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DREAM OF CALIFORNICATION: CONSTITUTIONAL QUESTIONS PUT THE BRAKES ON THE NATION’S FIRST LOW CARBON FUEL STANDARD

I. Introduction

While the federal government struggles to pass a comprehensive climate bill, California finds itself in the familiar position as a leader in clean energy and environmental policy by establishing the nation’s first low carbon fuel standard (LCFS).1 Standing in its way, however, are several lawsuits pending in the Ninth Circuit alleging that California’s LCFS violates the United States Constitution.2 The plaintiffs in these lawsuits, including ethanol producers, corn farmers, and trucking associations, are all fighting to prevent unfavorable corn-ethanol regulations from decimating the corn-ethanol market in California, the nation’s largest ethanol-consuming state.3 As the scientific community debates the facts surrounding the inclusion of indirect land-use change in carbon accounting, the country awaits a decision from the Eastern District of California on the important constitutional and environmental issues associated with state regulations of carbon emissions.4


3. See Complaint for Declarative and Injunctive Relief, supra note 2, at *4 (stating allegations of damages resulting from California low carbon fuel standard); see also Complaint for Declarative and Injunctive Relief and Jury Demand, supra note 2, at *5 (alleging irreparable harm resulting from California legislation).

A. The Greenhouse Gas Problem

The ill effects of excess greenhouse gases (GHGs) in the atmosphere have been studied and recorded in detail for decades. Their subsequent effects on global warming, however, have only recently become the subject of political and scientific debate. GHGs come in many varieties; some occur naturally while others are solely man-made. Carbon dioxide, which has long been labeled as one of the “worst” GHGs, is emitted into the atmosphere through both natural processes and human activities.

The largest source of global carbon dioxide emissions is the combustion of fossil fuels such as coal, oil and gas, which are used predominantly in automobiles, power plants, and other industrial facilities. Since the Industrial Revolution in the 1700s, the combination of industrial fossil fuel use and deforestation has increased carbon dioxide concentrations in the atmosphere dramatically, especially compared to other forms of GHG emissions. In assessing the current trends related to the fossil fuel emission of carbon dioxide, the Fourth U.S. Climate Action Report recently concluded that carbon dioxide emissions increased by twenty percent from 1990-2004, while methane and nitrous oxide emissions decreased by ten percent and two percent, respectively, due to a variety of technological, policy, and agricultural changes.


7. See id. (discussing different types of greenhouse gases).


10. See id. (recounting historical increase in greenhouse gas emissions).

The transportation sector is the second largest source of carbon dioxide emissions both in the U.S. and worldwide.\textsuperscript{12} Nearly all energy consumed by transportation vehicles is petroleum-based.\textsuperscript{13} Automobiles and light-duty trucks account for nearly two-thirds of all transportation sector emissions in the U.S.\textsuperscript{14} California alone is the fifteenth largest GHG emitter in the world, representing approximately two percent of worldwide GHG emissions.\textsuperscript{15} Transportation fuels are responsible for approximately thirty-eight percent of California’s annual GHG emissions.\textsuperscript{16}

Due to the continued increase in carbon emissions from transportation worldwide, identifying an effective strategy to reduce carbon emissions from transportation fuel is a long-standing goal of the international community, the U.S. federal government, and state governments alike.\textsuperscript{17} Examples of current and proposed legislation targeting GHG reduction through future reductions in carbon dioxide emissions include the International Kyoto Protocol; the United States Energy Independence and Security Act; the proposed Cap-and-Trade Bill; and the California Low Carbon Fuel Standard.\textsuperscript{18}

B. The Biofuel “Solution”

At the forefront of the new and proposed legislation is a mandated increase in future use of biofuels.\textsuperscript{19} “Biofuel” is a term

\begin{itemize}
\item \textsuperscript{13}See Climate Change and Greenhouse Gas Emissions, supra note 9 (describing different uses of petroleum in transportation).
\item \textsuperscript{14}See id. (impugning cars and trucks for majority of vehicle carbon emissions).
\item \textsuperscript{16}See id. at 145 (naming transportation sector as largest single GHG emitter in California).
\item \textsuperscript{17}See Climate Change and Greenhouse Gas Emissions, supra note 9 (emphasizing importance of decreasing carbon emissions).
broadly used to describe fuels produced from renewable biomass material that are often used in conjunction with petroleum-based fuels. Different varieties of biofuels used across the globe are manufactured using various types of biomass. Ethanol is the most popular and widely produced type of biofuel, and can be produced from a large variety and combination of biomass products including wheat, corn, animal waste, soybeans, and sugarcane.

The forms and production methods of ethanol differ greatly, revealing large discrepancies in each type of ethanol's carbon efficiency. Traditionally, biofuel carbon efficiency was measured in terms of the carbon intensity emitted from the fuel during its intended use. Recently, however, scientists and attorneys proposed an alternate method of measuring and classifying biofuel carbon intensity called Indirect Land-use Change (ILUC). While traditional carbon intensity calculations only encompass the production life cycle carbon emissions of biofuels, ILUC takes into account all of the indirect land-use changes. These changes include the life cycle effects of growing the biofuel crops, harvesting the crops, and processing the product, as well as deforestation and conversion of grazing land to crop cultivation. California recently adopted the controversial ILUC as a means of reducing GHG emissions, but the method has resulted in numerous lawsuits by farmers and corn-ethanol and Security Act of 2007, Pub. L. No. 110-140, 121 Stat. 1492 (2007) (establishing mandated increases in biofuel production); see also American Clean Energy and Security Act of 2009, H.R. 3454, 111th Cong. (2009) (suggesting modified biofuels standard); see also California Low Carbon Fuel Standard, Exec. Order No. S-1-07 (Jan. 18, 2007), available at http://gov.ca.gov/executive-order/5172/ (mandating biofuel carbon efficiency baselines).


21. See id. (surveying different types of biofuels).

22. See How Ethanol is Made, RENEWABLE FUELS ASS’N, http://www.ethanolrfa.org/pages/how-ethanol-is-made (last visited Dec. 29, 2010) (describing different ways to make ethanol). Biodiesel, another widely produced type of biofuel, is derived from natural oils such as soybean oil and currently accounts for nearly eighty percent of European Union (EU) biofuel production. Id.


27. See id. (enumerating details of carbon intensity calculation).
anol producers because of the ILUC's poor carbon emissions rating of corn-based ethanol. 28

This Comment will provide an overview of the different forms of ethanol, methods of measuring carbon emissions, and regulations targeted at GHG reduction. 29 Part II compares the methods and sources currently in place for manufacturing ethanol in the U.S. to other ethanol-producing countries around the world. 30 Part III offers a high-level view of the different methods of measuring the carbon intensity of ethanol compared with traditional fossil fuels. 31 Part IV examines current and future biofuel legislation aimed at reducing carbon emissions in transportation fuels, with a focus on the most recently adopted California Low Carbon Fuel Standard. 32 Part V concludes with the current controversies and lawsuits surrounding biofuel legislation and an outlook for the future of biofuels in the U.S. 33

II. THE CURRENT STATE OF THE BIOFUEL UNION

A. Sugar and Spice and Everything Corn

The U.S. is currently the world's largest single producer of ethanol fuel. 34 The U.S. produced a total of nine billion gallons of ethanol in 2008 alone. 35 Ethanol fuel is predominantly used in the U.S. as an oxygenate to petroleum gasoline in low-level blends, which serves to decrease gasoline's carbon emissions. 36 Most vehi-

28. See Complaint for Declarative and Injunctive Relief, supra note 2, at *5 (setting out facts of indirect land-use change); see also Farrell & Sperling, supra note 1 (emphasizing inclusiveness of indirect land-use changes).
29. For an overview of the different forms of ethanol, see supra notes 19-27 and accompanying text.
30. For a discussion of the methods and sources currently in place for manufacturing ethanol, see infra notes 34-65 and accompanying text.
31. For a high-level view discussion of the different methods of measuring the carbon intensity of ethanol and traditional fossil fuels, see infra notes 66-116 and accompanying text.
32. For a discussion of current and future biofuel legislation, see infra notes 117-70 and accompanying text.
33. For a discussion of the current controversies and lawsuits surrounding biofuel legislation as well as an outlook for the future of biofuels, see infra notes 171-251 and accompanying text.
35. See id. (summarizing U.S. fuel totals).
36. See Ethanol Market Penetration, supra note 20 (describing ethanol usage). Ethanol can be blended in small percentages with gasoline to serve as a substitute for gasoline as well as to improve the overall carbon efficiency of gasoline. Id. Scientists refer to the use of ethanol for this purpose as an “oxygenate.” Id.
ehicles manufactured today are able to run on gasoline containing up to ten percent ethanol, although vehicles that can run on a much higher ethanol blend are already in production.37

Experts predict that ethanol production will continue to increase dramatically over the next several years due to a variety of political and economic factors.38 The first factor rests at the most basic level of U.S. ethanol production: corn.39 The vast majority of American ethanol is produced from corn for many reasons.40 The U.S. has a deep history of corn-growing, particularly in its Midwest region where growth conditions are ideal.41 Beginning in 1973, domestic corn policy has focused on creating the greatest yield possible.42 Instead of regulating the corn industry by limiting production, the federal government provides hefty subsidies for corn farmers based on acreage and yield, leading to an increase in overall corn production for use in ethanol.43

Other political factors also contribute to the continued growth of U.S. ethanol production.44 The Energy Policy Act, signed by former President George W. Bush in 2005, set a renewable fuel standard mandating that annual domestic production exceed 7.5 billion gallons by 2012.45 Similarly, in the past several years, many states have begun to set minimum ethanol percentages for gasoline sold within their borders.46 As a result of the implementation of

37. See Data, Analysis & Trends: E85 FFVs in Use in U.S., U.S. DEP’T OF ENERGY ALT. FUELS & ADVANCED VEHICLES DATA CTR., http://www.afdc.energy.gov/afdc/data/vehicles.html (last visited Dec. 29, 2010) (stating limits on current vehicle biofuel consumption). Flexible-fuel vehicles, which can run on one hundred percent gasoline or up to eighty-five percent ethanol, are also increasing in prevalence in the U.S. Id.
38. For a discussion of the political and economic factors affecting ethanol production, see infra notes 39-46 and accompanying text.
39. For a discussion of U.S. corn policy, see infra notes 40-42 and accompanying text.
40. See Ethanol Market Penetration, supra note 20 (citing corn as most commonly used biomass for biofuel in U.S.).
41. See id. (recounting American tradition of growing corn in Midwest).
42. See id. (describing new position in U.S. agricultural policy).
43. See id. (detailing extensive corn subsidies given to American corn farmers). Corn ethanol subsidies totaled $7 billion in 2006 for 4.9 billion gallons of ethanol, which translates to $1.45 per gallon of ethanol. Id.
44. For a discussion of U.S. policy factors, see infra notes 45-46 and accompanying text.
these new regulatory schemes, the Energy Information Administration (EIA) predicts that ethanol consumption will likely reach 11.2 billion gallons by 2012, exceeding the 7.5 billion gallons required by the Renewable Fuel Standard of the Energy Policy Act.\textsuperscript{47}

The 2010 BP oil spill tragedy in the Gulf of Mexico spurred another recent push for increased ethanol use.\textsuperscript{48} Many citizens feel that curbing the nation’s dependence on fossil fuels is a top priority after watching billions of gallons of oil severely damage the Gulf region’s ecosystems and beaches, as well as the livelihood of residents in the surrounding area.\textsuperscript{49} President Barack Obama recently called on America to unify behind a “national mission” to sharply reduce its dependence on oil and reduce greenhouse gas emissions by using alternative energy sources.\textsuperscript{50} As a result of the oil spill, several lobbying groups launched advertising campaigns imploring lawmakers in Washington to unite over legislation pursuing an increase in ethanol usage and a decrease in foreign oil dependence.\textsuperscript{51}

B. Foreign Affairs

Other countries choose to manufacture biofuel using different biomass products in many combinations because of a variety of factors such as government regulations, automobile technology, cli-


\textsuperscript{49} See id. (citing oil spill in Gulf as justification for expediting overhaul in energy policy).

\textsuperscript{50} See id. (summarizing Obama administration’s view on energy policy).

mate, land availability, and cost effectiveness. Currently, European Union (EU) nations produce most of their biofuels with a combination of sugar beets and wheat because of the EU’s Common Agricultural Policy (CAP), which heavily regulates agricultural land-use and provides special payment for crop production dedicated to biofuels. In contrast, Brazilians manufacture their biofuels almost exclusively from sugarcane due to Brazil’s tropical climate and booming sugar industry.

C. Unexpected Consequences: Indirect Land-use Effects

Existing U.S. policy, which incentivizes large corn yield per acre, has led to several unexpected adverse environmental consequences. In order to increase corn yield, meet America’s demand for ethanol, and receive the optimum amount of government subsidies, farmers now use more fertilizers and pesticides throughout the growing process. The subsequent increase in fertilizer and pesticide runoff has adversely affected streams nationwide. When rain falls on Midwestern farmlands, pesticides and fertilizers find their way through subsidiary streams into the ocean and cause excess algae growth.

Corn subsidies, in addition to high corn demand, also led to the establishment of large farms that allocate a vast majority of their

56. See generally, Brian T. Turner et al., Creating Markets for Green Biofuels: Measuring and improving environmental performance, U.C. BERKELEY TRANSP. SUSTAINABILITY RESEARCH CTR. (Apr. 2007), http://docs.nrdc.org/air/files/air07041601A.pdf (outlining increased use of fertilizers to grow more crops). A new genetically engineered kernel manufactured by Monsanto, called Roundup Ready Corn, is resistant to the Roundup pesticide. Id.
57. See Bryan Walsh, Another Problem with Biofuels?, TIME (Mar. 12, 2008), http://www.time.com/time/health/article/0,8599,1721693,00.html (describing ill effects of fertilizer runoff into streams and oceans).
58. See id. (detailing how fertilizer runoff adversely affects oceans by creating algae growth). The Gulf of Mexico “dead zone,” created by excess fertilizer, continues to increase each year. Id.
acres to corn growth.59 Some of the land now utilized for harvesting corn was formerly either forest or grassland, which served as natural carbon dioxide sequesters.60 The practice of cutting down trees to plant corn generally increases the amount of carbon dioxide in the atmosphere because another tree is rarely planted elsewhere to account for each tree cut down on forestland converted for corn growth.61

Notably, these adverse environmental consequences are not limited just to the U.S.62 Other ethanol-producing countries feel many of the same effects, including Brazil, where scientists claim that too much of the Amazon rainforests are being decimated and converted to sugarcane farms.63 The Amazon is perhaps the largest carbon storage house in the world, but, economically speaking, the Amazon is often worth more deforested than it is intact.64 The most vivid display of this biofuel dynamic occurred in the second half of 2007, when a chunk of the Amazon the size of Rhode Island was deforested, and an even larger portion was destroyed by fire to make way for farm land.65

III. THE DIVIDING LINE: MEASURING CARBON INTENSITY

A. The Good, the Bad, and the Dirty

The debate over biofuels has largely revolved around arguments in favor of and against their generally limited GHG emissions.66 In theory, biofuels would be carbon-neutral if all of the carbon released through their combustion was drawn from carbon absorbed during photosynthesis by the plants used to produce the biofuels.67 In practice, however, the use of fossil fuels at various

60. See id. (discussing land-use change resulting from increased corn growth).
61. See id. (estimating impact of tree decimation on overall carbon dioxide levels).
62. See id. (suggesting that effects of land-use change are worldwide).
63. See id. (comparing effects seen in Brazil with those experienced in U.S.).
64. See Grunwald, supra note 59 (describing economic reality of Amazon deforestation).
65. See id. (comparing amount of deforestation to size of Rhode Island).
67. See id. at 306 (factoring carbon absorbed by plants into carbon emissions).
stages of the biofuel production life cycle eliminates the current possibility of truly carbon-neutral biofuels.68

A more accurate assessment of the carbon intensity in transportation fuels, resulting from the increased development of fuel regulations based on GHG emissions, sheds light on new and important financial implications.69 The scientific community has studied and adopted many models for measuring carbon intensity and efficiency, all of which prescribe a different and extremely detailed approach.70 Some of the most recent models seem to directly conflict, particularly those regarding the carbon efficiency rating of corn ethanol in relation to other bio-fuels and petroleum gasoline.71 The significant variances in each model’s estimates of GHG emissions for corn ethanol continue to raise questions within the scientific community as to which model is the most accurate.72

B. The Greenhouse Gases, Regulated Emissions, and Energy Use in Transportation Model

The Greenhouse Gases, Regulated Emissions, and Energy Use in Transportation (GREET) model of U.S. ethanol production was developed by the Argonne National Laboratory.73 Sponsored by the U.S. Department of Energy’s Office of Energy Efficiency and Renewable Energy, researchers at Argonne developed a model for biofuel production and consumption that accounts for the full life cycle analysis as well as a small portion of indirect land-use changes.74 The GREET model consistently gives favorable treatment to ethanol as a fuel source as compared to other alternative fuels.75 Regarding land-use change, the assumptions and default

68. See id. (explaining how fossil fuels used in biofuel refining process limit reduction in carbon emissions).


70. For further discussion of carbon accounting models, see infra notes 73-110 and accompanying text.

71. For further comparison of carbon accounting models, see infra notes 73-110 and accompanying text.

72. See Plevin, supra note 69, at 495 (illustrating scientific debate over different carbon accounting models).

73. See Mathews & Tan, supra note 66, at 310-11 (introducing GREET method).

74. See id. (summarizing basic tenants of GREET model).

75. See id. (noting favorable treatment of corn ethanol by GREET model). Of the liquid fuels considered, only sugarcane ethanol and cellulosic ethanol have negative GHG emissions. Id.
values in the GREET model largely depend on the plant types and market shares of ethanol feedstocks.76 Besides tracking energy flows through the entire fuel life cycle for a wide range of transportation fuels, GREET follows estimate emissions from the production, transport, and storage of fuels and feedstocks, as well as from the combustion of fuels.77 GREET then augments these combustion emissions by tracking non-combustion GHG sources.78

As seen in California’s ILUC approach, the predominant criticism of the GREET model is that it does not encompass the overall effects from indirect land-use change around the world.79 Recent concern about these increasing effects has led to more ambitious attempts, like the California approach, to capture and calculate the totality of the indirect land-use change impact.80 Like all of the other approaches, GREET relies on many studies and exogenous calculations for its estimations, which may not be precisely accurate in every circumstance.81

C. The Biofuel Energy Systems Simulator Model

The Biofuel Energy Systems Simulator (BESS) model is a software tool used to calculate the energy efficiency, GHG emissions, and natural resource requirements of different corn–to-ethanol biofuel production systems.82 The BESS model provides a “cradle-to-grave” analysis of the biofuel production life cycle from the creation of the material inputs to the manufacturing of the finished product.83 The software uses parameter values supplied by the user to determine the efficiency of a specific ethanol plant, the surrounding crop production zone for feedstock and co-product processing, and cattle feeding.84 The main divergences between the BESS and GREET models lie in the BESS model’s depiction of a

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77. See Plevin, supra note 69, at 496 (detailing GREET calculations).
78. See id. (summarizing augmentation process).
79. See Mathews & Tan, supra note 66, at 311 (emphasizing that GREET model does not include indirect land-use effects).
80. See id. (justifying switch to ILUC approach).
81. See Plevin, supra note 69, at 496 (describing GREET model assumptions).
82. See id. at 497 (summarizing BESS model).
83. See id. (detailing BESS measurement process).
more efficiently run biorefinery than the GREET model, as well as the treatment of upstream emissions. These differences in calculation methods result in the BESS model’s estimates of GHG emissions for corn ethanol to be twenty-five percent lower than those of the GREET model.

The greatest criticisms of the BESS model are that, in several instances, BESS fails to properly count upstream emissions and fails to account for any estimates of GHG fluxes attributable to ILUC. Not only is BESS more narrowly focused than GREET because it does not model the life cycle of fossil fuel or electricity production, but BESS only addresses corn ethanol produced in dry-grind facilities. BESS also relies on emission factors from the Intergovernmental Panel on Climate Change’s guidelines for additional GHG inventories, but many argue that such reliance undercounts emissions because these factors are not life cycle emission factors.

D. California’s Indirect Land-use Change Model Under the Low Carbon Fuel Standard

California’s LCFS uses carbon intensity as a measure of GHG emissions. Generally, the carbon intensity of all fuels encompasses two components: direct emissions and indirect effects from production. The direct emissions represent the emissions associated with producing, transporting, and using the fuel, while the indirect effects include changes in land-use caused by fuel manufacturing. For corn ethanol, the indirect land-use changes are a significant source of GHG emissions, which, in turn, affects corn ethanol’s carbon intensity rating under the California guidelines.

85. See Plevin, supra note 69, at 496 (setting out divergences in models).
86. See id. (explaining why BESS estimates treat corn ethanol more favorably).
87. See id. (illuminating criticisms of BESS model).
88. See id. (factoring type of grind facility into model explanation).
89. See id. (highlighting missing information in BESS model).
90. See Guerrero, supra note 4 (reaffirming use of ILUC in California LCFS).
91. See id. (setting out two-part measurement for carbon intensity).
92. See id. (defining factors included in indirect and direct land-use calculations).
93. See id. (describing significance of ILUCs in calculating corn ethanol’s GHG emissions). The carbon intensity of all fuels is measured in megajoules and is measured uniformly, in theory, to allow for a side-by-side comparison of each fuel’s comparative intensity. Id. For example, under the LCFS, petroleum gasoline has a carbon intensity of 95.86 megajoules (g CO₂ e/mj) when measured using the life cycle approach. Id. Using a direct approach, the LCFS measures corn ethanol at 69.40 megajoules. Id. When indirect land-use changes are added,
The birth of the ILUC model, as adopted in California’s LCFS, stems from a theory promulgated by several noted university researchers and eventually adopted by a broader group within the scientific and legal community.94 These scientists advocated that California adopt a policy to measure biofuel carbon intensity by using “market-based” life cycle tools.95 The modern ILUC model essentially incorporates the GREET model with the addition of added calculations for indirect land-use changes.96 The ILUC model gained national publicity when a group of scientists and an environmental lawyer published a study in 2008 postulating that carbon emissions related to indirect land-use change made corn-based ethanol more carbon intensive than gasoline.97 In summary, the ILUC theory predicts that the spike in American ethanol consumption will cause U.S. corn growth to increase dramatically and subsequently require increased grain crop yields around the world to make up for the shortfall in U.S. grain production.98 The predicted end-result of this chain of events is an overall increase in global carbon dioxide due to ILUC.99

While few deny the existence of land-use changes, the remaining issue is whether these changes can be measured and quantified in a way that supports sustainable and effective regulatory measures.100 The most highly criticized portion of ILUC theory is the however, corn ethanol’s carbon intensity jumps to 99.40 megajoules, which is higher than gasoline. Id. 94. See Farrell, supra note 23, at 508 (positing that indirect land-use changes should be considered in biofuel carbon accounting calculations).
96. See Plevin, supra note 69, at 497 (describing additions from GREET model).
98. See id. at 1238-39 (describing possible future effects of increased corn ethanol production).
99. Id. (detailing events leading to increased carbon dioxide emissions). The spike is predicted to result in land-use changes covering 10.8 million hectares and leading to the release of 3.8 billion tons of GHG emissions. Id. A hectare is a metric unit of land measurement equaling 100 acres, 10,000 square meters, or 2.47 acres. Metric System, MERRIAM-WEBSTER ONLINE, http://www.merriam-webster.com/mw/table/metricsy.htm (last visited Dec. 20, 2010) (defining hectare). There are 100 hectares in a square kilometer. Id.
100. See Mathews & Tan, supra note 66, at 306 (differentiating between existence of indirect land-use change and ability to accurately calculate its effects).
very particular approach used to calculate the indirect land-use changes.\footnote{101} The ILUC theory starts with an assumption that U.S. ethanol consumption will spike dramatically based on the congressional alternative fuel mandate of thirty billion gallons by 2016.\footnote{102} The theory further assumes that additional ethanol needed to meet this spike will be generated by growing corn domestically.\footnote{103} There is no mention of an alternative calculation in the event that increased American ethanol demands are met by Brazilian sugarcane ethanol imported into the U.S.\footnote{104}

Using a complex mathematical model, the ILUC theory then posits the indirect land-use effects in terms of the additional hectarage in foreign countries that must be dedicated to grain production to compensate for the shortfall in grain and food production.\footnote{105} The ILUC also assumes that land-use changes in the form of deforestation would be triggered based on changes observed during the 1990s in countries like China and India.\footnote{106} The theory further states that the land-use changes induced by harvesting the excess grain crops would trigger the release of carbon previously sequestered in vegetation and soil.\footnote{107}

In summary, many critics have analyzed each of the assumptions in the ILUC model and concluded that numerous imperfections exist.\footnote{108} Critics of the ILUC theory also argue that no margins of error are reported and neither the assumptions utilized in the models nor the degree of their validity is ever discussed.\footnote{109} Nevertheless, such critics have admitted that accurately calculating indirect land use changes is a near impossible task due to the “mind numbing quantity of shifting variables involved.”\footnote{110}

\footnote{101. See id. at 306-09 (analyzing flaws in ILUC model).}
\footnote{102. See id. (discussing potential criticisms of ILUC model).}
\footnote{103. See id. at 309-13 (describing assumptions relied upon in ILUC model).}
\footnote{104. See id. at 311-12 (criticizing failure to accommodate for possibility of changing circumstances in ILUC model).}
\footnote{105. See Mathews & Tan, supra note 66, at 316-17 (citing sources of information used in ILUC assumptions). This calculation is done by using a set of partial equilibrium, non-spatial econometric models developed at the Center for Agricultural and Rural Development and the Food and Agricultural Policy Research Institute of the Iowa State University. Id. at 306-07.}
\footnote{106. See id. at 311-12 (arguing that data used for some ILUC assumptions may be outdated).}
\footnote{107. See id. at 307 (explaining how carbon is released from plants when they are cut down to plant more corn).}
\footnote{108. See id. at 309-13 (citing scientific flaws in theory).}
\footnote{109. See id. at 307 (noting lack of discussion about margin of error).}
\footnote{110. Mathews & Tan, supra note 66, at 309 (acknowledging difficulty in ILUC calculations).}
E. International Guidelines

In response to the growing interest in alternative energy sources within the EU, the European Commission uses both legislation and formal directives to promote biofuel production and use. For example, a newly proposed EU biofuel directive forbids the importation of biofuels not produced sustainably. Many critics assert that no provisions account for the GHG emissions from indirect land-use changes, however, which creates a significant loophole in recently adopted biofuel legislation.

In 2009, the European Commission evaluated the effectiveness of its existing biofuel policies and made recommendations stressing the importance and necessity of promulgating a measurement system reflecting indirect land-use change principles. In part, the European Commission noted, “[w]ith ILUC emissions omitted from calculations, many biofuels will be promoted with the belief that they are reducing net GHG emissions whereas the opposite may be the case, thereby contradicting one of the key objectives of the promotion of biofuels and worsening climate change.” While the EU hopes to eventually implement indirect land-use change calculations, many scientists believe that only a global system fully accounting for net emissions from land-use and land-use change would address indirect land-use change sufficiently.

IV. Bio-Fueling the Debate: Current and Proposed Regulations

A. Federal Legislation

1. Clean Air Act

The Clean Air Act (CAA) defines the Environmental Protection Agency’s (EPA's) responsibilities for protecting and improving...
the nation’s air quality. \(^{117}\) One EPA mandate under the CAA is to establish emissions standards for new motor vehicles. \(^{118}\) There is, however, a large preemption clause associated with the promulgation of these regulations which states, in pertinent part, that “[n]o State or any political subdivision thereof shall adopt or attempt to enforce any standard relating to the control of emissions from new motor vehicles or new motor vehicle engines subject to this part.” \(^{119}\) The same section of the CAA also contains a two-part exception to the preemption clause. \(^{120}\) First, California is permitted to receive a waiver from the EPA Administrator if it meets certain qualifications, and can thereby set its own emissions standard. \(^{121}\) Second, other states may adopt California’s standards that receive a valid EPA waiver and compliance with California’s standards is treated as compliance with federal standards. \(^{122}\) At least eleven states have adopted California’s emissions standards since 1994. \(^{123}\)

2. Renewable Fuel Standards Under the Energy Independence and Security Act

On August 8, 2005, President Bush signed the Energy Policy Act of 2005 into law. \(^{124}\) This comprehensive energy legislation included a nationwide renewable fuels standard (RFS) that required minimum annual levels of renewable fuel be incorporated into U.S. transportation fuel. \(^{125}\) Specifically, the RFS slated the use of ethanol and biodiesel to double by 2012. \(^{126}\) The standard initially man-

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120. See id. § 7543(b) (offering exceptions to CAA express preemption clause).
121. See id. § 7543(b)(1) (providing grounds for waiver of preemption).
122. Id. § 7543(b)(3) (extending possibility of waiver to every state and treating this as compliance with federal legislation).
dated that 4 billion gallons of biofuel be used in 2006, with an increase to 7.5 billion gallons in 2012.\textsuperscript{127} The RFS also provided oil refiners flexibility by creating a credit trading program that allows refiners to use renewable fuels where and when it is most efficient and cost-effective for them to do so.\textsuperscript{128} Another important RFS provision provided for a minimum of 250 million gallons a year of cellulosic-derived ethanol beginning in 2013.\textsuperscript{129}

The Energy Independence and Security Act of 2007 (EISA), signed into law on December 19, 2007, effectively amended and replaced the Energy Policy Act’s RFS.\textsuperscript{130} The EISA set a modified standard of 9 billion gallons of renewable fuel in 2008 and a subsequent increase to 36 billion gallons by 2022.\textsuperscript{131} The amended standard also increased the cellulosic ethanol mandate from 250 million gallons to 21 billion gallons.\textsuperscript{132} Moreover, the revised standard gave the EPA Administrator the authority to temporarily waive a portion of the biofuels mandate if it is determined that “a significant renewable feedstock disruption or other market circumstance might occur.”\textsuperscript{133} The EISA additionally sets out a complex incentive system for biorefineries to reduce GHG emissions relative to the displacement of fossil-derived processing fuels used to operate biofuel production facilities.\textsuperscript{134} Lastly, the EISA contains provisions aimed to increase funding for scientific and market research on the effects of biofuels in the marketplace.\textsuperscript{135}

\textsuperscript{127} See Sissine, supra note 125, at 6 (stating beginning standards for RFS).

\textsuperscript{128} See id. at 5-6 (describing RFS trading program).

\textsuperscript{129} See id. (detailing other important RFS provisions).

\textsuperscript{130} See id. at 1 (noting this was same act that adopted related CAFE standards).

\textsuperscript{131} Id. at 5-6 (explaining that amended act also increased combined corporate average fuel economy standards to thirty-five miles per gallon by 2020). Specifically, Section 211(o) requires renewable fuel facilities to achieve “at least 20 percent reduction in lifecycle greenhouse gas emissions compared to baseline lifecycle greenhouse gas emissions.” 42 U.S.C. §7545(o)(2)(A)(i) (2006).

\textsuperscript{132} See Renewable Fuels Standard, supra note 126 (summarizing standards set in amended law).

\textsuperscript{133} See 42 U.S.C. § 7545 (2006) (citing times when EPA waiver may be permitted).

\textsuperscript{134} See Sissine, supra note 125, at 5-6 (reviewing incentivized system for renewable fuel production and refineries). Renewable fuels produced from new biorefineries will be required to reduce the life cycle greenhouse GHG emissions relative to life cycle emissions from gasoline and diesel by at least twenty percent. Id. Fuels produced from biorefineries that displace more than eighty percent of the fossil-derived processing fuels used to operate a biofuel production facility will qualify for incentivized cash awards. Id.

\textsuperscript{135} See id. at 6 (authorizing $25 million to establish grants for biofuels research, development, and demonstration as well as commercial applications in states with low ethanol production rates).
3. The Controversy Over Cap-and-Trade

In early 2009, the U.S. House of Representatives passed a comprehensive climate change bill, which was touted at the time as a "sure thing" to pass in the U.S. Senate and represented one of the Obama administration's first major bipartisan achievements. The bill, America's Climate Security Act of 2007, was first introduced in the House on October 18, 2007. The bill’s purpose states that "[p]rompt, decisive action is critical, since global warming pollutants can persist in the atmosphere for more than a century." Despite alleged "disagreement" among scientists about the level, cause, and consequences of global warming, the bill was passed quickly in the House of Representatives.

The legislation required the EPA Administrator to establish: (1) a federal GHG registry to monitor compliance with the act; (2) a GHG emission allowance transfer system for covered facilities; and (3) an international reserve allowance program. The bill also mandated the creation of a national “cap-and-trade” policy for GHG emissions through which companies would be allocated "right-to-emit" credits. Under this system, companies that emit fewer GHGs than they are allowed would be permitted to sell (“trade”) the excess credits to companies that exceed their allowances.

The bill was sent to the Senate in late 2009, where it met a series of “legislative revolts” after the Environmental and Public Works Committee approved a Senate counterpart of the house-
passed climate bill. An onslaught of defections, boycotts, threats, legal challenges, and doubts ensued, which caused many Congressmen to question the viability of such a stringent cap-and-trade bill. In March 2010, Senator Lindsey Graham, one of three senators working to produce a compromise climate bill, confirmed these doubts when he said, "[t]he cap-and-trade bills in the House and Senate are dead. The concept of cap-and-trade is going to be replaced." Some blame the demise of the bill on Big Oil, which consistently opposed the bill, while others cite Republicans who nicknamed the bill "cap and tax" because it would "undoubtedly increase electricity and fuel prices."

Senator Graham, along with Senators John Kerry and Joe Lieberman, is meanwhile working on what many call the most ambitious new climate change bill, which would likely cost American households no more than $150 a year. A less ambitious carbon cap proposal has been circulated by Senators Susan Collins, a Republican from Maine, and Maria Cantwell, a Democrat from Washington, which is designed to cost consumers even less. Other

143. See Michaels, supra note 136 (characterizing onslaught of controversy and criticism of bill in Senate).
144. See id. (questioning future of cap-and-trade type legislation).
146. See Michaels, supra note 136 (postulating possible reasons for bill’s demise). Even the cost of the bill is highly debated. Id. The Congressional Budget Office (CBO) claims the legislation would cost the average household $175 a year by 2020, while others say that the total cost of upending the energy economy would be no more than a postage stamp a day for the average household. Id. The CBO has said, however, that the bill “contains so many caveats as to render it useless.” Id.
148. See Samuelsohn, supra note 147 (comparing estimated costs of proposed energy bills).
proposed bills, however, do not include mandatory greenhouse gas reductions or a true cap-and-trade scheme.\footnote{149} A measure sponsored by Democratic Senator Jeff Bingaman of New Mexico requires utilities to generate fifteen percent of their power from renewable energy sources by 2021.\footnote{150} Yet another bill, proposed by Republican Senator Richard Lugar from Indiana, seeks more stringent fuel economy standards for cars as well as stricter efficiency standards for buildings, which are cited as the two largest sources of carbon emissions.\footnote{151} Many environmentalists claim, however, that none of the proposed bills can significantly combat the dangers of climate change and reduce the country's dependence on oil.\footnote{152} Moreover, despite the public's outrage over the oil spill in the Gulf of Mexico, it is highly unlikely that any significant climate-change bill will receive approval before Congress recesses in late 2010.\footnote{153}

B. California's Low Carbon Fuel Standard

California, the nation's highest GHG emitter, once again grew increasingly impatient while it waited for federal legislation to solve its smog and pollution problems.\footnote{154} In January 2007, Governor Arnold Schwarzenegger asserted California's leadership in clean energy and environmental policy by establishing the nation's first LCFS, which intends to lower the carbon intensity of California's transportation fuels by ten percent by 2020.\footnote{155} The Governor's executive order directed the state Secretary for Environmental Protection to coordinate the actions of the California Energy Commission, California Air Resources Board (CARB), the University of California, and other agencies to develop the protocols for measuring the "life-cycle carbon intensity" of transportation fuels as

\begin{itemize}
  \item \footnote{149} See id. (relaying alternative energy bills worthy of discussion). The proposed ten percent reduction is expected to reduce GHG emissions by 15 million metric tons per year. \textit{Id}.
  \item \footnote{150} See id. (describing proposed utility energy reduction system).
  \item \footnote{151} See id. (summarizing additional alternative energy bill ideas).
  \item \footnote{152} See Gies, \textit{supra} note 51 (citing need to look at all carbon emission sources and plan comprehensive reduction scheme).
  \item \footnote{153} See Michaels, \textit{supra} note 136 (predicting no serious climate legislation will be passed in next year).
\end{itemize}
part of the State Implementation Plan for alternative fuels as required by the Pavley Act.\textsuperscript{156}

The most controversial aspect of California's LCFS is the method CARB chose to calculate the carbon accounting of biofuels, which specifically includes ILUC.\textsuperscript{157} ILUC models are used within the LCFS to calculate the carbon intensity of different kinds of biofuels.\textsuperscript{158} California's LCFS uses carbon intensity as a measure of the direct and indirect GHG emissions associated with each step of a fuel's full life cycle, often referred to as the "well-to-wheels" for fossil fuels and "seed-to-wheels" for biofuels.\textsuperscript{159} The carbon intensity baseline is measured against gasoline mixed with ten percent corn ethanol.\textsuperscript{160}

Fuels with carbon intensity levels below the baseline generate credits and fuels with levels above the baseline create deficits.\textsuperscript{161} To comply with the act, a party must show that the total amount of credits equals or exceeds the deficits incurred.\textsuperscript{162} If a party incurs a negative credit balance for two or more consecutive years or incurs a credit-to-deficit ratio of less than ninety percent, the party will be deemed in violation of the LCFS and subject to civil and criminal penalties.\textsuperscript{163}

C. The Kyoto Protocol

Several of the Kyoto Protocol's articles provide for the inclusion of land-use, land-use change, and forestry (LULUCF) activities as part of a party's "efforts to implement the Protocol and contribute to the mitigation of climate change."\textsuperscript{164} The complexities inherent in LULUCF activities have led to contentious and prolonged debates regarding the merits of their inclusion in the first commit-

\textsuperscript{156} See Low Carbon Fuel Standard, supra note 154 (referring to Pavley Act regulations). For a further discussion of the Pavley Act, see infra note 212 and accompanying text.

\textsuperscript{157} See Kahn, supra note 155 (citing inclusion of indirect land-use change as new and controversial concept).

\textsuperscript{158} See id. (summarizing concept of indirect land-use change).

\textsuperscript{159} See Guerrero, supra note 4 (introducing measurement method for carbon intensity).

\textsuperscript{160} See id. (giving carbon intensity baseline).

\textsuperscript{161} See id. (describing carbon trading system established under regulations).

\textsuperscript{162} See id. (detailing methods of compliance).

\textsuperscript{163} See id. (stating consequences for entities held in violation of regulations).

\textsuperscript{164} LULUCF under the Kyoto Protocol, UNITED NATIONS FRAMEWORK CONVENTION ON CLIMATE CHANGE, http:// unfcc.int/methods_and_science/lulucf/items/4129.php (last visited Dec. 30, 2010) [hereinafter LULUCF under the Kyoto Protocol] (surveying relevant Kyoto Protocol articles affecting biofuels and land-use change calculations).
Emissions trading, as set out in Article 17 of the Kyoto Protocol, allows countries to sell excess emissions units (i.e. units which were allocated to them but not used) to countries that have exceeded their emission targets. This trading system creates a "carbon market" where not just actual emissions units can be traded and sold, but removal units (RMUs) may be traded on the basis of LULUCF activities such as reforestation.

Under the Protocol, emissions trading schemes may be established as climate policy instruments at both the national and regional levels. The EU emissions trading scheme is the largest of the "cap-and-trade" schemes currently in operation. Despite international pressure, the U.S. remains one of the few countries that is not a signatory of the Kyoto Protocol because it believes that "[t]he Kyoto Protocol is fundamentally flawed, and is not the correct vehicle with which to produce real environmental solutions."

V. AMERICA THE BIO-FOOLISH?

A. Ethanol Interests Unite

In a last ditch effort to prevent California’s LCFS from taking effect, two federal lawsuits were filed in the Eastern District of California alleging the unconstitutionality of the regulations. The first suit, Rocky Mountain Farmers Union v. Goldstene (Rocky Mountain), filed December 23, 2009 and amended January 11, 2010, is a case brought by groups associated with the corn-growing industry. The second suit, National Petrochemical & Refiners Ass’n v. United States, summarizing United States position on Kyoto Protocol.

165. See id. (recalling debate among countries regarding land-use provisions).
166. See id. (detailing advanced trading system under Kyoto Protocol).
167. See id. (allowing for trading of removal units and carbon units).
168. See id. (describing flexibility provided to countries and regions to set up their own carbon trading system).
169. See LULUCF under the Kyoto Protocol, supra note 164 (mentioning EU as an example of such trading system).
171. See Pettit, supra note 1 (giving background of lawsuits).
172. Complaint for Declarative and Injunctive Relief, supra note 2, at *7 (stating facts of case).
173. See id. at *7-8 (detailing plaintiffs by industry). The lawsuit was filed jointly by the Rocky Mountain Farmers Union, a cooperative association representing family farmers and ranchers in Wyoming, Colorado, and New Mexico; Penny Newman Grain, a leading merchant in the grain and feed byproduct market; Redwood County Minnesota Corn and Soybean Growers, a not-for-profit cooperation of farmers; Growth Energy, a non-profit organization committed to greener energy; and the Renewable Fuels Association, a trade association in the fuel ethanol industry. Id.
Goldstene (National Petrochemical), filed February 2, 2010, is a case brought predominantly by ethanol industry groups.

Both complaints basically allege that the LCFS violates the U.S. Constitution’s Commerce Clause by discriminating against non-California ethanol and that the LCFS is preempted by federal law – specifically, Section 211(o) of the CAA – in violation of the Supremacy Clause. Although the relationship between GHG emissions and climate change-related harm to California citizens may be tenuous, a substantial limitation on Midwestern ethanol may pass muster based on Supreme Court precedent involving the Commerce Clause. As for preemption, “the ethanol interests bringing the suit will have to overcome a strong presumption in favor of California’s right to protect the health and safety of its citizens.”

1. “Dormant” Commerce Clause

The Commerce Clause explicitly grants Congress the authority to regulate commerce among the states, but has also long been construed to limit states’ power to discriminate against or unduly burden interstate commerce – often called the “Dormant” Commerce Clause. The U.S. Supreme Court has adopted a “two-tiered approach” to Commerce Clause analysis. The first tier “applies only when a state statute directly regulates or discriminates against interstate commerce.” In these cases, the Supreme Court has traditionally struck down the regulation as per se unconstitutional.

174. Complaint for Declarative and Injunctive Relief and Jury Demand, supra note 2, at *5 (stating details of complaint).
175. Id. at 3 (providing detail about plaintiffs). The suit was filed by the National Petrochemical and Refiners Association, a trade association comprised of a majority of all U.S. refiners and petrochemical manufacturers; American Trucking Association, a federation of motor carriers and trucking associations; Center for North American Energy Security, a company responsible for developing oil sands, shale, and other “non-conventional” energy resources; and the Consumer Energy Alliance, a nonprofit organization. Id.
176. See Pettit, supra note 1 (summarizing complaints’ allegations).
178. Id. (stating burden of proof for ethanol producers and corn farmers).
179. Guerrero, supra note 4 (describing Dormant Commerce Clause jurisprudence).
180. Id. (explaining two-tiered approach for Dormant Commerce Clause analysis).
181. Id. (detailing first tier of analysis).
without further inquiry.\textsuperscript{182} The second tier "applies to cases where a statute or regulation is said to be neutral on its face, meaning that it regulates in-state and out-of-state commerce evenly and has only an indirect effect on interstate commerce."\textsuperscript{183} The test applied in such situations, often called the \textit{Pike}\textsuperscript{184} balancing test from the 1970 case where it originated, requires courts to balance the burdens of the challenged state law against the law's purported benefits.\textsuperscript{185}

Because the LCFS requires land-use changes to be considered in calculating carbon intensity, it is without doubt that the LCFS regulates conduct outside California's boundaries.\textsuperscript{186} For example, California accounts for only a fraction of the country's total corn production, so the land-use practices regulated by the LCFS mostly occur outside the state.\textsuperscript{187} The \textit{National Petrochemical} plaintiffs allege that this practice is an unconstitutional attempt by California to regulate policy beyond its boundaries.\textsuperscript{188} Additionally, the plaintiffs in both suits allege that the LCFS is an economically protectionist measure.\textsuperscript{189} By creating various incentives for in-state refineries through the LCFS, California is allegedly directly benefiting in-state growers and biofuel refiners while disadvantaging out-of-state corn growers and corn ethanol producers.\textsuperscript{190}

In deciding the merits of both cases on the Commerce Clause issue, the Eastern District of California will have to determine whether the adverse effects of climate change, which the LCFS attempts to combat, outweigh the harm to out-of-state ethanol producers and farmers.\textsuperscript{191} Looking to tip the balancing test in their favor, the industry and farming groups allege that climate change is largely symbolic, whereas the LCFS's effect on interstate commerce of corn ethanol will be significant.\textsuperscript{192} This is a very broad theory, however, which has the potential to invalidate many state and re-

\textsuperscript{182}. See id. (generalizing Supreme Court's prior decisions).
\textsuperscript{183}. Id. (examining second tier of analysis).
\textsuperscript{185}. See id. at 142 (requiring balancing of interests of involved parties).
\textsuperscript{186}. See Guerrero, supra note 4 (evaluating claims that LCFS will regulate activities outside California).
\textsuperscript{187}. See id. (applying regulatory claims to LCFS).
\textsuperscript{188}. See id. (summarizing Commerce Clause allegations).
\textsuperscript{189}. See id. (noting similarities in allegations of Commerce Clause violation in both suits).
\textsuperscript{190}. See id. (reasoning that out-of-state commerce may be harmed by LCFS policies).
\textsuperscript{191}. See Guerrero, supra note 4 (displaying need to weigh legislation's harms and benefits).
\textsuperscript{192}. See id. (restating that court will need to apply balancing test to weigh both sides' interests).
gional climate change initiatives. Alleging that California’s LCFS should be invalidated because it insufficiently impacts the worldwide climate change problem necessarily lends itself to the slippery slope argument that all state climate change laws should likewise be discredited, which is an argument unlikely to pass muster.

The strongest support for a decision in favor of California’s LCFS may be found in Exxon Corp. v. Maryland (Exxon), where the Supreme Court held that the Commerce Clause protects the interstate market as a whole, rather than particular interstate firms, from prohibitive or burdensome regulations. In reaching this decision, the Court stated, “the fact that the burden of a state regulation falls on some interstate companies does not, by itself establish a claim of discrimination against interstate commerce.” Moreover, a neutral regulation that serves a substantial state purpose is not automatically invalid because it causes some business to shift from a predominantly out-of-state industry to a predominantly in-state industry.

Analogous to Exxon, although the LCFS will harm Midwestern ethanol-producing firms, it may not directly impede the flow of biofuels across state lines so long as the biofuel’s carbon intensity meets specific benchmarks. If the pending lawsuits are decided in favor of California, there is no doubt that the Midwestern corn ethanol industry will be significantly impacted. Nevertheless, it will ultimately be up to the Eastern District of California to determine if California’s justification for the LCFS outweighs the adverse industry effects.

2. Preemption

The second claim alleged in both lawsuits is that the LCFS is preempted by the EISA, which the plaintiffs argue “expressly exempted existing corn ethanol biorefineries from the requirement

193. See id. (noting broad spectrum to which allegations can be applied).
194. See id. (identifying defects in plaintiff’s argument).
196. Id. at 119 (summarizing holding of case).
197. Id. at 125 (stating that burden on interstate companies is not dispositive).
198. Id. at 133 (qualifying claims that neutral regulation may be automatically invalidated because of shift to in-state industry).
199. See Lawrence, supra note 177 (applying Exxon holding to cases against California’s LCFS).
200. See Guerrero, supra note 4 (laying out discrepancies at heart of complaints).
201. See id. (highlighting ultimate task facing Eastern District of California).
of having to claim or demonstrate reductions in GHG emissions."\(^{202}\) The Constitution’s Supremacy Clause serves to invalidate state laws that interfere with or are contrary to federal law.\(^{203}\) State laws are said to be preempted by federal law if the scheme of federal regulations “leaves no room” for supplementary state regulation or if the state laws “stand as an obstacle” to federal objectives.\(^{204}\) State laws, therefore, may be preempted by “express language in a congressional enactment, by implication from the depth and breadth of a congressional scheme that occupies the legislative field, or by implication because of a conflict with a congressional enactment.”\(^{205}\) Congressional intent is the starting point for determining the scope of an allegedly preempted statute.\(^{206}\) There is a well-established presumption against preemption when Congress legislates in a field traditionally occupied by the states, and federal law is generally not found to preempt state law unless there is evidence of the clear and manifest intention to do so by Congress.\(^{207}\)

The plaintiffs in both lawsuits allege conflict preemption on the grounds that California’s LCFS conflicts with the CAA’s Section 211(o), as adopted by the EISA.\(^{208}\) While the CAA creates national

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\(^{202}\) See Complaint for Declarative and Injunctive Relief, supra note 2, at *7 (arguing LCFS is preempted); see also Complaint for Declarative and Injunctive Relief and Jury Demand, supra note 2, at *8 (making same argument).

\(^{203}\) See Guerrero, supra note 4 (summarizing preemption clause of U.S. Constitution).

\(^{204}\) Id. (detailing preemption qualifications). Three types of preemption are recognized: express (“Congress can define explicitly the extent to which its enactments pre-empted state law”), field (“state law is pre-empted where it regulates conduct in a field that Congress intended the Federal Government to occupy exclusively”), and conflict (“state law is pre-empted to the extent that it actually conflicts with federal law”). English v. Gen. Elec. Co., 496 U.S. 72, 78-79 (1990).


\(^{208}\) See Complaint for Declarative and Injunctive Relief, supra note 2, at *5 (alleging pre-emption by conflict with congressional intent).
standards and programs, it "generally seeks to preserve state authority in the area of pollution." Under the CAA, the federal government is said to share jurisdiction with states in the area of air pollution control and prevention because "air pollution prevention... and air pollution control at its source is the primary responsibility of States and local governments." Preemption claims are somewhat familiar to California because of their use as a constitutional attack in the realm of motor vehicle fuel regulations. California successfully implemented GHG standards for passenger vehicles through the California Assembly Bill 1493 (Pavley Act), which survived claims of preemption. The opposite result occurred in *Engine Manufacturers Ass'n v. South Coast Air Quality Management District* (*Engine Manufacturers*), however, where the Supreme Court invoked CAA preemption against rules enacted by a political subdivision of California that prohibited the purchase or leasing of vehicles which failed to meet certain emissions requirements. In this case, the Court found that a state law need not actually interfere with federal law to be considered "related to" the federal law for the purposes of preemption. Even though the challenged rules in *Engine Manufacturers* had a limited impact on the CAA's objectives, the Court determined that allowing one state or political subdivision to enact such rules would lead to

209. *Oxygenated Fuels Ass'n v. Davis*, 331 F.3d 665, 670 (9th Cir. 2003) (reserving space for state regulation and control of air pollution).


211. See Pettit, *supra* note 1 (recalling previous cases against California containing allegations of preemption).

212. See Memorandum from James M. Goldstene, Executive Officer, California Air Resources Board to Members of the California Air Resources Board, Attachment B at 18 (May 19, 2010), available at http://www.arb.ca.gov/fuels/lcfs/LCFS_Regulation_Update.pdf (detailing requirements under Pavley Act). In order to implement these state standards under the federal Clean Air Act, California submitted a waiver request in December 2005 and was denied by the U.S. EPA in March 2008. *Id.* at 20. That decision was based on a finding that California's request to reduce GHG emissions from passenger vehicles did not meet the Clean Air Act requirement of showing that the waiver was needed to meet "compelling and extraordinary conditions." *Id.* at 20-21. This decision, made by the EPA under the Bush administration, was reversed by the EPA under the Obama administration, which granted the long sought-after waiver by returning to and applying EPA's traditional waiver review principles. *Id.* at 18. President Obama stated that the federal government would adopt California's famed "Pavley" auto emission standards nationwide; however, he also mandated that California and his administration implement the standards on a slower time frame than that originally put forth by California. *Id.* at 7-8.


214. *See id.* at 258 (summarizing holding of case).

an aggregate effect that eventually "would undo Congress's carefully calibrated regulatory scheme."

Although the RFS does not expressly preempt state low carbon fuel standards, the lawsuits argue that California's LCFS frustrates the EISA's blending mandate by effectively excluding Midwestern corn from California's ethanol market. The EISA "mandates that GHG emission assessments must evaluate the full life cycle emission impacts of fuel production including both direct and indirect emissions, including significant emissions from land-use changes." The EISA, however, also expressly exempts existing corn ethanol biorefineries from having to demonstrate reductions in GHG emissions, which, for California, includes 15 billion gallons of existing production.

The fate of "newer" biofuels, including corn ethanol, under the EISA is unclear. The full life cycle emissions impacts of feedstocks would be assessed under proposed EPA rules (RFS 2.0), but whether the final rules incorporate or conflict with California's LCFS life cycle analysis has yet to be determined because the EPA's rules have not yet been released. One commentator asserts that "even if California's LCFS frustrates the integration of 15 billion gallons of 'grandfathered' corn ethanol into the fuel supply, it could provide a framework for a future federal life cycle analysis that covers all new biofuels." In the meantime, Midwestern ethanol producers can still access other markets with less stringent standards than California.

It can be argued, however, that the federal RFS and California's LCFS are explicitly designed to accomplish two different goals; the RFS attempts to augment domestic fuel supply, while the LCFS tries to reduce carbon intensity of fuels. The inherent contradiction of these laws in the short term will present a difficult issue.

216. Id. at 255 (envisioning aggregate effect of regulations).
217. See Guerrero, supra note 4 (stating that LCFS may frustrate EISA's blending mandate).
219. Lawrence, supra note 177 (explaining exemption for existing corn ethanol refineries).
220. Id. (depicting unclear fate of newer biofuels).
221. See id. (describing difficulty in evaluating compatibility with RFS 2.0).
222. Id. (questioning fate of existing ethanol and biorefineries).
223. Id. (noting that many states besides California are also large ethanol consumers).
224. Lawrence, supra note 177 (comparing stated goals of LCFS and RFS).
before the courts. Regardless of whether the courts determine that energy security and climate security are different "fields" under a Supremacy Clause analysis, it would be very difficult today for an ethanol refinery to follow both the standards under California's LCFS and the blending goals set forth by the EISA.

B. Back to the Future

As evidenced from the varying scientific opinions on ILUC, diverse interests, and high financial stakes involved in the LCFS, the verdict is still out on both the constitutionality of such regulations and their effectiveness in reducing carbon emissions. Advocates of the LCFS state that the regulations are relatively politically neutral, as they will allow fuel providers to choose how to reduce the carbon intensity of their production. Others say that this concept also encourages businesses to identify new strategies and technologies that work for them and their providers. While most fuel providers will likely offer liquid fuel in the form of corn-ethanol initially, promulgators hope that over time the need to lower the carbon intensity of fuels will encourage innovation to improve biofuels. The theory is that as the low carbon fuel standards tighten, the industry will transition to a new generation of fuels and vehicles including plug-in hybrids and hydrogen fuel-cell vehicles.

Advocates further argue that the LCFS not only addresses global warming, but also tackles high oil prices and foreign oil dependence by stimulating private companies to develop new technologies and bring them to the market, a concept which would be very popular with politicians in Washington, D.C. if it came to fruition. LCFS proponents also argue that the method is a favorable

225. Id. (illuminating contradictions as key decision-point in litigation).
226. Id. (postulating difficulty for biorefineries to follow both regulatory schemes).
227. See Farrell & Sperling, supra note 1 (pointing out lingering questions on effectiveness of ILUC regulations).
228. See id. (explaining choices under LCFS for fuel providers). Fuel providers may choose from options such as blending low-carbon biofuels into conventional gasoline, selling low-carbon fuels such as hydrogen, or buying credits from providers of other low-carbon fuels. Id.
229. See id. (explaining how regulations could promote industry development and innovation).
230. See id. (describing succession of biofuel innovation over time).
231. See id. (deducing how tightening regulations will foster new generation of biofuels).
232. See Farrell & Sperling, supra note 1 (postulating how successful biofuel implementation could further goals of energy independence).
alternative to taxes or caps on carbon across the entire economy because higher gasoline prices in both the U.S. and EU have not significantly changed industry practices.\textsuperscript{233} If the LCFS is as successful as its authors predict, the LCFS has the potential to incentivize the agricultural, energy, and automotive industries to start lowering the carbon intensity of today's fuels and speed along the transition to the next generation of truly low carbon fuels and vehicles.\textsuperscript{234}

Industry opponents of the LCFS not only claim that the regulation is unconstitutional, but they also argue that, while there may be a time where strong scientific basis exists for initiating such regulations, that time has not yet come.\textsuperscript{235} One of their primary arguments is that the life cycle analysis included in the ILUC models relies on a theoretical framework rather than observable data.\textsuperscript{236} Opponents frequently cite a paper published in 2007 by many current LCFS advocates where they admitted, "indirect land-use changes associated with biofuel production in the LCFS would be difficult to estimate because it is uncertain how increased biofuel production in one location... would affect the use of land in another location."\textsuperscript{237} Like most critics of the ILUC method, those opposed to the LCFS also question many of the assumptions on which the method relies.\textsuperscript{238}

As expressed in the \textit{National Petrochemical} complaint, industry opponents also claim that the LCFS endorses different standards for different types of energy because ILUC penalties only apply to biofuels.\textsuperscript{239} Contrary to those in favor of the LCFS, industry opponents aver that the ILUC method could slow advancements in second-generation biofuels based on the notion that manufacturers

\begin{itemize}
\item \textsuperscript{233} See \textit{id.} (comparing LCFS to other alternative regulations of carbon emissions).
\item \textsuperscript{234} \textit{id.} (illuminating possible successes of LCFS).
\item \textsuperscript{236} See \textit{id.} (reiterating that California ILUC calculations are theoretical and not based on observable data).
\item \textsuperscript{238} For a further discussion of the ILUC method's underlying assumptions, see \textit{supra} notes 90-110 and accompanying text.
\item \textsuperscript{239} See \textit{Growth Energy Policy Brief}, \textit{supra} note 235, at 4-5 (stating that ILUC provisions only apply to biofuels and not petroleum-based fuels).
\end{itemize}
would instead invest in making their corn production process increasingly more efficient. 240 In summary, the ethanol industry cites the lack of “credible and thorough” scientific evidence, which would allow for accurate measurements of carbon intensity from ILUC, as a reason to delay ILUC enforcement. 241

As California’s struggling economy posts a jobless rate over twelve percent in early 2010, further opposition to the LCFS comes from California taxpayers concerned about paying too high a price for the cost of the regulations. 242 In a 2009 study commissioned by the California Small Business Roundtable, economists at the California State University at Sacramento found that implementation costs of the LCFS “could easily exceed $100 billion.” 243 The fact that this plan could raise the cost of living for Californians by $3,857 per household each year by 2020 illuminates that there is really no such thing as a free green lunch. 244 A potential ballot initiative in the near future could effectively repeal the LCFS if the initiative gains enough support from California taxpayers. 245

C. “If not us, who? If not now, when?” 246

Like it or not, the U.S. fuel and transportation sector will not change overnight and, even if the LCFS is approved by the courts and enforced, it will take decades to determine the real effect of the regulations on the environment, petroleum sector, and alternative fuels sector. 247 In the meantime, without updated federal legislation to usher in a new era of carbon reform, states will likely con-

240. See id. at 5 (criticizing belief that regulations will contribute to innovation).
241. See id. at 3-4 (reiterating lack of scientific evidence to support implementation of ILUC-based regulations).
243. See id. (illuminating high cost of ILUC implementation).
244. See id. (calculating cost of LCFS implementations to California households).
245. See id. (explaining how ballot initiative could effectively repeal LCFS).
continue to propose solutions to their own carbon problems.\textsuperscript{248} Many other states will closely watch the Eastern District of California’s decision on the constitutionality of California’s LCFS because they are slated to propose their own versions of carbon reduction programs to their respective state legislatures.\textsuperscript{249} Not only are the stakes involved in these regulations and pending lawsuits huge for California, but they are also significant for other states hoping to implement similar regulations and for foreign countries, such as Brazil, which have a large interest in the outcome of U.S. biofuel regulations.\textsuperscript{250} For the time being, until there is a viable alternative to Midwestern corn ethanol that can compete in both price and quantity, California’s LCFS will not be the last low carbon fuel standard to test the outer boundaries of green federalism.\textsuperscript{251}

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\textsuperscript{249} See id. A group of Western states began a regional effort called the Western Climate Initiative to develop ideas for a regional cap-and-trade effort. Additionally, ten Northwestern and mid-Atlantic states comprise the Regional Greenhouse Gas Initiative that seeks to reduce carbon dioxide emission by ten percent by 2018. \textit{Id.}

\textsuperscript{250} See Lawrence, \textit{supra} note 177 (emphasizing importance of Court’s decision to entities interested in U.S. biofuel policy).

\textsuperscript{251} See id. (predicting future lawsuits resulting from implementation of low carbon fuel standards by other states). While U.S. importation of Brazilian sugarcane ethanol may be a cheaper and more eco-friendly way of meeting increased ethanol demand, factors such as the heavily subsidized U.S. corn industry and tariffs on Brazilian sugarcane are unlikely to change in the near future. See Obama & Da Silva, \textit{supra} note 247 (stating that trade situation with Brazil still produces great tension).

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