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Arrested Development: A Call for Feasible Market-Control Measures to Incentivize Alternative Fuel Innovation and Combat Global Climate Change

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COMMENT

ARRESTED DEVELOPMENT: A CALL FOR FEASIBLE MARKET-CONTROL MEASURES TO INCENTIVIZE ALTERNATIVE FUEL INNOVATION AND COMBAT GLOBAL CLIMATE CHANGE

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INTRODUCTION

Now the story of a wealthy nation that relies on fuels intrinsically tied to the looming dangers of global climate change, and the elected officials who have no choice but to reexamine the policies governing the production of those fuels.[1]

If the above seems like an overly dramatic view of current United States environmental policy toward global climate change, perhaps it is important to remember how publicly divisive the debate has been surrounding the issue of global climate change. Affecting both industrial and developing nations, global climate change creates conflicting political and economic interests that inhibit a collective solution to a

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[1] *Cf. Arrested Development—Arrested Development Theme Song*, YOUTUBE (June 25, 2008), www.youtube.com/watch?v=zYqPs0LInls. Referencing this FOX/Netflix comedy felt like an appropriate summation of the United States' dysfunctional approach to market-based environmental policy.

global crisis.[2] Adding fuel to the fire, a growing amount of scientific research suggests that global climate change is heavily influenced by the release of greenhouse gases (GHGs) stemming from human fossil fuel consumption.[3]

The rise in GHG concentration has facilitated the warming of our planet, increasing the average global temperature over the past century.[4] In 2013, the Intergovernmental Panel on Climate Change (IPCC) found that Earth's combined surface and ocean temperature rose by 0.89 degrees Celsius from 1901 to 2012, which included a temperature increase of 0.72 degrees Celsius from 1951 to 2012.[5] The IPCC also noted that these elevated temperatures directly coincided with substantial changes to the environment, from the diminution of the Arctic ice sheets[6] to an unprecedented rise in sea level.[7] The increased presence of these sweeping environmental changes necessitates a thorough examination of human fuel consumption and how fuel use contributes to the Earth's warming through the emission of GHGs.[8]

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[2] *See generally* Lisa Schenck, *Climate Change "Crisis"—Struggling for Worldwide Collective Action*, 19 COLO. J. INT'L ENVTL. L. & POL'Y 319, 347 (2008) ("[E]conomics plays a major role in whether parties will act collectively to address climate change. The economics of this global threat involves questions of perceived implementation costs, the role of particular industries in the emissions problem, and computer modeling in estimating the costs. Estimating possible environmental and socioeconomic harms or costs resulting from climate change is encumbered by uncertainty as well. Nevertheless, the economic impact of climate change is a key variable in generating global action. Parties may be discouraged from acting collectively to address climate change if mitigation and abatement costs exceed the perceived benefits of action." (footnote omitted)).

[3] *See generally Causes of Climate Change*, CLIMATE CHANGE—U.S. EPA, http://epa.gov/climatechange/science/causes.html (last updated Mar. 18, 2014).

[4] *Id.*

[5] *See* THOMAS F. STOCKER ET AL., CLIMATE CHANGE 2013: THE PHYSICAL SCIENCE BASIS, WORKING GROUP I CONTRIBUTION TO THE FIFTH ASSESSMENT REPORT OF THE INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE 37 (2013) *available at* www.climatechange2013.org/images/report/WG1AR5_ALL_FINAL.pdf.

[6] *Id.* at 9 ("The average rate of ice loss from the Greenland ice sheet has very likely substantially increased from 34 [–6 to 74] Gt yr^{-1} over the period 1992 to 2001 to 215 [157 to 274] Gt yr^{-1} over the period 2002 to 2011.").

[7] *Id.* at 11 ("Since the early 1970s, glacier mass loss and ocean thermal expansion from warming together explain about 75% of the observed global mean sea level rise (*high confidence*). Over the period 1993 to 2010, global mean sea level rise is, with *high confidence*, consistent with the sum of the observed contributions from ocean thermal expansion due to warming (1.1 [0.8 to 1.4] mm yr^{-1}), from changes in glaciers (0.76 [0.39 to 1.13] mm yr^{-1}), Greenland ice sheet (0.33 [0.25 to 0.41] mm yr^{-1}), Antarctic ice sheet (0.27 [0.16 to 0.38] mm yr^{-1}), and land water storage (0.38 [0.26 to 0.49] mm yr^{-1}). The sum of these contributions is 2.8 [2.3 to 3.4] mm yr^{-1}.").

[8] *See generally* John M. Broder, *Climate Talks in Durban Yield Limited Agreement*, N.Y. TIMES, Dec. 11, 2011, *available at* www.nytimes.com/2011/12/12/science/earth/countries-at-un-conference-agree-to-draft-new-emissions-treaty.html.

The convergence of these energy-related interests and environmental impacts has largely hindered comprehensive efforts to address global climate change.[9] For instance, the 2011 United Nations Framework Convention on Climate Change in Durban, South Africa[10] was a fruitless effort by the world's largest nations to come to a consensus regarding the emissions reduction targets of the Kyoto Protocol—the most comprehensive worldwide proposal to curb GHG emissions to date.[11] Unfortunately, large multi-nation conferences like Durban, and efforts like the Kyoto Protocol, illustrate why nations like the United States are reluctant to commit to stringent GHG reductions: Other major polluters remain exempt from such targets,[12] further complicating a collective effort to halt the threat of global climate change.

The world's nations have yet to find common ground in mitigating their respective GHG contributions to global climate change.[13] Further, the reticence to fashion a collective approach to GHG reduction exists not only at the international level, but domestically as well. For the United States, the question of how state governments and Congress should share in the responsibility of enacting measures to reduce GHGs is largely in dispute, which ultimately affects domestic energy needs.[14]

New proposals for market-based GHG reduction are fraught with friction here in the United States. The latest example comes from California's Low Carbon Fuel Standard (LCFS),[15] promulgated by the California Air Resources Board (CARB) under the authority of the

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[9] *Id.*

[10] *See generally* Alex Kirby, *Will the Kyoto Protocol Survive the Durban Climate Talks?*, GUARDIAN, Oct. 10, 2011, www.theguardian.com/sustainable-business/durban-climate-talks-kyoto-protocol. The convention brought together negotiators and campaigners from all over the world in an effort to create a collective solution to the question of global climate change. The convention ended with a refusal to ratify the Kyoto Protocol, an international treaty providing a framework for collective GHG reduction. *Id.*

[11] *See generally* Broder, *supra* note 8.

[12] Kirby, *supra* note 10 ("The developing countries want to keep the Protocol, the only legally binding agreement requiring the rich world to make necessary (but far from sufficient) cuts in emissions of greenhouse gases. The U.S. has refused to ratify the Protocol, saying it won't accept constraints that do not apply to the world's other principal greenhouse polluter, China. And China, like other developing countries, is exempt from Kyoto's provisions. The European Union and other industrialized countries say the U.S. will never ratify Kyoto, and that therefore the world should let it die and work instead on some new and as yet undefined way to reduce emissions.").

[13] *See generally* Broder, *supra* note 8.

[14] Nicole Miller et al., *Policy, Urban Form, and Tools for Measuring and Managing Greenhouse Gas Emissions: The North American Problem*, 80 U. COLO. L. REV. 977, 977-98 (2009) ("The scale of intervention required to reduce and adapt to the effects of climate change will require action at all levels of government and society.").

[15] CAL. CODE REGS. tit. 17 §§ 95480-95490 (Westlaw 2014).

California Global Warming Solutions Act of 2006 (GWSA).[16] Billed as a comprehensive effort to reduce California's GHGs by 15% in 8 years, CARB puts forth an annually declining state-wide "cap" on GHG emissions, coupled with the ability to "trade" excess emissions credits.[17] CARB's basis for this declining cap is the LCFS, which measures the carbon intensity for all major fuels present in the current energy market.[18] Such a program is expected to reward companies that produce fuels with low GHG emissions, companies that continue to invest in the development of alternative fuels, while their excess emissions can be purchased by otherwise non-compliant entities as credits.[19]

Unfortunately, rather than successfully pioneering green policy, California's LCFS has met strong opposition from lawmakers and the energy industry alike. This Comment examines the implementation and perceived effectiveness of measures like California's LCFS. The following Parts explore the United States' arrested development in implementing effective market-based measures to reduce GHGs, and how a market-based approach to incentivize fuel innovation is simply one facet in addressing the complex issue of global climate change.[20]

Part I addresses the science of global warming, identifying the immediate need to transition from an economy reliant on fossil fuels to one buoyed by the promise of new, zero-emission fuels. Part II provides background on how current notions of federalism shape environmental policy and the obstacles that have hindered comprehensive efforts to reduce GHG emissions in the United States. Part III chronicles the feverish debate over California's LCFS and how a federal market-based plan to reduce GHG emissions is vital to the United States. Part IV proposes ways Congress can go about employing a low carbon fuel standard in a market-based approach to GHG reduction. Part IV presents two trains of thought on how Congress can craft policy that will stimulate innovation in alternative fuels while reducing overall GHG emissions.

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[16] CAL. HEALTH & SAFETY CODE § 38500 et seq. (West 2014); s*ee also California Proceeds with Cap-and-Trade Program*, 4002 PUR UTIL. REG. NEWS 1, 1 (2011).

[17] *See also California Proceeds with Cap-and-Trade Program*, 4002 PUR UTIL. REG. NEWS 1, 1 (2011).

[18] CAL. CODE REGS. tit. 17 § 95482 (Westlaw 2014); *see also* Debra Kahn, *California Adopts Low-Carbon Fuel Standard*, SCI. AM., Apr. 24, 2009, www.scientificamerican.com/article.cfm?id=california-adopts-low-car.

[19] Kahn, *supra* note 18, *Id.*

[20] Robert L. Glicksman, *Climate Change Adaptation: A Collective Action Perspective on Federalism Considerations*, 40 ENVTL. L. 1159, 1164 (2010) ("If a 'one size fits all' approach was ill-suited to pollution control regimes, it is likely to be that much more problematic when addressing climate change adaptation issues." (footnote omitted)).

I. MAKING A HUGE MISTAKE: FOSSIL FUELS, THE U.S. TRANSPORTATION SECTOR, AND THEIR CONTRIBUTIONS TO THE GREENHOUSE EFFECT

Understanding the expansive nature of global warming requires an examination of how human actions contribute to the overall greenhouse effect that warms our planet.[21] Global climate change is a product of how GHGs—namely water vapor (H_2O), carbon dioxide (CO_2), methane (CH_4), and nitrous oxide (N_20)—absorb and trap energy from the sun, increasing Earth's temperature year to year.[22] While fluctuations in the Earth's temperature have generally occurred over time, and GHGs form through natural processes, Earth's continuous temperature increases since the Industrial Revolution suggest that natural processes are not the only catalysts for climate change.[23]

Increased concentrations of GHGs, to levels well beyond their long-term averages, provide the clearest indication that Earth's warming is the result of something other than natural causes. According to the IPCC, pre-Industrial Revolution atmospheric levels of CO_2, CH_4, and N_20 averaged around 280 parts per million (ppm),[24] with current levels averaging around 391 ppm.[25] IPCC's monitoring further suggests that current concentrations of CO_2, CH_4, and N_2O exceed the highest concentrations recorded in Earth's ice cores within the past 800,000 years.[26]

Of all the GHGs present in our atmosphere, CO_2 deserves special attention because increases in CO_2 are directly tied to human activities.[27] According to the IPCC, an increased reliance on fossil fuels is responsible for the increase in CO_2 concentrations in the post-Industrial Revolution era.[28] Global CO_2 emissions directly attributable to fossil

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[21] Edward Cameron, *The Human Dimension of Global Climate Change*, 15 HASTINGS W.-NW. J. ENVTL. L. & POL'Y 1, 2 (2009) ("[T]he atmospheric concentrations of greenhouse gases have increased markedly as a result of human activities . . . .").

[22] *See generally Causes of Climate Change*, *supra* note 3.

[23] *Id.*

[24] STOCKER ET AL., *supra* note 5, at 100.

[25] *Id.* at 11 ("In 2011 the concentrations of these greenhouse gases were 391 ppm [. . .] and exceeded the pre-industrial levels by about 40%, 150%, and 20%, respectively.").

[26] *Id.* ("Concentrations of CO_2, CH_4, and N_2O now substantially exceed the highest concentrations recorded in ice cores during the past 800,000 years. The mean rates of increase in atmospheric concentrations over the past century are, with *very high confidence*, unprecedented in the last 22,000 years.").

[27] *See* Morgan Brubaker, Comment, *Dream of Californication: Constitutional Questions Put the Brakes on the Nation's First Low Carbon Fuel Standard*, 22 VILL. ENVTL. L.J. 57, 57-58 (2011).

[28] STOCKER ET AL., *supra* note 5, at 17 ("It is extremely likely that more than half of the observed increase in global average surface temperature from 1951 to 2010 was caused by the

fuel consumption increased by 3.2% per year on average during 2000–2009, compared to 1.0% in the 1990s and 1.9% in the 1980s.[29] CO_2 concentrations rose by 7.8 pentagrams of carbon per year[30] during 2000–2009, relative to the 6.4 pentagrams per year during the 1990s, and 5.5 pentagrams per year during 1980s.[31] The rise in CO_2 concentration is intimately tied to the process of global warming, accounting for "changes in arctic temperatures and ice, widespread changes in precipitation amounts, ocean salinity, wind patterns and aspects of extreme weather, including droughts, heavy precipitation, heat waves, and the intensity of tropical cyclones."[32] In other words, not only is the rise in CO_2 concentration occurring at an unprecedented rate, its global impact is being felt on an unprecedented scale.[33]

The United States emitted roughly 6702 million metric tons of carbon equivalent[34] in 2011, primarily through the use of petroleum

anthropogenic increase in greenhouse gas concentrations and other anthropogenic forcings together. The best estimate of the human-induced contribution to warming is similar to the observed warming over this period.").

[29] STOCKER ET AL., *supra* note 5, at 489. These figures include 4% overall emissions from cement production during the relevant time periods. *Id.*

[30] 1 pentagram of carbon is the equivalent of 1 billion metric tons.

[31] STOCKER ET AL., *supra* note 5, at 489. These figures include 4% overall emissions from cement production during the relevant time periods, as well as their standard deviation. The error rates for the relevant decades are as follows: ± 0.6 for 2000-2009, ± 0.5 for 1990-1999, and ± 0.4 for 1980-1989. *Id.*

[32] *See* SUSAN SOLOMON ET AL., *Direct Observations of Recent Climate Change*, *in* CLIMATE CHANGE 2007: THE PHYSICAL SCIENCE BASIS, WORKING GROUP I CONTRIBUTION TO THE FOURTH ASSESSMENT REPORT OF THE INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE (2007) *available at* www.ipcc.ch/publications_and_data/ar4/wg1/en/spmsspm-direct-observations.html. One specific example is the rise sea levels due to the Earth's increased global temperature melting the polar ice caps at a faster rate. The IPCC found that the global average sea level rose at a rate of 1.8 mm per year during 1961 to 2003. IPCC also found that the rate was faster over 1993 to 2003: About 3.1 mm per year. *Id.* tbl.SPM.1.

[33] E. Britt Bailey, Comment, *From Sea to Rising Sea: How Climate Change Challenges Coastal Land Use Laws*, 33 U. HAW. L. REV. 289, 292 (2011) ("Even if human-related emissions levels stabilized, the accumulated concentration of greenhouse gas emissions would continue to cause warming well into the next century, inducing many changes in the global climate system during the twenty-first century that will likely be larger than those observed during the twentieth century. Based on the modeling of six possible emission scenarios, the IPCC projects that temperatures will increase between 1.8 and 4.0 degrees Celsius, or a change of about four degrees Fahrenheit, by 2099 . . . ." (footnotes omitted)).

[34] *Sources of Greenhouse Gas Emissions*, *Climate Change*, U.S. EPA, www.epa.gov/climatechange/ghgemissions/sources.html (last updated Apr. 17, 2014). Overall emissions from fossils fuels are converted to their carbon dioxide equivalent, or "carbon equivalent." This allows scientists and policymakers to compare GHG emissions using one emission type and concentration. Carbon equivalent is calculated using the emission's Global Warming Potential (GWP). This practice was popularized by IPCC's 2007 Working Group I. *See* SUSAN SOLOMON ET AL., CLIMATE CHANGE 2007: THE PHYSICAL SCIENCE BASIS, WORKING GROUP I CONTRIBUTION TO THE FOURTH ASSESSMENT REPORT OF THE INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE,

products and coal.[35] In 2012, the American economic sector produced these CO_2 emissions as follows: electricity production (32%), transportation (28%), commercial residential ventures (10%), agriculture (10%), and industry (20%).[36] The transportation sector is of particular importance—the U.S. and China's transportation sectors each produce more CO_2 than any other nation's total, overall CO_2 emissions.[37]

Since the 1980s, CO_2 emissions increased more in the U.S. transportation sector than in any other domestic industry.[38] Although the recession has slowed the gradual growth of CO_2 emissions from the transportation sector,[39] the U.S. Energy Information Administration's Annual Energy Outlook predicts CO_2 emissions will continue to grow at a rate of 0.2% per year through 2035.[40] Therefore, any serious talk about GHG reduction must address a change within the transportation sector, the portion of our domestic economy that is continuing to grow and is still largely dependent on GHG-producing fossil fuels.[41]

II. NO TOUCHING: FEDERALISM AND HOW GOVERNMENTAL SEPARATION HAS SLOWED THE IMPLEMENTATION OF NOVEL ENVIRONMENTAL POLICY

Discussing the implementation of environmental policy requires an examination of how modern notions of federalism imbue federal, state, and local government actors with the authority to set policy. This Comment focuses specifically on the notion of environmental federalism, which "should be understood to refer more broadly to the study of the normative and positive consequences of the shared role of national and subnational units of government in controlling environmental

(2007) *available at* www.ipcc.ch/publications_and_data/ar4/wg1/en/ch2s2-10-2.html (illustrating the GWP of various GHG emissions).

[35] *Sources of Greenhouse Gas Emissions*, *supra* note 34.

[36] *Id.*

[37] *See* David L. Green & Andrea Schafer, *Reducing Greenhouse Gas Emissions from U.S. Transportation* 2-6 (May 2003), *available at* www.c2es.org/docUploads/ustransp.pdf.

[38] *Id.*

[39] *See generally The Close Tie Between Energy Consumption, Employment, and Recession*, OURFINITEWORLD.COM (Sept. 17, 2012), http://ourfiniteworld.com/2012/09/17/the-close-tie-between-energy-consumption-employment-and-recession/ (illustrating how energy consumption is tied to employment, so that in times of lower employment there is less energy expended and therefore less GHGs emitted).

[40] *See Metric of the Month: February 2012—Energy-Related Carbon Dioxide Emissions*, INSTITUTE FOR 21ST CENTURY ENERGY 2 (Feb. 2012), www.energyxxi.org/sites/default/files/file-tool/MetricoftheMonth-FEB12CO2Emissions.pdf.

[41] *See* SANYA CARLEY ET AL., *Innovation in the Auto Industry: The Role of the U.S. Environmental Protection Agency*, 21 DUKE ENVTL. L. & POL'Y F. 367, 367-68 (2011) (discussing petroleum dependence in the transportation sector).

problems."[42] Within this shared responsibility to control environmental problems like global warming rests a fragile tension over which governmental entity has the authority to set policy, which ultimately impacts the form of such policy. The following Subparts explore how current notions of environmental federalism have slowed the creation and implementation of GHG-reduction measures in the United States.

A. FAKEBLOCK[43]: OBSTACLES AND OVERSIGHTS WITHIN MODERN ENVIRONMENTAL FEDERALISM

GHGs like CO_2 are airborne agents, and efforts to control their concentrations require an examination of the Clean Air Act (CAA).[44] Congress enacted the CAA in 1970 to function as the basis for national ambient air quality standards and hazardous air pollutant standards, as well as mechanisms to produce such limitations.[45] While the CAA provides ample opportunities for federal, state, local, and non-governmental agencies to participate in creating pollution control measures, the CAA is not without limitations in respect to preemptive federalism. [46] Many of the CAA's provisions function as top-down mandates, setting pollution limits or compliance measures, while allowing federal agencies and state governments to act as architects in

[42] WILLIAM M. SHOBE & DALLAS BURTRAW, UNIVERSITY OF VIRGINIA CENTER FOR ECONOMIC AND POLICY STUDIES, RETHINKING ENVIRONMENTAL FEDERALISM IN A WARMING WORLD 2 (Jan. 17, 2012), *available at* http://econ.ccps.virginia.edu/RePEc_docs/ceps_docs/RethinkingEnvFederalism_wp12-01.pdf.

[43] During *Arrested Development's* fourth season, George Michael Bluth (played by Michael Cera) tricked his father, Michael Bluth (played by Jason Bateman), into thinking he is developing a privacy app called "Fakeblock." The app was described as an anti-social network that builds a wall around one's online privacy, when it reality, George Michael was developing a music app that emulated the percussion of a wood block. The isolationist sentiment of George Michael's supposedly anti-social network serves as an appropriate parallel to the artificial separatism that runs throughout environmental federalism. The following Section details how this separatism affects the creation and implementation of environmental policy in the United States. *See generally Fakeblock*, ARRESTED DEVELOPMENT WIKI http://arresteddevelopment.wikia.com/wiki/Fakeblock (last visited May 14, 2014); *see also* Sarah A. Downey, *Ode to Arrested Development's Fakeblock from a Real Privacy Company*, THE ONLINE PRIVACY BLOG—ABINE, May 29, 2013, www.abine.com/blog/2013/fakeblock/ (last visited May 14, 2014) (discussing the anti-social network aspect of Fakeblock in more detail).

[44] Clean Air Act, 42 U.S.C.A. § 7401 et seq. (Westlaw 2014).

[45] Clean Air Act, 42 U.S.C.A. § 7401(c) (Westlaw 2014) ("A primary goal of this chapter is to encourage or otherwise promote reasonable Federal, State, and local governmental actions, consistent with the provisions of this chapter, for [air] pollution prevention."); *see generally Background of the Federal Clean Air Act*, CAL. AIR RESOURCES BOARD, www.arb.ca.gov/fcaa/fcaa.htm (last updated Apr. 14, 2010).

[46] *See* Hari M. Osofsky, *The Future of Environmental Law and Complexities of Scale: Federalism Experiments with the Climate Change Under the Clean Air Act*, 32 WASH. U. J.L. & POL'Y 79, 83-86 (2010).

designing the implementation of their own pollution controls.[47] In its most ideal setting, the CAA lays out a cooperative division of responsibility built to shift over time,[48] with states providing pressure for federal standards and industry reform, while federal agencies provide minimum guidelines as well as legislative stability.[49]

Successful measures adopted through the CAA's framework of environmental federalism are typically lauded because of their flexibility. For example, Title IV of the 1990 CAA Amendments sought to reduce sulfur dioxide emissions through annually increasing emission reduction targets, while allowing utilities to self-regulate in achieving those limits.[50] Title IV allowed utilities that emit sulfur dioxide to use low-sulfur burning coal, install pollution control devices,[51] or trade emissions credits with entities operating below the yearly sulfur dioxide limit.[52] As of 1997, these utilities had not only met their sulfur dioxide reduction goals but had built up excess credit reserves[53] equating to the reduction of about six million tons in sulfur dioxide.[54] "By 2007, annual emissions had declined below the [program's] 9 million ton goal (a 43% reduction

[47] *Id.* ("For example, states create implementation plans for meeting the national air quality standards.").

[48] *Id.* at 90 ("The relevant mechanisms of the CAA allow complex regulatory dynamics that involve state dominated action and federal decision making, state-federal and state-state interactions, top-down and bottom-up pressure, and conflict and cooperation at different moments.").

[49] *See generally* J.R. DeShazo & Jody Freeman, *Timing and Form of Federal Regulation: The Case of Climate Change*, 155 U. PA. L. REV. 1499, 1504-10 (2007).

[50] 42 U.S.C.A. § 7651(b) (Westlaw 2014); *see generally The Clean Air Act Amendments of 1990*, U.S. EPA, http://epa.gov/air/caa/caaa_overview.html (last visited May 13, 2014).

[51] 42 U.S.C.A. § 7651n(c) (Westlaw 2014) (highlighting alternative methods of compliance for sulfur dioxide emitters under Title IV); *see Power Plant Emissions of Sulfur Dioxide and Nitrogen Oxides Continue To Decline in 2012*, U.S. ENERGY INFO. ADMIN. (Feb. 27, 2013), www.eia.gov/todayinenergy/detail.cfm?id=10151.

[52] 42 U.S.C.A. § 7651b (Westlaw 2014) (providing an overview of the sulfur dioxide credit program); *see also* Nadine Etienne, Note, *Should We Go Green for the Waxman-Markey Bill?*, 21 FORDHAM ENVTL. L. REV. 345, 349 (2010) ("Under the cap-and-trade model, the government establishes a maximum pollution limit ('cap') and allows parties to use markets to achieve the cap either by trading allowances or obtaining credits ('trade'). Accordingly, the polluters are free to use their allowances or purchase extra allowances from other polluters. A facility that reduces its amount of GHG emissions below its allowance limit may sell the excess." (footnotes omitted)).

[53] *See* ROBERT N. STAVINS ET AL., *What Can We Learn from the Grand Experiment? Lessons from SO_2 Allowance Trading*, 12 J. ECON. PERSP. no. 3, at 69-88, 71 (1998).

[54] While other emissions credit systems have used some form of the sulfur dioxide trading mechanisms popularized by Title IV of the 1990 CAA Amendments, a thorough examination of emissions trading is outside the scope of this Comment. This Comment touches on current trading schemes insofar as they relate to industry emissions targets, not the actual logistics or auctions that facilitate the trading of credits themselves.

from 1990 levels),"[55] illustrating that Title IV's ultimate success is the full realization and execution of environmental federalism.

However, successes such as Title IV are exceptions and not the rule. The battle in U.S. environmental policy centers on disputes over the scope of existing authority to regulate or promulgate pollution standards.[56] States and federal entities struggle over their ability to create comprehensive GHG reform because federalism concerns pit inflexible federal ceilings against inconsistent state regulations, rather than apportioning each task to the governmental level best equipped to handle it.[57] Ultimately, the standards that result from any level of government involvement are either too lenient or too limited to assist in achieving sustainable GHG reductions within the transportation sector.[58]

Massachusetts v. EPA[59] illustrates the legislative disconnect emblematic of modern environmental policy. The U.S. Supreme Court decision in *Massachusetts* came nearly four decades after the CAA was enacted, holding that the EPA was authorized to "regulate greenhouse gas emissions from new motor vehicles in the event that it forms a 'judgment' that such emissions contribute to climate change."[60] The decision came in spite of the fact that GHGs have affected the Earth's temperature since the Industrial Revolution,[61] and that the CAA's sweeping definition of air pollutant includes nearly any physical or chemical substance emitted into the air.[62] In other words—it took over forty years to determine which governmental entities could regulate CO_2.

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[55] ROBERT N. STAVINS ET AL., *The US Sulphur Dioxide Cap and Trade Programme and Lessons for Climate Policy*, VOX (Aug. 12, 2012), www.voxeu.org/article/lessons-climate-policy-us-sulphur-dioxide-cap-and-trade-programme.

[56] *See* Brian T. Burgess, Note, *Limiting Preemption in Environmental Law: An Analysis of the Cost-Externalization Argument and California Assembly Bill 1493*, 84 N.Y.U. L. REV. 258, 266 (2009) (exploring the interstate effects of current environmental federalism, suggesting a balance between the right amount of cost-externalization protection and decentralized policymaking).

[57] *See generally* DeShazo & Freeman, *supra* note 49, at 1503-06.

[58] *Id.* at 1522 ("[T]o the dismay of environmentalists, the state measures are not likely to produce large reductions nationally. Few states have set clear emissions reductions targets, and fewer still have designed policies to achieve them. Even the most ambitious state targets are strikingly low, the deadlines generous, and the percentage of emitters covered quite limited.").

[59] Massachusetts v. EPA, 549 U.S. 497 (2007).

[60] *Id.* at 525; *see also* Michael B. Gerrard & J. Cullen Howe, *Global Climate Change: Legal Summary*, SS028 ALI-ABA 583, 613 (2011).

[61] *See* STOCKER ET AL., *supra* note 5, at 11.

[62] Massachusetts, 549 U.S. at 528-9 (The Clean Air Act's sweeping definition of 'air pollutant' includes "*any* air pollution agent or combination of such agents, including *any* physical, chemical . . . substance or matter which is emitted into or otherwise enters the ambient air . . . ." § 7602(g) (emphasis added). On its face, the definition embraces all airborne compounds of whatever stripe, and underscores that intent through the repeated use of the word "any."); *see also* 42 U.S.C.A. § 7602(g) (Westlaw 2014).

Congress could have settled this issue far sooner, given the scientific research available in the late 1960s, research that detailed the steady rise in CO_2 concentrations and its potential to alter the planet's temperature.[63]

Federal ambiguity also mutes the effectiveness of novel GHG reduction measures like the U.S. Renewable Fuel Standard (RFS), found within the CAA.[64] In an effort to promote the production of renewable fuels with lower GHG emissions, the RFS charges EPA with setting annual volumetric targets for refineries and fuel blenders.[65] The RFS requires EPA to "promulgate regulations to ensure that gasoline sold or introduced into commerce . . . contains the applicable volume of renewable fuel,"[66] in the hopes that U.S. refineries continue to develop fuels from renewable sources while reducing its consumption of fossil fuels.[67]

Yet unlike Title IV, under which federal mandates promoted the use of available alternatives to reduce sulfur dioxide, nothing in the RFS specifies the mechanisms states may use to produce these volumetric targets[68] or how states should continue to refine renewable fuels overtime. Though the EPA is responsible for assessing yearly targets based on current nationwide production capability, there are concerns regarding the means to produce current renewable fuels (corn-based ethanol[69] being the most popular), and how their long-term use might

[63] *See generally* Justin Gillis, *A Scientist, His Work and a Climate Reckoning*, N.Y. TIMES, Dec. 21, 2010, *available at* www.nytimes.com/2010/12/22/science/earth/22carbon.html?pagewanted=all. This article discusses the legacy and research of Dr. Charles David Keeling. Keeling's work developed the methods used for measuring atmospheric CO_2 concentrations in the early 1950s. "By the late 1960s, a decade after Dr. Keeling began his measurements, the trend of rising carbon dioxide was undeniable, and scientists began to warn of the potential for a big increase in the temperature of the earth." *Id.*

[64] 42 U.S.C.A. § 7545 (Westlaw 2014).

[65] *United States Low Carbon Fuel Policies*, INT'L COUNCIL ON CLEAN TRANSP. (Apr. 12, 2011), *available at* www.theicct.org/us-low-carbon-fuel-policies.

[66] 42 U.S.C.A. § 7545(o)(2)(A) (Westlaw 2014).

[67] 42 U.S.C.A. § 7545(o)(1)(J) (Westlaw 2014) ("The term 'renewable fuel' means fuel that is produced from renewable biomass and that is used to replace or reduce the quantity of fossil fuel present in a transportation fuel.").

[68] Jamie Konopacky, Comment, *Refueling Biofuel Legislation: Incorporating Social Sustainability Principles to Protect Land Rights*, 30 WIS. INT'L L.J. 401, 406 (2012) ("Although the RFS2 legislation begins to address environmental sustainability, its provisions are minimal at best. The only environmental conditionality in the law is a requirement that biofuels being used to reach the blending targets reduce greenhouse gas emissions below the level of traditional fuels.").

[69] Timothy A. Wise, *U.S. Corn Ethanol Fuels Food Crisis in Developing Countries*, ALJAZEERA, Oct. 10, 2012, www.aljazeera.com/indepth/opinion/2012/10/201210993632838545.html ("Ethanol now consumes roughly 40 per cent of the US corn crop, up from just 5 per cent a decade ago. The biggest jump came after the US Congress enacted the RFS in 2005 then expanded it dramatically in 2007.").

affect states disproportionally.[70] Furthermore, the RFS has yielded volumes of renewable fuels well below federal volumetric targets, which is unsurprising given the measure's weak federal guidance.[71]

GHG reduction measures rarely succeed without strong federal guidance, and strong federal guidance is typically absent. Within this void of federal silence, states have been left to fashion their own GHG reduction schemes. California is one such state, having developed a market-based approach to reduce its GHG emissions. However, as the following Subpart illustrates, the strict governmental separation found in modern federalism has slowed California's efforts to reduce statewide GHG emissions.

B. EGGS IN ONE BASKET: CALIFORNIA'S LOW CARBON FUEL STANDARD AND ITS GAMBIT TO OVERCOME FEDERAL INACTION

After a long history of GHG reduction policies lacking in tangible environmental benefits, California enacted the GWSA.[72] The GWSA grants CARB the authority to fashion market-based emission reductions that increase annually for sources or categories that produce GHGs.[73] Emission limits are measured by the LCFS, which assesses the total GHG emissions of a fuel's life cycle—its "carbon intensity."[74] A fuel's carbon intensity is calculated by considering its direct emissions (production, transportation, and use) and indirect effects (changes in land

[70] *See generally* Ned Stowe, *Should We Waive the Renewable Fuel Standard in the Wake of the Drought?*, RENEWABLEENERGYWORLD.COM, Sept. 24, 2012, www.renewableenergyworld.com/rea/news/article/2012/09/q-a-on-waiving-renewable-fuel-standard-in-the-wake-of-the-2012-heat-wave-and-drought?page=all (discussing the 2012 drought and its affect on corn prices).

[71] Todd Woody, *The Brutal Bust in Next-Generation Biofuels in One Chart*, ATLANTIC, Apr. 23, 2014, www.theatlantic.com/technology/archive/2014/04/the-brutal-bust-in-next-generation-biofuels-in-one-chart/361104/ ("The official 2013 target official for cellulosic biofuel—made from the non-edible parts of plants, wood waste and other non-food feedstocks—was 1.75 billion gallons. That was the volume of biofuels Congress mandated that oil refiners blend with gasoline in an effort to fight climate change. The EPA subsequently slashed that target to 6 million gallons last year. And on Earth Day yesterday the agency finally came down to earth and issued a retroactive target to reflect the actual production of biofuels in 2013. The number: 810,185 gallons.").

[72] CAL. HEALTH & SAFETY CODE § 38500 et seq. (Westlaw 2014).

[73] CAL. HEALTH & SAFETY CODE § 38561 (Westlaw 2014) (illustrating how the state board is responsible of developing a compliance plan to reduce California's overall GHG emissions by 2020); *see also* CAL. CODE REGS. tit. 17 § 95480 (Westlaw 2014) (identifying the implementation of a low carbon fuel standard under the GWSA); *see generally Assembly Bill 32: Global Warming Solutions Act*, CAL. ENVTL. PROTECTION AGENCY—AIR RESOURCES BOARD, www.arb.ca.gov/cc/ab32/ab32.htm (last visited Mar. 10, 2014).

[74] CAL. CODE REGS. tit. 17 § 95482 (Westlaw 2014); *see also* Todd J. Guerrero, *Lawsuit: LCFS Violates US Constitution*, ETHANOL PRODUCER MAG., Jan. 4, 2010, www.ethanolproducer.com/articles/6246/lawsuit—lcfs-violates-us-constitution.

use), measuring the overall GHG impact at every stage of its development.[75] The GWSA charges the CARB with setting the LCFS's carbon intensity measurements as new alternative fuels are introduced to the marketplace, or as manufacturing methods change, producing fuels with fewer GHG emissions.[76]

California's LCFS features a "cap-and-trade" framework.[77] CARB sets annually increasing reduction targets for GHG emissions based on the LCFS, while non-compliant entities are able to purchase emissions credits from fuel producers and blenders that emit GHGs under the annual threshold.[78] Entities participating in the program are able to meet part of their compliance obligations through the trading and purchase of these credits.[79] From there, the cap is reduced annually in the continued effort to cut 15% of California's GHG emissions by 2020.[80]

Despite being the first of its kind regulation to implement a life cycle measurement for GHG emissions, California's LCFS faces familiar federalism challenges when it comes to the scope of its reach. *Rocky Mountain Farmers Union v. Goldstene*[81] placed California's LCFS firmly in its cross hairs, challenging the state's ability to promulgate such a market measure. The U.S. District Court for the Eastern District of California held the LCFS was unconstitutional, violating the Commerce

[75] CAL. CODE REGS. tit. 17 § 95481(16) (Westlaw 2014) ("'Carbon intensity' means the amount of lifecycle greenhouse gas emissions, per unit of energy of fuel delivered, expressed in grams of carbon dioxide equivalent per megajoule (gCO2E/MJ)."); 17 § 95481(38) ("'Lifecycle greenhouse gas emissions' means the aggregate quantity of greenhouse gas emissions (including direct emissions and significant indirect emissions such as significant emissions from land use changes), as determined by the Executive Officer, related to the full fuel lifecycle, including all stages of fuel and feedstock production and distribution, from feedstock generation or extraction through the distribution and delivery and use of the finished fuel to the ultimate consumer, where the mass values for all greenhouse gases are adjusted to account for their relative global warming potential.").

[76] *Assembly Bill 32: Global Warming Solutions Act*, *supra* note 73.

[77] CAL. CODE REGS. tit. 17 § 95485 (Westlaw 2014) (illustrating how emmissions credits are calculated for compliant entities under the LCFS); *see also* Gerrard & Howe, *supra* note 60, at 633.

[78] CAL. CODE REGS. tit. 17 § 95488 (Westlaw 2014); *see also* Gerrard & Howe, *supra* note 60, *Id.*

[79] 17 § 95488 (providing an overview of the trading program for emission credits under the LCFS); *see also* Gerrard & Howe, *supra* note 60, *Id.* ("In 2012, CARB will distribute emission allowances equal to the declining cap. During the first few years of the program, CARB has proposed allocating most of the allowances for free.").

[80] Gerrard & Howe, *supra* note 60, *Id.* ("These draft rules establish a phased in compliance framework designed to reduce the state's emissions to approximately 15% below 2012 levels by 2020.").

[81] Rocky Mountain Farmers Union v. Goldstene, 843 F. Supp. 2d 1071 (E.D. Cal. 2011), *rev'd sub nom.* Rocky Mountain Farmers Union v. Corey, 730 F.3d 1070 (9th Cir. 2013), *petition for cert. filed*, 82 U.S.L.W. 3598 (U.S. Mar. 20, 2014) (nos. 13-1148, 13-1149), *petition for cert. filed* (U.S. Apr. 21, 2014) (no. 13-1308).

Clause by ascribing a higher carbon intensity rating to out-of-state ethanol producers using Midwest corn.[82] Though ethanol produced in California is chemically identical[83] to the ethanol produced outside its borders, the district court held that the difference in their carbon intensity disadvantaged out-of state producers[84] doing business in California, thereby insulating the state's own ethanol market in the process.[85] The court held that the California overstepped its jurisdictional authority in enacting the LCFS, because the carbon intensity's effect on out-of-state producers amounted to a regulation of interstate commerce, a power reserved to the federal government under the Commerce Clause.[86] The Ninth Circuit has since reversed the district court's ruling, holding that California's LCFS does not violate the Commerce Clause,[87] but *Rocky Mountain's* slow litigious crawl[88] to the United States Supreme Court also illustrates a larger problem with the parameters of current environmental federalism.

Rocky Mountain exemplifies how the function of environmental policy is often debated more furiously than the feasibility of the measure itself. While states may bring about a regulatory "sweet spot," a point

[82] *Id.* at 1087 (noting plaintiffs' allegation that using the life cycle measurements to account for all production, manufacturing, transportation, and land use, CARB assigned "Midwest ethanol over 10% higher carbon intensity over its California ethanol counterpart").

[83] *Id.* at 1088 ("While the ethanol made in the Midwest and California are physically and chemically identical when ultimately mixed with petroleum, and while the pathways may be the similar, this Court appreciates that the carbon intensities of these two otherwise-identical products are different according to lifecycle analysis.").

[84] *Id.* at 1089 ("Defendants admit that in California there is a price difference between the 90.1 CI corn ethanol and the 98.4 CI corn ethanol." (citation and internal quotation marks omitted)).

[85] *Id.* ("[T]he pressure the LCFS puts on out-of-state competitors to reduce its CI score to become equal to those scores in California makes doing business in the state more costly for out-of-state companies relative to in-state firms." (citation, internal quotation marks, brackets, and ellipsis omitted)).

[86] *Id.* at 1091 ("States and localities may not attach restrictions to imports in order to control commerce in other States. Doing so would extend the State's police power beyond its jurisdictional bounds." (citation, internal quotation marks, brackets, and ellipsis omitted)).

[87] Rocky Mountain Farmers Union v. Corey, 730 F.3d 1070, 1087–88 (9th Cir. 2013) ("Absent discrimination, we will uphold the law 'unless the burden imposed on [interstate] commerce is clearly excessive in relation to the putative local benefits.'"), *rev'g* Rocky Mountain Farmers Union v. Goldstene, 843 F. Supp. 2d 1071 (E.D. Cal. 2011), *petition for cert. filed*, 82 U.S.L.W. 3598 (U.S. Mar. 20, 2014) (nos. 13-1148, 13-1149), *petition for cert. filed* (U.S. Apr. 21, 2014) (no. 13-1308).

[88] *See* Carolyn Whetzel, *Ethanol Groups Seek Supreme Court Review of California's Low-Carbon Fuel Standard*, BLOOMBERG BNA, Mar. 21, 2014, www.bna.com/ethanol-groups-seek-n17179888987/ ("The Renewable Fuels Association and Growth Energy filed a petition for writ of certiorari March 20, challenging an appellate court decision that reversed a district court's finding that the fuel standard discriminates against out-of-state commerce and is an extraterritorial regulation.").

where both industry and state unrest prompts federal action,[89] such a strategy is passive in light of the quickly escalating threat of global climate change. Unfortunately, rather than functioning as a cooperative mechanism for lawmaking, current federalism[90] produces legislation that is either ill-fitted or poorly implemented for present environmental and economic needs.[91]

While Congress languishes in providing strong, regulatory guidance, states are left to confront a second hurdle in developing successful GHG reduction policies. As discussed in Part I, meaningful GHG reduction must account for long-term economic sustainability within the transportation sector. Alongside this modern and limiting view of federalism, the economic interests relevant to transitioning away from fossil fuels present a unique challenge in creating feasible, market-based GHG reductions. The following Part explores these converging economic interests by examining the contested feasibility of California's LCFS.

III. HOT MESS: THE FIGHT OVER CALIFORNIA'S LOW CARBON FUEL STANDARD AND ITS LONG-TERM FEASIBILITY

Federalism concerns are not the only concerns slowing the implementation of GHG reduction policies. Maintaining regional

[89] DeShazo & Freeman, *supra* note 49, at 1559 ("By unnerving industry while leaving environmentalists unsatisfied, they have created the perfect conditions under which both pro-regulatory and anti-regulatory constituencies will simultaneously appeal to the federal government for relief. This illustrates how states can be incremental catalysts of a federal policy response, increasing the likelihood that Congress will act sooner rather than later.").

[90] J.B. Ruhl, *Thinking of Environmental Law as a Complex Adaptive System: How To Clean up the Environment by Making a Mess of Environmental Law*, 34 HOUS. L. REV. 933, 981-82 (1997), ("It is no surprise, therefore, that a central and raging debate in environmental law focuses on the balance of power between state and federal governments and the merit of the system of so-called 'cooperative federalism' that has been in place for twenty-five years and under which the federal government has taken the policy-shaping and standard-setting role for the states and their local subdivisions. That debate, however, largely ignores the qualities that complexity theory suggests are needed in adaptive systems. To be truly adaptive, the environmental law system must be able to operate with many coupled patches arrayed on a variety of nested, coupled levels of organization, including levels intermediate in structure to the bottom (local) and top (federal) of the system.").

[91] Robert L. Glicksman, *From Cooperative to Inoperative Federalism: The Perverse Mutation of Environmental Law and Policy*, 41 WAKE FOREST L. REV. 719, 777 (2006) ("Congress has narrowed the responsibilities of some federal agencies to consider the adverse environmental implications of their decisions by creating categorical exclusions from NEPA. It also has exempted some federal activities, primarily military activities, from pre-existing statutory constraints on their ability to pollute. In addition, Congress has made it more difficult for federal agencies such as EPA to restrict environmentally damaging conducted by others, in part by burying those agencies under a mountain of analytical paperwork and by requiring agencies to employ analytical techniques that are inherently inimical to the protection of environmental values that are difficult to quantify.").

economic stability is a crucial component of sustainable GHG reduction, especially considering the link between the emission of GHGs and the transportation sector.[92] Using California's LCFS as an example, the constitutional questions outlined in Part II also coincide with industry concerns about the overall feasibility of California's novel market-based approach to GHG reduction.

Subpart A details the California refinery industry's concerns about the LCFS, such as (1) an insufficient supply of renewable fuels to meet declining LCFS emissions targets, (2) the LCFS negatively impacting the price of petroleum-based fuels, and (3) the LCFS causing a substantial harm to California's job market and economy. Subpart B explores a second series of studies tracking the first three years of the LCFS program. These studies suggest that the LCFS is making progress on several fronts with its ability to (1) advance alternative fuel technology, (2) create a surplus of carbon credits within the 2011-2013 compliance period, and (3) produce monetary savings for consumers throughout the LCFS's nine-year implementation. Despite the competing nature of these studies, what emerges in Subpart C is the realization that Congress must provide strong guidelines to help reduce GHG emissions, no matter how California's experiment pans out.

A. THERE IS ALWAYS MONEY IN THE PETROLEUM STAND[93]: THE REFINERY INDUSTRY FORECASTS DISASTER FOR CALIFORNIA'S LOW CARBON FUEL STANDARD

The refinery industry paints the LCFS as an unmitigated disaster. One of the first concerns the refining industry has is whether the current generation of renewable fuels[94] (ethanol[95] and biodiesel blends[96]) can be

[92] *See Sources of Greenhouse Gas Emissions*, *supra* note 33 (illustrating that the transportation sector accounted for 28% of the United States' overall GHG emissions as recently as 2011).

[93] Early in the first season of *Arrested Development*, Michael Bluth (played by Jason Bateman) informs his imprisoned father George Bluth Sr. (played by Jeffrey Tambor), that he has burned down Bluth's Original Frozen Banana Stand. The stand was owned by the Bluth Company and sold frozen bananas to the public, about which George Sr. often remarked, "There's always money in the banana stand." Michael burned the banana stand down as an act of protest against his father but failed to realize that George Sr. was being literal—that there was over $250,000 lining the inside of the banana stand's walls. The banana stand's function as a hidden rainy-day fund mirrors how the oil industry sees petroleum-based fuels, both as its lifeline and as its source of income. The following section details the refinery industry's reliance and concern surrounding the status of its rain-day fund—the fossil fuels that hold its financial well-being; *see generally Bluth's Original Frozen Banana Stand*, ARRESTED DEVELOPMENT WIKI (last visited May 3, 2014) http://arresteddevelopment.wikia.com/wiki/Bluth's_Original_Frozen_Banana_Stand.

[94] *See generally Biofuels Overview*, CENTER FOR CLIMATE & ENERGY SOLUTIONS, www.c2es.org/technology/overview/biofuels (last visited May 14, 2014) ("Biofuels encompass any

produced in sufficient quantities to meet increasing fuel demand, while supporting the LCFS's 15% GHG reduction target by 2020.[97] CARB projects an increase in California's ethanol demand, which could rise from 1875 million gallons in 2015 to 2689 million gallons a year by 2020.[98] Moreover, the carbon intensities for California and Midwest-produced ethanol are currently not compliant through 2020.[99] According to the California Energy Commission, the lack of local ethanol production also limits California's ethanol supply[100] as the state's ethanol consumption rose to roughly 1450 million gallons in 2010, with about 1350 million coming from out-of-state suppliers.[101] The refining industry points out that the largest exporter of LCFS-compliant ethanol is the sugarcane-based ethanol from Brazil, but Brazil's total ethanol export to the United States would not even cover California's needs during the

fuel produced from plant- or animal-based feedstock (referred to as 'biomass'). The two most common forms of biofuel today are ethanol and biodiesel. Biofuels are used primarily to fuel vehicles, but can also fuel engines or be used in fuel cells to generate electricity. As countries seek to reduce greenhouse gas emissions from the transportation sector and lessen dependence on petroleum-based fuels, biofuels continue to attract attention as one possible solution. Biofuels offer a way to produce transportation fuels from renewable sources or waste materials and to reduce net carbon dioxide (CO_2) emissions because the CO_2 emitted during combustion of the fuel is captured during the growth of the feedstock.").

[95] *Id.* ("Corn ethanol is the most widely used liquid biofuel in the United States. Most of this ethanol is blended into gasoline for use in passenger vehicles. Gasoline with up to 10 percent ethanol (E10) can be used in most vehicles without further modification, while special flexible fuel vehicles can use a gasoline-ethanol blend that has up to 85 percent ethanol (E85).").

[96] *Id.* ("Biodiesel is the other commonly used biofuel in the United States, primarily produced from soybean oil. The most common blend of U. S. biodiesel is 20 percent biodiesel/80 percent petroleum diesel (B20). Biodiesel can be legally blended with petroleum diesel in any fraction, though vehicle system modifications may be required for percentages higher than B20.").

[97] *See* FUELING CALIFORNIA, LOW CARBON FUEL STANDARD ISSUE BRIEF: A COMPREHENSIVE ANALYSIS OF CURRENT RESEARCH AND OUTLOOK FOR THE FUTURE 9 (Sept. 11, 2012), *available at* www.fuelingcalifornia.org/wpcms/wp-content/uploads/LCFS-Issue-Brief-FINAL.pdf; *see also* Gerrard & Howe, *supra* note 60, at 633.

[98] *See* CAL. AIR RES. BD., LOW CARBON FUEL STANDARD 2011 PROGRAM REVIEW REPORT 88 (Dec. 8, 2011), *available at* www.arb.ca.gov/fuels/lcfs/workgroups/advisorypanel/20111208_LCFS%20program%20review%20report_final.pdf. This is a conservative estimate. CARB also projects that ethanol need could rise to 2,742 million gallons by 2020. *Id.*

[99] ANDREW CHANG & CO., THE FISCAL AND ECONOMIC IMPACT OF THE CALIFORNIA GLOBAL WARMING SOLUTIONS ACT OF 2006, at 193 (June 2012), *available at* http://cmta.net/pdfs/CMTA%20-%20AB%2032%20Report-Final.pdf ("California and Midwest ethanol and electricity have carbon intensities above the 2020 standard.").

[100] *See* FUELING CALIFORNIA, *supra* note 97, at 11.

[101] GORDON SCHREMP, CAL. ENERGY COMM'N, RFS2, BIOFUEL SUPPLY, INFRASTRUCTURE & AGRICULTURAL ISSUES 20 (Sept. 9, 2011), *available at* www.energy.ca.gov/2011_energypolicy/documents/2011-09-09_workshop/presentations/Gorgon_Schremp_RFS2_Biofuel_Supply_Infrastructure_and_Agriculture_Issues.pdf.

lifetime of the LCFS.[102] Locally produced alternatives to Brazilian ethanol (such as cellulosic ethanol fermented from grains and soy biomass) are currently too underdeveloped provide a viable answer to California's growing ethanol needs, thereby calling the LCFS's 15% GHG emissions target into question.[103]

Second, the refinery industry also voices concerns about how compliance costs to reduce the carbon intensity of California's fuels will affect fuel prices for consumers. Fueling California[104] points out that of CARB's eleven compliance scenarios tracking the cost of gasoline and gasoline substitutes through 2020,[105] seven of these scenarios predict price increases as high as $0.09 a gallon, while only four scenarios forecast price decreases of any kind.[106] The refining industry also notes that all of CARB's scenarios forecast an increase in diesel prices, ranging from $0.17 a gallon to $0.23 a gallon through 2020.[107] Boston Consulting Group's (BCG)[108] study estimates that full implementation of the LCFS would create recovery costs in the range of $0.33 to $1.06 per gallon.[109] According to BCG, these projections point to a massive

[102] FUELING CALIFORNIA, *supra* note 97, at 11 ("CARB's analysis of the LCFS assumes up to 2.73 billion gallons of ethanol per year from sugarcane will be available for use in California by 2020. Virtually all sugarcane ethanol, which has lower carbon intensity than corn-based ethanol, comes from Brazil and according to CEC (California Energy Commission) data no Brazilian ethanol has been exported to the U.S. since 2009. The Brazilian government's own export projections, cited by the CEC, suggest only 500 million gallons of sugarcane ethanol will be sent to the entire U.S. market in 2020.").

[103] *Id.* ("Cellulosic ethanol is made from wood fiber or other waste plant materials and therefore has a much lower carbon intensity than corn ethanol. However, production of cellulosic ethanol is more difficult and has not yet reached commercial scale.").

[104] *See generally* Press Release, Fueling California, United, Chevron Among Members of New Group Looking To Impact California Fuel Policies (Aug. 19, 2009), *available at* www.fuelingcalifornia.org/newsroom/articles/united-chevron-among-members-of-new-group-looking-to-impact-california-fuel-policies. Fueling California is a nonprofit entity comprising refinery businesses and large fuel consumers such as Chevron, United Airlines, UPS, Union Pacific Railroad, Con-Way, Harris Ranch, Ambassador International and the Avis Budget Group. *See id.*

[105] FUELING CALIFORNIA, *supra* note 97, at 13; *see also* CAL. AIR RES. BD., *supra* note 96, at 129.

[106] FUELING CALIFORNIA, *supra* note 97, at 13; *see also* CAL. AIR RES. BD., *supra* note 96 at 129.

[107] CAL. AIR RES. BD., *supra* note 96, at 130.

[108] The Boston Consulting Group is a consulting firm that specializes in risk management and business strategy; *see Mission*, BOS. CONSULTING GROUP, www.bcg.com/about_bcg/vision/mission.aspx (last visited May 1, 2014) (describing BCG's mission); *see generally* Dana Hall, *Chevron and Its Allies Take Aim at California's Low Carbon Fuel Standard*, SAN JOSE MERCURY NEWS, Jan. 1, 2013, www.mercurynews.com/ci_22492404/chevron-and-its-allies-take-aim-at-californias (describing how The Boston Consulting Group's 2012 study of California's LCFS was commissioned by the Western States Petroleum Association).

[109] THE BOS. CONSULTING GRP., *Understanding the Impact of AB 32*, at 4 (June 19, 2012), *available at* www.secureourfuels.org/wp-content/uploads/2012/07/BCG_report.pdf; *see also*

disruption of California's economy and refinery capacity, challenging the LCFS's viability through 2020.[110]

The refining industry also believes that ethanol shortages and unrecovered compliance costs stand to cause a sizable disruption of California's economy.[111] BCG projects that the lack of available ethanol and biodiesel could result in the shutdown of approximately six California refineries during the 2015-2017 compliance period and approximately two more refineries if the LCFS is fully implemented.[112] Closures of that magnitude would account for a projected loss of approximately 28,000 manufacturing jobs and a shift toward reliance on foreign imports in order to satiate the state's demand for ethanol and biodiesel.[113] California also stands to lose up to $4.4 billion in tax revenue, mostly as uncollected fuel excise taxes, as these refineries are shut down.[114] Analysis by Stonebridge Associates, Inc.[115] indicates that the LCFS will disadvantage middle-class workers within the logistics departments of these refineries,[116] and that rising diesel costs will displace over 616,922 individuals working on containerization imports within the state.[117] Higher diesel prices will also discourage out-of-state businesses from exporting to California, and the state is primed to lose

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FUELING CALIFORNIA, s*upra* note 97, at 17 ("The cost of compliance could end up being much higher if the price per ton of carbon increases and becomes volatile (increasing to a total of $2.70 per gallon based on a $150/ton estimate) or if other states or the nation adopt similar LCFS policies. As well, the cost of compliance can fluctuate due to the availability of biofuels.").

[110] THE BOS. CONSULTING GRP., *supra* note 109, at 32-33 ("Without sufficient sugarcane or cellulosic ethanol or adequate LCFS credits, refiners will be unable to meet the LCFS and will be forced to cease production or export even more fuel, potentially resulting in disruption of fuels supply throughout California. While it is difficult to quantify the financial impact, we believe that this potential for disruption of California's fuels supply is sufficient to make LCFS unviable.").

[111] *See* FUELING CALIFORNIA, s*upra* note 97, at 19.

[112] *See* THE BOS. CONSULTING GRP., *supra* note 109, at 3.

[113] *Id.* This is a conservative estimate for BCG's calculations. They also predict fuel shortages and unrecovered compliance costs could displace up to 51,000 manufacturing jobs. *Id.*

[114] *Id.*

[115] Stonebridge Associates Inc. is an legislative consulting firm based in California; *see generally Services*, STONEBRIDGE, www.stonebridge-associates.com/services.html (last visited May 21, 2014) (describing Stonebridge Associates' client services). *See also Study Finds That "California-Only" Diesel Will Come at High Cost for State*, PR NEWSWIRE, Apr. 25, 2012, www.prnewswire.com/news-releases/study-finds-that-california-only-diesel-will-come-at-high-cost-for-state-148936795.html (describing how the California Trucking Association commissioned Stonebridge Associates' 2012 study on California's LCFS).

[116] *See* STONEBRIDGE ASSOCS., INC. THE IMPACT OF THE LOW CARBON FUEL STANDARD AND CAP AND TRADE PROGRAMS ON CALIFORNIA RETAIL DIESEL PRICES 3-5 (Apr. 25, 2012), *available at* http://caltrux.org/sites/default/files/CTALCFS.pdf.

[117] *Id.*

roughly $95.5 billion just tied to the price spike in diesel alone.[118] Taking into account projected ethanol shortages, spikes in fuel prices, and the hit to California's economy, the refining industry is largely pessimistic about the success of California's market-based approach to GHG reduction.

However, while the refining industry paints a grim picture of California's LCFS, such studies were conducted on the eve of the measure's implementation and by parties with a vested interest in fossil fuel consumption. In the three years since the LCFS rolled out its initial compliance period, several independent studies paint a far different picture of the LCFS's ability to transform the California fuel market while reducing the state's overall GHG emissions.

B. NOT EASY BEING GREEN: INDEPENDENTLY TRACKING THE PROGRESS OF CALIFORNIA'S LOW CARBON FUEL STANDARD

California's LCFS sets annual declining targets for the carbon intensity of California's fuels, with a carbon intensity reduction that starts at 0.25% in 2011 and increases to 10% by 2020.[119] Since 2011, several entities independent of the refinery industry have tracked the LCFS's effectiveness in reducing the carbon intensity of California's fuels, overall program compliance, and its economic effect on the state as a whole. Studies conducted by several departments at the University of California Davis (UC Davis), as well as a study from Mills College, examine the three-year beginning of California's LCFS to help provide insight about its long-term viability.

California's expanded implementation of renewable fuels within the 2011-2013 compliance period indicates that the LCFS is beginning to drive innovation within the renewable fuels market. UC Davis points out that "[a]lternative fuels under the [LCFS] program increased from 6.3% of total transport energy use in California in 2011 to 6.8% in the first half of 2013."[120] Moreover, the 2011-2013 compliance period suggests that

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[118] *Id.* at 4 (projecting job loss in the containerization imports sector amounting to "$68.5 billion in lost state domestic product, $21.7 billion in lost income and $5.3 billion in lose state and local taxes").

[119] Sonia Yeh & Julie Witcover, *Status Review of California's Low Carbon Fuel Standard January 2014 Issue*, U.C. DAVIS INST. TRANSP. STUD. Jan. 2014, at 2, *available at* www.its.ucdavis.edu/research/publications/publication-detail/?pub_id=2008 ("The standard requires reductions of 0.25%, 0.5%, and 1% in 2011, 2012, and 2013, respectively, below [carbon intensity] baselines established for conventional gasoline and diesel fuels sold in California. The standard requires a 2.5% [carbon intensity] reduction in 2015, and increases in stringency in subsequent years (reaching 10% reduction in 2020).").

[120] Yeh & Witcover, *supra* note 119, at 1.

local fuel production is already resulting in renewable ethanol alternatives that have lower carbon intensities to meet the LCFS declining annual targets. "[E]thanol's contribution (primarily using corn or grain mixes) [121] to LCFS credits[122] decreased from 70-80% in 2011 through 2013 Q1, to 52% in 2013 Q2 [with an] increasing share of biofuel LCFS credits [coming] from use of waste-based fuels (biodiesel/renewable diesel from tallow or waste oils and ethanol from beverage wastes)."[123] In response to BCG's 2012 study, UC Davis also notes that the contribution of several renewable fuels, rather than a one-for-one replacement for Brazil's sugarcane ethanol, could still keep refineries in compliance, while satiating California's fuel needs throughout the life of the LCFS.[124] The increase of LCFS-compliant renewables is significant because it illustrates the beginnings of alternative fuel innovation, as well as contribution toward the 15% GHG reduction from the use of low-carbon fuels.

Yet early industry compliance with the LCFS does more than drive innovation for the next generation of alternative fuels—it also results in the creation of carbon credits to stabilize future compliance costs for California refineries. During the reporting period for UC Davis's study (2011 Q1-2013 Q2), refineries complying with the LCFS generated 1.64 million carbon credits, 61% more credits than necessary to cover total generated deficits up to that point.[125] UC Davis noted that while there is some concern about the volatility of these credits within the secondary trading market itself, prices have largely trended upward throughout this

[121] As the discussion in Part III.A pointed out, corn-based ethanol possesses a higher carbon intensity rating than sugarcane or other biomass-based ethanol blends under the LCFS. While the refinery industry believes that reliance on other biomass-based ethanol is too risky, given its underdeveloped status for commercial use, California's fuel market over the first three years of the LCFS is challenging that notion, as indicated by the rise in production of lower-carbon, non-corn ethanol.

[122] Yeh & Witcover, *supra* note 119, at 3. The presence of credits is important insofar as the LCFS's cap is concerned because "LCFS credits and deficits are generated based on emissions below or above the standard. The credits can be traded or banked over time." *Id.*

[123] Yeh & Witcover, *supra* note 119, at 1.

[124] John Weyant et al., *Expert Evaluation of the Report: "Understanding The Impacts of AB32,"* U.C. DAVIS POL'Y INST. FOR ENERGY, ENV'T & ECON., May 2013, at 13, *available at* http://policyinstitute.ucdavis.edu/files/general/pdf/2013-05-09_Expert-Evaluation-of-BCG-Report.pdf ("The BCG report consistently relies on a single expected compliance strategy for California refineries – imported sugarcane ethanol. Furthermore the expanded demand for that product does not appear to trigger a supply response; the price is anticipated to grow dramatically without an increase in supply even though there is time for supply to expand to meet anticipated demand. Although a number of other strategies are identified, they are given no weight in the calculation of compliance. Even small contributions from the various other strategies would collectively have an important influence on the reduction needed in sugarcane ethanol.").

[125] Yeh & Witcover, *supra* note 119, at 3.

first compliance period, resting around $50 per credit as of December 2013.[126] Referencing the LCFS's credit creation thus far is important as it relates to mechanisms for refineries to control compliance costs when the LCFS cap declines more stringently after 2015.[127] With the current creation of excess of carbon credits early in the LCFS's implementation, refineries now have the ability to bank these credits for later use without having to shoulder the allegedly crippling compliance costs affecting fuel prices, factory closures, and job loss.[128]

Refineries with the ability to bank carbon credits would not be the only entities benefitting from the savings produced by the LCFS. While the refinery industry expressed concern over consumers shouldering the spikes in fuel prices, a new study from Mills College actually suggests that the LCFS will lead to consumer savings.[129] Mills College reaffirms the findings made by UC Davis, suggesting that the LCFS is overachieving in its first compliance period by displacing roughly 2.8 billion gallons of petroleum-based fuels, while decreasing the fuel carbon intensity of California's fuels by 5.4 million tons.[130] This petroleum displacement has resulted in a substantial number of banked credits, "representing over compliance with [LCFS] requirements by about 60% on average, or an excess of 2.0 million credits, which is equivalent to over half of the amount needed to meet the current 2014 LCFS requirements."[131] Mills College projects that the introduction of greater quantities of renewable fuels will help diversify California's fuel market, lowering the market power for petroleum-based fuels.[132] Projected fuel diversification will take the form of a 1.3% reduction in fuel prices overall (roughly $0.04 per gallon), as well as an annual savings of roughly $837 million for California consumers.[133] In other words, California's gambit is currently working to drive fuel innovation, provide

[126] Yeh & Witcover, *supra* note 119, at 7 ("LCFS credit prices increased from $16 per credit in 2012 to $75-$85 per credit in November 2013. According to PFL Markets Daily, prices declined to about $50 per credit by mid-December.").

[127] Yeh & Witcover, *supra* note 119, at 2.

[128] Weyant et al., *supra* note 124, at 6 ("Finally, the accumulation of LCFS credits has been substantial in the first eight quarters of the program. If sustained even at current levels, the accumulation seems likely to ease the transition toward satisfying the LCFS.").

[129] *See* JASMIN ANSAR & ROBERT SPARKS, MILLS COLLEGE, INCREASING MARKET COMPETITION TO REDUCE THE LEVEL AND VARIABILITY OF TRANSPORTATION FUEL PRICES: A CASE STUDY ON CALIFORNIA'S LOW CARBON FUEL STANDARD 2 (Mar. 2014), *available at* http://docs.nrdc.org/energy/files/ene_14040101a.pdf.

[130] *Id*. at 3.

[131] *Id*.

[132] *Id*.

[133] *Id*. at 2.

savings for industry and consumers alike, and create market-driven reductions in GHGs emissions.

C. THE CHICKEN DANCE: INDUSTRY PRESSURE AND THE LIMITED REACH OF STATES NECESSITATES FEDERAL GUIDANCE IN CURBING GHG EMISSIONS

Subparts A and B have outlined two potential futures for California under the LCFS, one detrimental to California's economic stability, and one projecting continued technological growth and tangible GHG reduction. Yet it is important to understand how these divergent positions on California's novel GHG reduction policy also bookend the nationwide discussion regarding market-based GHG reduction. The oil industry has remained largely resistant thus far, enlisting third-party consulting firms to drum up nightmare scenarios about new market-based GHG reduction measures.[134] Moreover, studies like the ones conducted by UC Davis and Mills College are essential for tracking progress of newly implemented market-based schemes, but they are not necessarily indicative of assured long-term success for GHG reduction plans like California's LCFS. The uncertainty of both scenarios, coupled with the often-stringent limitation on state authority to act, places the responsibility on Congress to fashion strong guidelines for GHG reduction.

The threat of global climate change and the future of the United States' energy independence are too valuable to allow Congress the luxury of silence—it can't chicken out.[135] As Part II indicates, a major paradigm shift is required to promote federal guidance in market-based GHG reduction, regardless of the success or failure of California's experiment.

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[134] Geoff Dembicki, *Big Oil and Canada Thwarted U.S. Carbon Standards*, SALON (Dec. 25, 2011), www.salon.com/2011/12/15/big_oil_and_canada_thwarted_u_s_carbon_standards/. The article examines how Canadian and U.S. oil companies contracted with PR firms to create non-profit organizations designed to kill low-carbon fuel legislation. The article details the creation of the Consumer Energy Alliance (CEA), an organization that prepared 'easy-to-read and user friendly informational briefs' targeted at trade associates and unions in the hopes of applying political pressure to stop LCFS measures in Northeast/Mid Atlantic states. *Id. See generally* CONSUMER ENERGY ALLIANCE, ANALYSIS OF THE ECONOMIC IMPACT OF A REGIONAL LOW CARBON FUEL STANDARD ON NORTHEAST/MID-ATLANTIC STATES (Mar. 2012), *available at* http://consumerenergyalliance.org/wp/wp-content/uploads/2012/03/The-Economic-Impact-of-a-Regional-Low-Carbon-Fuel-Standard-on-Northeast-Mid-Atlantic-States.pdf.

[135] *Cf. Arrested Development—Chicken Dance (Whole Family)*, YOUTUBE (Aug. 8, 2012), https://www.youtube.com/watch?v=1TphEh0Qgv0. Again, referencing this FOX/Netflix comedy felt appropriate given Congress's reticence to fashion strong GHG reduction policies.

IV. DEVELOPMENT ARRESTED: THE PARADIGM SHIFT NEEDED TO IMPLEMENT A NATIONAL AND FEASIBLE MARKET-BASED APPROACH TO GHG REDUCTION

While states such as California are making incremental progress in reducing GHG emissions within the U.S. transportation sector, state action is fairly limited in its effectiveness. As stated in Part II, meaningful GHG reduction requires stronger federal guidance. The following Subparts outline two potential paths for congressional guidance. Subpart A focuses on a methodology that works within the doomsday scenarios put forth by the oil industry. Subpart B advocates the use of California's LCFS as a blueprint for a national market-based measure to reduced GHGs. Both Subparts suggest a low carbon fuel standard in different fashions to achieve the same result: a feasible, market-based approach to GHG reduction.

A. YOU ARE GOING TO GET HOP-ONS: CONGRESS SHOULD IMPLEMENT A FLEXIBLE LOW CARBON FUEL STANDARD THAT REWARDS COMPLIANT BUSINESSES WITH MONETARY INCENTIVES

Congress can still use a modified low carbon fuel standard as a mechanism for GHG reduction despite the refinery industry's fears that such a measure will cause fuel shortages and high compliance costs that disrupt local economies. While the refinery industry might paint California's LCFS implementation as infeasible, using a low carbon fuel standard may still be important piece of market-based environmental policy.[136] By implementing a GHG measurement for all periods of a fuel's life cycle, a low carbon fuel standard is able to relay important information about the human interaction with a particular product, which can allow policymakers to fashion decisions based on that behavior.[137]

One approach Congress could use is implementing a flexible low carbon fuel standard on the national level, one that uses such life cycle

[136] STEPHEN P. HOLLAND ET AL., NAT'L BUREAU OF ECON. RESEARCH, GREENHOUSE GAS REDUCTIONS UNDER LOW CARBON FUELS STANDARDS? 31 (July 2007), *available at* www.nber.org/papers/w13266.pdf?new_window=1 ("We show that the LCFS is more likely to increase carbon emissions if (*i*) supply and/or demand for the high carbon fuel are relatively steep . . . .").

[137] *See generally* U.S. EPA, LIFE-CYCLE GHG ACCOUNTING VERSUS GHG EMISSION INVENTORIES, (undated), *available at* http://epa.gov/epawaste/conserve/tools/warm/pdfs/life-cycle-ghg-accounting-versus-ghg-emission-inventories10-28-10.pdf ("A life-cycle perspective accounts for all emissions connected to the good or service, regardless of which industrial or economic activities or sectors produce these emissions (e.g., energy, mining, manufacturing, or waste sectors) and when these benefits occur over time.").

measurements as a means of eligibility for monetary incentives.[138] These monetary incentives could be in the form of tax breaks for refineries that fall under the cap of a national low carbon fuel standard, or eligibility for federal grants and loans to use in the development of alternative fuels.[139] This would be a concerted move away from the mandatory cap-and-trade program in California, and it would tend to support businesses that already create products with low GHG emissions.

This would be a good approach, should Congress buy into the refinery industry's rhetoric, because it is not passive. A flexible cap that would emphasize rewarding successfully developed alternative fuels can help the fuel market adjust to innovation, rather than simply punishing non-compliant entities.[140] In other words, Congress might be more successful in swaying refinery companies with the honey of tax breaks or development grants, rather than the vinegar of a mandatory compliance cap.[141] Once the market illustrates the viability of these advanced renewable fuels, other refineries will invariably hop on board, developing and producing more low-carbon fuels in order to keep up with their competitors. Therefore, as the market and means for low-carbon fuels grow, the United States' GHG emissions should decline.

B. THERE IT IS: CONGRESS SHOULD USE CALIFORNIA'S LCFS AS THE BLUEPRINT FOR A NATIONWIDE LCFS

Congress should explore a national market-based GHG reduction scheme similar to that of California's LCFS. Part III outlined the encouraging potential of California's LCFS as a novel approach to market-based GHG reduction, one that can stimulate the state's economy and advance renewable fuel technology.[142] Though a national low carbon fuel standard has already failed to pass the Senate once before

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[138] HOLLAND ET AL., *supra* note 136, at 31 ("In fact, a regulator's best option may be to choose a nonbinding LCFS . . . .").

[139] *Id.* ("[A]n energy-based LCFS, which subsidizes low-carbon fuels (primarily renewables), may be a second best policy instrument for addressing multiple policy goals with one instrument.").

[140] *See* TRISHA SHRUM, GREENHOUSE GAS EMISSIONS: POLICY AND ECONOMICS 29 (June 15, 2007), *available at* www.carbontax.org/wp-content/uploads/2008/03/kansas-energy-council_ghg-review.pdf ("Research and development subsidies can help to correct market failure and underinvestment in a public good.").

[141] JEREMIAH DONOR, BARRIERS TO ADOPTION OF RENEWABLE ENERGY TECHNOLOGY 21 (May 2007), *available at* http://irps.illinoisstate.edu/downloads/research/documents/IRPSDonerWorkingPaper050707.pdf ("Policies such as research and development, financial incentives, and procurement initiatives are appropriate for stimulating commercialization and initial markets for new technologies, which can create a 'technology push.'").

[142] *See generally* Yeh & Witcover, *supra* note 119.

(2010's Waxman-Markey Bill[143]), evidence of a successful LCFS on the state level could help persuade Congress that such an approach could be a feasible, nationwide approach for GHG reduction. Congress faces the difficult task of accounting for the economy and resource use of an entire country; however, Congress now has the benefit of watching California's methodology and implementation. Congress should begin investigating this method now, so it can adjust for obstacles California might face at the end of its program in 2020. California's LCFS may have opened to door to a feasible, market-based approach to GHG reduction, but Congress must walk through that door for the benefit of the United States and the world at large.

CONCLUSION

Market-based measures will undoubtedly play a crucial role in future efforts to curb GHG emissions. The United States—and Congress in particular—faces the difficult task of fashioning legislation that will balance concerns about shared natural resources and future economic growth. While there are concerns about the viability of current market-based strategies to produce long-term GHG reductions and technological innovation, continuing to subsist under the yoke of fossil fuel is not a viable option either at home or abroad. If market-based measures are to be successful, Congress must develop a framework that encourages alternative fuel development, transitioning us away from fossil fuels while reducing GHG emissions.

Feasible market-based approaches to GHG reduction are just one facet of a larger, more complex conversation about addressing global climate change. Yet the issue of global climate change is a race against time, one better handled with cooperative goals, instead of isolationist lawmaking, public-relations wars, or willful blindness. Policymakers should remain mindful of the limitations of market-based GHG reduction measures, while taking note of the pioneering efforts present in states like California. To that end, Congress must use federalism as a catalyst for change rather than legislative stalemate. Congress must depend on states as laboratories of innovation, to help spur nationwide strategies in developing alternative fuels. After all, the whole world is watching

[143] *See generally* Kate Sheppard, *Was Waxman-Markey a Waste of Energy?*, MOTHERJONES.COM, Mar. 9, 2010, www.motherjones.com/politics/2010/03/waxman-markey-senate-climate-kerry-graham-lieberman (providing an overview of the politics surrounding the eventual demise of the Waxman-Markey Bill, a national cap-and-trade program that failed to pass the Senate in 2010).

us,[144] and strategies the United States implements to combat global climate change will undoubtedly have an important impact on the future of our planet.

[144] Unlike the critically acclaimed *Arrested Development* (from which this article borrows its title) neither the United States nor the world at large can bank on a direct-to-Netflix revival should global climate change pull the plug on our planet.