goals of the Gasohol Act and Louisiana Revised Statute 3:3761 to develop a sustainable sugarcane ethanol industry, just as it was once on pace to accomplish. A closer look into the Brazilian ethanol industry provides the best roadmap for developing Louisiana sugarcane as a fuel for the future.

III. BRAZIL'S CARNIVAL WITH ETHANOL

Louisiana's carnival season is all about "*laissez le bon temp rouler*" (French for "let the good times roll"), but the common phrase of Brazilian revelers during carnival could easily be "*gostaria de comprar uma fábrica etanol*" (Portuguese for "I would like to buy an ethanol plant"). Brazil's 30 year history of ethanol production has created an ethanol industry that has attained the status of a "global energy commodity that is fully competitive with motor gasoline and appropriate for replication in many countries."[205] Brazil's favorable climatic conditions and tradition for cultivating sugarcane were fundamental in developing ethanol as a biofuel.[206]

A. How it Began

Brazil's history of sugarcane-based ethanol generation began with the 1970s oil crisis.[207] After the oil crisis, Brazil sought out alternative fuels and began its "Proálcool" program to increase ethanol production as a gasoline substitute.[208] The first stage of the program has Brazil on pace toward energy independence from

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high temperatures. Sugarcane ethanol also requires less energy than corn in production and grows sufficiently with little irrigation relying mostly on rainfall. Furthermore, significant amounts of nitrogen create detrimental effects on sugarcane crops. *See Sugarcane, Soil and Climate*, *supra* note 103. *See also* discussion *supra* Part I.A.

205. Sandra Dos Santos, *The Tainted Grail of Brazilian Ethanol: Achieving Oil Independence but who has Borne the Cost and Paid the Price?*, 11 N.Y. CITY L. REV. 61, 73 (2007) (citing Jose Goldemberg, *Ethanol for a Sustainable Energy Future*, 315 SCIENCE 808, 808 (2007)).

206. Elbehri, *supra* note 119.

207. Marcus Renato Xavier*, The Brazilian Sugarcane Ethanol Experience,* COMPETITIVE ENTER. INST. 4 (Feb. 17, 2007), http://cei.org/pdf/5774.pdf, archived at http://perma.cc/Q37T-RQM2.

208. *Id. See* Elbehri, *supra* note 119, at 18. Proalcool was also an agricultural price support program that sought to guarantee the profitability of the sugar industry after a drop in sugar prices.

foreign oil imports.[209] Under the second stage of Proálcool, the adoption of flexible-fuel vehicles via a government mandate provided an incentive to produce more ethanol for the vehicles.[210]

Brazil's foray into ethanol production started under a military dictatorship that significantly influenced the country's economy.[211] Brazil's ethanol model under "Proálcool" consisted of a five-part framework. First, the country granted low interest loans and credit guarantees to new biorefineries.[212] Second, Brazil opened state trading to buy ethanol for a low price.[213] Third, gas prices were set higher, giving ethanol an advantage over gasoline.[214] Fourth, the state-owned oil company began investing in ethanol.[215] Finally, the country implemented a marketing push, informing and educating citizens about the benefits of ethanol, with the slogan "Let's unite, make alcohol."[216] With this framework in place, ethanol production increased 500% in Brazil in a four-year span.[217] The second stage of Proálcool consisted of agreements with auto manufacturers for the production of 100% ethanol vehicles.[218] The government provided incentives for taxi drivers who used 100% ethanol vehicles, and racecar drivers also made use of 100% ethanol vehicles.[219] Brazil's Proálcool policy has solidified the country as the world's leading sugarcane ethanol producing country.[220]

B. Impact on Brazil Today

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209. David Sandalow, *Ethanol: Lessons from Brazil*, BROOKINGS 3 (May 2006), http://www.brookings.edu/~/media/research/files/articles/2006/5/energy%20sandalow/sandalow20060522.pdf, archived at http://perma.cc/3BPM-63AU.

210. Elbehri, *supra* note 119, at 18. Massey, *supra* note 116.

211. Sandalow, *supra* note 209, at 1–2 (The dictatorship gave the country many tools and freedom in order to explore methods for a having an ethanol program, thus no choice in policy.).

212. *Id.*

213. *Id. See State Trading Enterprises*, OFFICE OF THE U.S. TRADE REPRESENTATIVE, http://www.ustr.gov/trade-agreements/wto-multilateral-affairs/wto-issues/state-trading-enterprises, archived at http://perma.cc/RJ82-F23B (last visited Oct. 1, 2014) (defining state trading enterprises as governmental and non-governmental enterprises, including marketing boards, which deal with goods for export and/or import).

214. Sandalow, *supra* note 209, at 1–2.

215. *Id.*

216. *Id.* at 1.

217. *Id.*

218. *Id.* at 2.

219. *Id.*

220. *See Brazil's Diverse Energy Matrix*, SUGARCANE.ORG, http://sugarcane.org/the-brazilian-experience/brazils-diverse-energy-matrix, archived at http://perma.cc/9EG5-ZP6P (last visited Oct. 1, 2014).

Today, ethanol provides more than 40% of the fuel supply in Brazil.[221] The ethanol-blending ratio is about 20% ethanol with gasoline, which meets the mandated required minimum.[222] The costs of ethanol are competitive with, and in some instances cheaper than, gasoline in Brazil. [223] Brazilian ethanol is also less expensive than ethanol produced in the United States.[224] Brazilian refineries operate via an integrated scheme, producing both sugar and ethanol, a cost effective process that allows operators to divert sugarcane production from ethanol to sugar when sugar prices increase.[225] The ethanol refineries use sugarcane bagasse for heat generation by processing heat and electricity, making energy costs even lower for production.[226] Some refineries generate enough electricity to sell surplus electricity to the electrical grid.[227] Sugarcane bioelectricity provides approximately three percent of Brazil's electricity needs and is projected to increase 18% by 2022.[228]

Brazil's dependency on sugarcane ethanol is not without its faults. The increasing demand for sugarcane ethanol has led to detrimental effects in Brazil, such as land use changes.[229] The Cerrado, known as the Brazilian Savannah, spans nearly 500 million acres of Brazil—about three times the size of Texas,[230] and in the past 40 years, more than half of the vast land of the Cerrado has been transformed due to farming.[231] Many argue that the transformation was caused by the global demand for ethanol, which was boosted more so after the United States passed the RFS.[232] Despite such faults, it is undisputed that Brazil's ethanol production process has been successful.

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221. Monsma & Riggs, *supra* note 102, at 70. A tax cut is provided to those who purchase flex fuel vehicles and flex fuel vehicles account for more than 70% of new cars sold.

222. *Id.* at 67. As the price of sugar increases, the government adjusts the blending ratio to cope with global sugar prices.

223. Massey, *supra* note 116, at 218.

224. *Id.*

225. Xavier, *supra* note 207, at 7 (explaining that there are over 300 mills producing 55 million tons of sugar or ethanol).

226. Specht, *supra* note 16, at 191.

227. *Id.*

228. *Id.*

229. *Id.*

230. *Brazil Cerrado*, NATURE (Jan. 31, 2011), http://www.nature.org/ourinitiatives/regions/southamerica/brazil/placesweprotect/cerrado.xml, archived at http://perma.cc/55L-ZEQQ.

231. Glenn Hurowitz, *Soros, Goldman Sachs Financing Destruction of Brazilian Forests*, GRIST (Aug. 2, 2007, 11:08 PM), http://www.grist.org/article/george-soros-vs-the-planet, archived at http://perma.cc/7N7Y-BVZC.

232. *Id.*

The model of success in Brazil can be credited to an abundance of feedstock, the developed technology in the country in furtherance of production, and the supportive government.[233] The Brazilian ethanol program, Proálcool, is a model for Louisiana and the United States because it demonstrates that a sound consistent policy that has the support of the country can become a job creator. Brazil's use of sugarcane as an ingredient for fuel, and also its use of bagasse as a fuel that powers the development of ethanol, allows for a seemingly self-sufficient operation.[234] Louisiana has the foundation available to implement such a policy with the Gasohol Act and the Field-to-Pump strategy as outlined in Louisiana Revised Statute 3:3761.

IV. THE BAYOU FUEL FORMULA

The RFS ethanol mandate of 36 billion gallons assumes technological advancements in cellulosic ethanol development.[235] Although not always politically popular, government research and tax incentives have made many technological advances in the energy sector.[236] Both Brazil and the United States responded to the 1973 energy crisis with policies designed to achieve energy independence. However, the results of these policies could not be more divergent. The key component lacking in America's federal and state energy policies is consistency.[237] Today, the United

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233. Christoph Berg, *World Fuel Ethanol Analysis And Outlook,* DISTILL (2004), http://www.distill.com/World-Fuel-Ethanol-A&O-2004.html, archived at http://perma.cc/M8UL-KTGB.

234. Xavier, *supra* note 207, at 7.

235. Grossman, *supra* note 9, at 174.

236. Diane Cardwell, *Renewable Sources of Power Survive, but in a Patchwork*, N.Y. TIMES, Apr. 11, 2012, at F5 (noting how government backing of solar power has created an outlook for a strong future in the industry). *See* CHARLES E. JENNINGS ET AL., A HISTORICAL ANALYSIS OF INVESTMENT IN SOLAR ENERGY TECHNOLOGIES 1 (Dec. 2008), *available at* http://permanent.access.gpo.gov/LPS113477/43602.pdf, archived at http://perma.cc/G26F-Y554. The solar energy sector has grown expansively with the Department of Energy Solar Technologies Program investing approximately 50% of the investments in solar power. *Id.* Solar energy currently provides enough electricity in the U.S. to power more than 1.5 million American homes, an increase of 145%. *Id.* The boom in solar energy has been contributed to investments from the "complex interactions between the private and public sectors, involving multiple feedback loops." *Id.* Within the solar energy industry, "investments from governments, private investors and public equity markets have interacted to help commercialize technology innovations." *Id.*

237. *See* Sandalow, *supra* note 209, at 5. The requirement that ethanol make up a certain percentage of the Brazilian fuel supply over the past three decades represents the country's consistent ethanol policy. *Id.* "The Brazilian

States is back to square one, importing foreign oil and again seeking renewable fuels. America cannot afford such an inconsistent energy policy and must focus on viable biofuels to advance the RFS.

Ethanol's resurgence has created an opportunity for advancement on both national and local levels because of environmental mandates, dwindling oil discoveries, and significant private investment.[238] If Louisiana is to contribute in the advancement of the biofuel industry, it should leverage its unique natural resources and agricultural infrastructure in order to do so competitively.[239]

Louisiana must establish itself as a leader in biofuel production through the implementation of a sound sugarcane ethanol policy. The path forward should focus on achieving the goals of the Gasohol Act, preserving the sugarcane industry, and developing sugar as an energy producer.[240] First, the state should revitalize the Agricultural Industrial Incentive Fund. This would allow in-state sugarcane ethanol producers to continue sugar operations and take part in ethanol production. The incentive should focus on providing grants for sugarcane farmers who make technological advances and seek cost-effective formulas for sugarcane ethanol. This incentive should be more specific than the subsidies for construction of new ethanol plants because building an ethanol plant onto an existing sugarcane facility maintains a lower capital expenditure cost and may make it more comparable to corn-based facilities.[241] Giving private companies and farmers a commercial role in the sugar-to-ethanol process because of their expertise is significant in the initial production stages.[242] Furthermore, farmers

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government has used this requirement to help control the ethanol market, varying the percentage somewhat depending on market conditions." *Id.* Also, even during periods of decline and modest political support the requirement did not falter, an important aspect in sustaining the industry during difficult times. *Id.*

238. Moser, *supra* note 194.

239. Paul M. Darby, The Economics Of Processing Ethanol At Louisiana Sugar Mills: A Three Part Economic Analysis Of Feedstocks, Risk, Business Strategies, And Uncertainty 80 (Dec. 2011) (unpublished Ph.D. dissertation, Louisiana State University), *available at* http://etd.lsu.edu/docs/available/etd-10132011-155152/unrestricted/Paul_M_Darby_diss.pdf, archived at http://perma.cc/T7K3-98C2.

240. LA. REV. STAT. ANN. § 30:1301 (2007).

241. Jacobs, *supra* note 18.

242. Darby, *supra* note 239, at 15 (noting that "[t]he potential benefits of collocating a cellulosic ethanol plant include reduced transportation costs when

would have the flexibility to switch operations between ethanol and sugar-molasses production dependent upon market prices for each, which allows the facilities to maximize profits whenever prices of the two commodities fluctuate.[243]

Louisiana should also require farmers to have a legitimate conservation plan. Louisiana sugarcane mill production currently produces three products: raw sugar, molasses, and bagasse.[244] In implementing the Bayou Fuel Formula, the Louisiana sugarcane-to-ethanol process would use the excess bagasse, which would not detract from the raw sugar and molasses generated from the sugarcane.[245] Currently, local utility companies rarely allow the power from bagasse to be sold back to the grid. [246] Therefore, the boilers run inefficiently and are burning as much bagasse as possible.[247] As demonstrated in Brazil, there should be energy diversity within any sugarcane-to-ethanol production process. Producers should be allowed to add to the electrical grid in order to maintain energy costs and create a bioelectricity market.[248]

A sugarcane ethanol policy would result in agricultural and economic benefits for Louisiana. The agricultural benefits would be noticeable with the growth of a sustainable energy crop that will increase the farm value output, create new jobs, and stimulate the economy in rural areas.[249] In addition, the investment in production plants—located mainly in rural areas—will increase the tax base and help support local governments, schools, and other public services.[250]

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using on-site bagasse, fully-established transportation and unloading systems, and the ability to reuse some capital like grinders and storage.").

243. *Id.* Sandalow, *supra* note 209, at 5 (further noting that "any ethanol program must anticipate commodity price swings").

244. Darby, *supra* note 239, at 8 (stating that the "raw sugar is sent to a refinery where it is processed into refined white sugar . . . [and] molasses is sold and generally ends up being used as a livestock feed additive.").

245. *Id.* (noting that "a representative mill that grinds 12,000 tons of cane per day during the harvest season, about 15,000 gallons of ethanol could be produced per day from the mill's excess bagasse").

246. *Id.* (indicating that "most mills still produce excess bagasse, which must then be trucked out and disposed of").

247. *Id.*

248. *Bioelectricity, supra* note 121 (the majority of sugar and ethanol plants are located fairly close to the more populous regions of Brazil, where electricity demand is the highest).

249. Monsma & Riggs, *supra* note 102, at 5. *See also* Sandalow, *supra* note 209, at 3–4 (Brazil's ethanol industry has created more than 1.8 million jobs).

250. Monsma & Riggs, *supra* note 102, at 5.

As with many new technologies, expectations should be tempered in regard to ethanol's ability to immediately impact gasoline prices. Further, the state must anticipate that public attitudes about a new energy policy may be less than enthusiastic.[251] The Louisiana Legislature should anticipate and prepare for short-term changes in public perception of ethanol in response to shifting market conditions.[252] Producing a significant amount of ethanol takes time, so it is critical to have continuing support for the existing industry.[253]

This policy could also be implemented in the other sugarcane producing states. Hawaii, for example, produces about 1.4 million tons of sugarcane, and has seen its production rates decline over the past five years.[254] Currently, Hawaii provides income tax relief for ethanol producers that equal 30% of production facility nameplate capacity, between 500,000 and 15 million gallons per year.[255] Florida, the nation's leading sugarcane producer, yielded approximately 15.6 million tons of sugarcane used to produce sugar in 2012.[256] Florida provides matching grants for demonstration, commercialization, research, and development projects relating to renewable energy technologies, bioenergy, and innovative technologies that significantly increase energy

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251. *Id.* at 73 (During the 1970s and 1980s enthusiasm for ethanol in Brazil was high, however, in the late 1980s and early 90s, public support dropped drastically.).

252. *Id.* at 73. Brazil has maintained a strong marketing effort in the promotion of ethanol. The marketing effort educated citizens about the economic benefits that a sound sugarcane ethanol policy would entail for citizens.

253. *See id.* New technologies take time to develop, in Brazil production of ethanol between 1975 and 2000 more than doubled and during this same period, harvesting costs fell by half. The U.S., remaining consistent in its ethanol policies, can achieve similar improvements.

254. *Hawaii Sugarcane Acreage & Production*, NAT'L AGRIC. STATISTICS SERV. (Nov. 5, 2008), http://www.nass.usda.gov/Statistics_by_State/Hawaii/Publications/Archive/xsug1008.pdf, archived at http://perma.cc/FGJ5-2K59.

255. *Ethanol Production Incentive,* DEP'T OF ENERGY (Nov. 12, 2013), http://www.afdc.energy.gov/laws/law/HI/5883, archived at http://perma.cc/S33Y-6EQB; HAW. REV. STAT. ANN. § 235-110.3 (West 2008).

256. *Louisiana sugarcane outlook brightens for now, but future uncertain*, THE TIMES PICAYUNE (Oct. 20, 2012, 6:59 PM), http://www.nola.com/business/index.ssf/2012/10/louisiana_sugarcane_outlook_br.html, archived at http://perma.cc/NYK2-92AW [hereinafter *LA Sugarcane Outlook*]; Diane Huntrods, *Sugarcane profile*, AGRIC. MKTG. RESEARCH CTR. (May 2012), http://www.agmrc.org/commodities__products/grains__oilseeds/sugarcane-profile/, archived at http://perma.cc/KT8S-JBQE.

efficiency for vehicles.[257] Texas sugarcane is grown in the southern Rio Grande Valley region, and the industry there produces over 1.6 million tons of sugarcane each year across 40,000 acres.[258] Texas's ethanol policy is similar to Louisiana's and therefore, Texas could implement the same Bayou Fuel Formula.[259] Together, the sugarcane producing states have the opportunity to make great strides in mainstreaming the sugarcane-to-ethanol production process.

CONCLUSION

Modern technology must push toward the higher goal of energy independence. Although Louisiana has tried and failed at a sugar-to-ethanol policy, there needs be a continued urgency to right the wrongs of the past for the benefit of the iconic sugarcane industry's future and the state's reputation as an energy leader. A sugarcane ethanol policy would not only benefit the state by bolstering employment and scientific advances, but it will also be of value to all 50 states. Louisiana should implement the Bayou Fuel Formula to further develop Twain's vision of spacious streets as the sugary fuel that keeps Americans moving.

Iman S. Montgomery[*]

257. FLA. STAT. ANN. §§ 377.804, 570.954 (West Supp. 2014); *Renewable Energy Grants*, DEP'T OF ENERGY (Nov. 12, 2013), http://www.afdc.energy.gov/laws/law/FL/6072, archived at http://perma.cc/J7BZ-MKNN.

258. *LA Sugarcane Outlook*, *supra* note 256; *Our History*, RIO GRANDE VALLEY SUGAR GROWERS, http://www.rgvsugar.com/history, archived at http://perma.cc/7VMT-J7XH (last visited Oct. 1, 2014).

259. TEX. AGRIC. CODE ANN. § 50D.013 (West Supp. 2013).

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I wish to thank Professor Christina Sautter for her invaluable guidance and feedback. Thanks to Beth Williams and Professor Melissa T. Lonegrass, whose lasting and enduring commitment make this Journal possible. Most of all I thank my always encouraging and loving mother, whose everlasting support makes the impossible possible.