

# FAR FROM A CAN OF CORN: A CASE FOR REFORMING ETHANOL POLICY

Zachary M. Wallen \*

*Modern society is profoundly tied to the energy sources that power it. From the dawn of the Industrial Revolution, fossil fuels have supplied that energy, enabling a modern, mobile society now largely dependent on oil and gasoline. When the unsustainability of this reliance became apparent in the 1970s, the U.S. government began a series of programs which subsidized the ethanol production process in an effort to create an alternative to oil imports. This Note explores the history of governmental support for ethanol, as well as the achievements and limitations of those programs. Drawing upon the inherent limitations of the present programs, this Note will argue for a movement away from corn-based ethanol toward alternative energy programs which have greater potential to solve America's oil addiction.*

## INTRODUCTION

J. Paul Getty knew as his one true key to success the mantra, “rise early, work hard, strike oil.”<sup>1</sup> Many entrepreneurs followed Getty’s example and did just that throughout the twentieth and into the beginning of the twenty-first century. But like all too many natural resources, oil is a finite commodity, one that will eventually be unable to support global demand. Even today, once-rich petroleum reserves are dwindling in many spots around the globe.<sup>2</sup> The fact that global

---

\* J.D. Candidate, University of Arizona James E. Rogers College of Law, 2010. The Author would like to thank Richard V. Butler, Robert Glennon, and Barak Y. Orbach for their invaluable assistance.

1. See, e.g., *Slick Game: It's User Friendly*, TIMES OF INDIA, Jan. 13, 2008, available at <http://timesofindia.indiatimes.com/Home/Oils-not-well/Slick-game-Its-USer-friendly/articleshow/2695823.cms>.

2. One such example is in the United Arab Emirates, whose economy was built on the exploration and exportation of petroleum. Dubai estimates that it will be without oil by 2025, while the country as a whole expects to run out within the next century. See Pepe Escobar, *Dubai Lives the Post-Oil Arab Dream*, ASIA TIMES ONLINE, June 7, 2006, available at [http://www.atimes.com/atimes/Middle\\_East/HF07Ak01.html](http://www.atimes.com/atimes/Middle_East/HF07Ak01.html).

demand is increasing, driven by the economic expansion of the developing world, especially China and India,<sup>3</sup> further accelerates the diminution of the world's oil resources. At the same time, demand throughout the rest of the globe has certainly not declined.<sup>4</sup> As the global oil supply has remained relatively steady in response to this rapidly increasing global demand, oil prices have, in turn, increased dramatically.<sup>5</sup>

From the American perspective, this situation is even worse than it would initially appear. Given the fact that approximately 16% of the oil consumed in the United States originated in the Persian Gulf Region,<sup>6</sup> there is a great reluctance to continue to surrender such a large percentage of the country's GDP to a region that has ties to terrorism.<sup>7</sup> The problem, however, is that the U.S. economy is so profoundly tied to oil that it is stuck as a "price taker" in the world's oil market.<sup>8</sup>

Short of burying our collective heads in the sand, the question then becomes how to find alternatives to America's gasoline addiction. Many such alternatives have been suggested. Some have suggested that the United States move toward solar,<sup>9</sup> wind,<sup>10</sup> or nuclear power.<sup>11</sup> One seemingly ubiquitous entrepreneur willing to share his opinion on the current energy crisis is longtime Texas oilman, T. Boone Pickens. Pickens is heavily invested in natural gas and

---

3. See DANCING WITH GIANTS: CHINA, INDIA, AND THE GLOBAL ECONOMY (L. Alan Winters & Shahid Yusuf eds., 2007).

4. See ROBERT PIROG, CONGRESSIONAL RESEARCH REPORT FOR CONGRESS, WORLD OIL DEMAND AND ITS EFFECT ON OIL PRICES 1 (2005), available at <http://fas.org/sgp/crs/misc/RL32530.pdf>.

5. Even considering the general decline in the price of oil over the past eighteen months, the price of oil is climbing once again as of February 2010. In fact, it has nearly doubled in the last year. U.S. Energy Info. Admin., *This Week in Petroleum*, Feb. 24, 2010, available at <http://tonto.eia.doe.gov/oog/info/twip/twip.asp#>.

6. U.S. ENERGY INFO. ADMIN., U.S. IMPORTS BY COUNTRY OF ORIGIN: TOTAL CRUDE OIL AND PRODUCTS IMPORTS, [http://tonto.eia.doe.gov/dnav/pet/pet\\_move\\_impcus\\_a2\\_nus\\_ep00\\_im0\\_mbb1\\_a.htm](http://tonto.eia.doe.gov/dnav/pet/pet_move_impcus_a2_nus_ep00_im0_mbb1_a.htm) (last visited Mar. 1, 2009). In 2007, the United States imported 4,915,957,000 barrels of oil. *Id.* More than 789,607,000 barrels of that imported oil came from the Persian Gulf Region. *Id.* That number amounts to 16.06% of total crude oil imports. *Id.*

7. See, e.g., MICHAEL T. KLARE, BLOOD AND OIL: THE DANGERS AND CONSEQUENCES OF AMERICA'S GROWING PETROLEUM DEPENDENCY (2004).

8. "Price taking" is an economic term referring to consumers who lack market power in a monopolistic or oligopolistic market environment. See, e.g., EDGAR K. BROWNING & MARK A. ZUPAN, MICROECONOMICS: THEORY AND APPLICATIONS 155 (8th ed. 2005).

9. See, e.g., Oliver Morton, *Solar Energy: A New Day Dawning?: Silicon Valley Sunrise*, NATURE, Sept. 2006, at 19, 19–22.

10. *Id.*

11. See, e.g., Peter Stoett, *Toward Renewed Legitimacy? Nuclear Power, Global Warming, and Security*, 3 GLOBAL ENVTL. POL. 99 (2003).

wind power<sup>12</sup> and has spent more than \$58 million to promote a transition to those energy sources.<sup>13</sup>

All of these initiatives have been beaten to the punch in many ways by an alternative energy program that has been in motion for the past quarter century—ethanol. Perhaps, its backers posited, we can grow our way out of the present energy crisis, rather than trying to shrink to accommodate a world of increased energy prices.<sup>14</sup> In fact, this is literally what we have been trying to do in the United States for the past three decades.

Ethanol production has become a significant component of the American economy. As of February 2010, in the United States there were 183 operational ethanol refineries, which combined to produce nearly 12 billion gallons of ethanol each year.<sup>15</sup> And despite the recession and the downturn in the ethanol market,<sup>16</sup> that number continues to increase. Ten additional ethanol refineries are presently under construction, or are expanding existing production capacity, across the United States, which will add another 1.3 billion gallons to domestic capacity.<sup>17</sup> Ethanol production technology is also tremendously popular among the population as a whole.<sup>18</sup>

The question, of course, is whether that popularity has any rational basis or whether ethanol's omnipresence in the societal consciousness has trumped any proper evaluation of its merits. But as much as references to ethanol have become

---

12. Dave Michaels, *T. Boone Pickens' Motives in Energy Plan Questioned*, DALLAS MORNING NEWS, Aug. 7, 2008, available at <http://www.dallasnews.com/sharedcontent/dws/dn/latestnews/stories/080708dnbuspickens.42abd0f.html>.

13. Ed Tibbetts, *Pickens Coming to Iowa to Promote His Energy Plan*, QUAD-CITY TIMES, Aug. 11, 2008, available at [http://www.qctimes.com/news/local/article\\_09ee7b47-4a5c-5a5f-8dd6-celacdf0115a.html](http://www.qctimes.com/news/local/article_09ee7b47-4a5c-5a5f-8dd6-celacdf0115a.html).

14. For example, then-President George W. Bush argued that "Congress needs to continue strong support for ethanol and biodiesel. . . . We're going to continue to figure out ways to grow our way out of dependence on foreign oil." *President Discusses Energy Policy*, STATES NEWS SERVICE, Mar. 9, 2005.

15. See Renewable Fuels Ass'n (RFA), *Biorefinery Locations*, <http://www.ethanolrfa.org/industry/locations/> (last visited Feb. 18, 2010). The nameplate capacity, or the maximum production capability, of all American ethanol refineries is more than 13 billion gallons. *Id.*

16. The ethanol industry has been hurt by the overall reduction in demand caused by the current economic recession. See, e.g., David Adams, *Recession Saps Energy From Ethanol Industry*, ST. PETERSBURG TIMES, Apr. 8, 2009, available at <http://www.tampabay.com/news/business/energy/article990514.ece> (describing some of the structural instabilities created by the ethanol industry's meteoric growth); Erin Voegele, *Recession Continues to Impact Ethanol Industry*, ETHANOL PRODUCER MAG., May 12, 2009, available at [http://ethanolproducer.com/article.jsp?article\\_id=5677](http://ethanolproducer.com/article.jsp?article_id=5677) (describing the impact of the recession on corporations such as Archer Daniels Midland).

17. Renewable Fuels Ass'n, *supra* note 15.

18. An April 2007 poll by CBS News/New York Times found that 70% of the public thought ethanol was a good idea, agreeing with the statement that ethanol made from corn is an American-made substitute for foreign oil that causes less air pollution. CBS News/New York Times Poll, *Americans' Views on the Environment*, Apr. 20–24 (2007), available at <http://www.cbsnews.com/htdocs/pdf/042607environment.pdf>.

a ubiquitous part of quotidian existence, there is general ignorance about ethanol as an alternative fuel.<sup>19</sup>

Essentially, ethanol is a form of grain alcohol that is made by fermenting plant sugars.<sup>20</sup> While American ethanol production largely uses corn, ethanol can be produced from any number of plants that contain sugar.<sup>21</sup> The world's largest ethanol producer, Brazil, meets its ethanol needs by using sugarcane.<sup>22</sup>

Manufacturers must blend ethanol in some quantity with gasoline so that it can be used in current engines.<sup>23</sup> The most common blend of ethanol and gasoline in the United States is a 10% to 90% ethanol-to-gasoline mixture, known as E10 unleaded.<sup>24</sup> The issues with using higher percentage ethanol blends are more financial than technological,<sup>25</sup> and E10 is not the only possible combination of these fuels. For example, a blend containing up to 85% ethanol, called E85, is increasingly becoming available in the United States for use in flex-fuel vehicles.<sup>26</sup>

---

19. Press Release, Pavilion Techs., National Survey Reveals Ignorance about Ethanol Runs High Among Consumers (Jan. 22, 2007), *available at* [http://www.businesswire.com/portal/site/google/index.jsp?ndmViewId=news\\_view&newsId=20070122005293&newsLang=en](http://www.businesswire.com/portal/site/google/index.jsp?ndmViewId=news_view&newsId=20070122005293&newsLang=en). Among other things, the survey conducted by the Harris Institute found that 57% of drivers were unclear as to how the costs of ethanol compared with gasoline and diesel fuels, that 57% of respondents who do not use a biofuel do not believe that their car can run on it, and that 47% of drivers not using biofuels are unclear as to where to purchase them. *Id.*

20. EPA, SMARTWAY TRANSPORT PARTNERSHIP, ALTERNATIVE FUELS: E85 AND FLEX FUEL VEHICLES 1 (2006), *available at* <http://www.epa.gov/SmartwayLogistics/growandgo/documents/0factsheet-e85.htm>.

21. ETHANOL PROMOTION & INFO. COUNCIL, PRODUCING ETHANOL, [http://www.drivingethanol.org/ethanol\\_facts/producing\\_ethanol.aspx](http://www.drivingethanol.org/ethanol_facts/producing_ethanol.aspx) (last visited Oct. 29, 2008). For a detailed explanation of the process of producing ethanol, see *id.* The leftover byproducts of the ethanol production process are used for various other purposes. For example, the distiller's grain is used as feed for livestock, while the remaining carbon dioxide is rendered fit for use in carbonated beverages and dry ice. Alex Halperin, *Ethanol: Myths and Realities*, BUS. WK., May 19, 2006, *available at* [http://www.businessweek.com/technology/content/may2006/tc20060519\\_225336.htm](http://www.businessweek.com/technology/content/may2006/tc20060519_225336.htm).

22. Halperin, *supra* note 21.

23. WORLDWATCH INST. & CTR. FOR AM. PROGRESS, AMERICAN ENERGY: THE RENEWABLE PATH TO ENERGY SECURITY 14 (Sept. 2006), *available at* <http://images1.americanprogress.org/il80web20037/americanenergynow/AmericanEnergy.pdf>. "Most cars and SUVs on the road today can run on blends of up to 10 percent ethanol, and motor vehicle manufacturers already produce vehicles designed to run on much higher ethanol blends." *Id.*

24. Stanley R. Bull & Lynn Billman, *Renewable Energy: Ready to Meet Its Promise?*, 23.1 WASH. Q. 229, 234 (2000).

25. BRIAN WEST ET AL., EFFECTS OF INTERMEDIATE ETHANOL BLENDS ON LEGACY VEHICLES AND SMALL NON-ROAD ENGINES, REPORT 1, at 1-1 (2008), *available at* [http://www.afdc.energy.gov/afdc/pdfs/int\\_blends\\_rpt\\_1.pdf](http://www.afdc.energy.gov/afdc/pdfs/int_blends_rpt_1.pdf). This study, commissioned by the Department of Energy, found that there were greater fuel economy issues with such ethanol blends, rather than any incompatibility with the engines themselves. *Id.* at xvii.

26. *Id.* at 1-1.

One example of a nation that uses higher consistency blends of ethanol is Brazil, the world's leading ethanol producer.<sup>27</sup> All Brazilian gasoline contains at least 25% ethanol.<sup>28</sup> Brazil, at the vanguard of ethanol development, has a large number of flex-fuel vehicles capable of running on either blends of ethanol and gasoline or on pure ethanol.<sup>29</sup>

What to make of all of this? Ethanol is certainly a product that can be produced domestically, but is it the future of America's energy production? Like all magic potions, this one has a tendency to go up in smoke. While some claim that ethanol is a viable component, or even a solution to the country's energy needs,<sup>30</sup> others contend that ethanol's beneficial values have been oversold.<sup>31</sup> In fact, a recent report by the Congressional Budget Office tied ethanol to both a potential increase in greenhouse gases and higher food prices.<sup>32</sup>

Questions remain as to what beneficial results can actually be attributed to ethanol. Obviously, just because ethanol is a substitute for gasoline does not necessarily mean it is an improvement. On a public-policy level, a lack of tangible benefits would not matter if ethanol was being freely bought in the global market in lieu of oil. Consumers in a free market are able to substitute between goods as they choose. Billions of dollars, however, are being spent to subsidize American ethanol production,<sup>33</sup> while little effort is made to produce an accurate cost-benefit analysis of these subsidies. And when such a large quantity of money is being spent with little, if any, accrual of benefits for the American taxpayer, this represents a profound failure in good governance and public policy.

---

27. Andrew Downie, *Brazil Defends Ethanol in Food-Versus-Fuel Fight*, CHRISTIAN SCI. MONITOR, May 5, 2008, available at <http://www.csmonitor.com/2008/0505/p04s01-woam.html>. For an in-depth look at Brazil's ethanol experience, see Vanessa M. Cordonnier, *Ethanol's Roots: How Brazilian Legislation Created the International Ethanol Boom*, 33 WM. & MARY ENVTL. L. & POL'Y REV. 287 (2008).

28. Downie, *supra* note 27.

29. William Lemos, *Brazil's Flex-Fuel Car Production Rises, Boosting Ethanol Consumption to Record Highs*, ICIS, Nov. 12, 2007, available at <http://www.icis.com/Articles/2007/11/12/9077311/brazils-flex-fuel-car-production-rises-boosting-ethanol-consumption-to-record-highs.html>.

30. See, e.g., James A. Duffield, Irene M. Xiarchos & Steve A. Halbrook, *Ethanol Policy: Past, Present, and Future*, 53 S.D. L. REV. 425 (2008) (discussed *infra*, Part I); Brandon E. Durrett, *The New Organic "Texas Tea"?: National Energy Security Implications of "Clean Fuel" Regulatory Ban on Texas Biodiesel*, 40 TEX. TECH L. REV. 1001 (2008).

31. See, e.g., DOUG KOPLOW, INT'L INST. FOR SUSTAINABLE DEV., BIOFUELS – AT WHAT COST? GOVERNMENT SUPPORT FOR ETHANOL AND BIO-DIESEL IN THE UNITED STATES (2006), available at [http://www.earthtrack.net/files/biofuels\\_subsidies\\_us.pdf](http://www.earthtrack.net/files/biofuels_subsidies_us.pdf); Marcel De Armas, *Misleadingly Green: Time to Repeal the Ethanol Tariff and Subsidy for Corn*, 7 SUSTAINABLE DEV. L. & POL'Y 25 (2007).

32. CONG. BUDGET OFFICE, THE IMPACT OF ETHANOL USE ON FOOD PRICES AND GREENHOUSE-GAS EMISSIONS (2009), available at <http://www.cbo.gov/ftpdocs/100xx/doc10057/04-08-Ethanol.pdf> [hereinafter CONG. BUDGET OFFICE, ETHANOL REPORT].

33. *Cheap No More: Rising Incomes in Asia and Ethanol Subsidies in America Have Put an End to a Long Era of Falling Food Prices*, ECONOMIST, Dec. 6, 2007, available at [http://www.economist.com/PrinterFriendly.cfm?story\\_id=10250420](http://www.economist.com/PrinterFriendly.cfm?story_id=10250420). Subsidies for ethanol on the federal level alone total \$7 billion each year. *Id.*

This Note examines the legislation that created the ethanol subsidy situation, analyzes the effects of the promotion of ethanol at the federal level, and attempts to highlight areas where law and public policy concerning ethanol can be ameliorated. Part I gives a summary of American ethanol subsidies, showing the longstanding support for ethanol, driven by the powerful agricultural lobby. Next, Part II examines the effects of these subsidies at the national level. This includes the subsidies' effect on the demand for gasoline, the price of corn, the demand for other agricultural products, consumer food prices, and its impact on the environment. Part II also briefly touches on the plethora of diverse subsidies on the state level that further buttress the American ethanol industry.

Part III advances public-policy solutions to the ethanol predicament. Through limiting the effects of ethanol subsidies and supporting more eco-friendly and energy-efficient alternatives to ethanol, traditional ethanol can be replaced with more efficient technological innovations. This will not be easy to achieve, however, as ethanol subsidies are solidly engrained in the American political landscape. But these policies must be implemented and supported, because the negative consequences of public-policy stagnation in this area are profoundly far-reaching. It is also vitally important to consider all public-policy alternatives in light of the present economic climate and to be cognizant of how individual public-policy choices affect the economy as a whole.

This Note showcases the importance of vigilance in the world of law and public policy. Laws that may seem merely inefficient and valueless on the surface can actually have far-reaching and even more negative implications than the status quo.

## I. ETHANOL SUBSIDIES

### A. A History of Federal Ethanol Subsidies

Historically, ethanol was one of the competing fuels to power the very first automobiles.<sup>34</sup> In fact, Henry Ford built his first vehicle to run on pure ethanol.<sup>35</sup> Ethanol was soon overtaken by gasoline as the preferred automotive fuel, and by the close of World War II, ethanol demand dried up.<sup>36</sup> The low price of gasoline seemed to render ethanol obsolete, but during the 1970s ethanol became a much more attractive option as domestic oil supply decreased and the country moved toward unleaded gasoline.<sup>37</sup>

The United States' subsidization of ethanol began in the late 1970s, when domestic oil production began to decline.<sup>38</sup> The Energy Tax Act of 1978 was the

---

34. UNIV. OF ILL. CTR. FOR ADVANCED BIOENERGY RESEARCH, HISTORY OF ETHANOL (May 15, 2007), <http://bioenergyuiuc.blogspot.com/2007/05/history-of-ethanol.html>.

35. *Id.* Later Ford built the iconic Model T to be able to run on either ethanol, gasoline, or a combination of the two—the first commercially available flex-fuel vehicle. *Id.*

36. *Id.*

37. *Id.*

38. U.S. crude oil production peaked in 1970 at 3,517,450,000 barrels. U.S. ENERGY INFO. ADMIN., U.S. CRUDE OIL FIELD PRODUCTION (Thousand Barrels) (July 28,

first piece of federal legislation promoting ethanol through tax incentives.<sup>39</sup> This Act gave tax breaks to ethanol blends that were at least 10% by volume.<sup>40</sup> Such blends were allowed a four-cent-per-gallon break from federal motor fuels tax.<sup>41</sup>

The energy crisis of 1979, which occurred in the wake of the Islamic Revolution in Iran, reinforced the American belief that alternatives to imported oil needed to be found and supported.<sup>42</sup> Several initiatives passed in 1980 bolstered domestic ethanol production. The first was the Energy Security Act, which offered loans to small ethanol plants that produced less than one million gallons per year.<sup>43</sup> These guaranteed grants and loans have continued to the present day in various forms as an important support mechanism for ethanol production and promulgation.<sup>44</sup> This Act also issued a requirement that the Secretaries of Agriculture and Commerce prepare a plan that would result in ethanol comprising 10% of the nation's gasoline supply by the close of the decade.<sup>45</sup>

That same year, Congress passed the Crude Windfall Profit Tax Act, which extended the ethanol tax exemption Congress created two years earlier and also allowed ethanol producers the option of obtaining an income-tax exemption in lieu of the fuel-tax exemption.<sup>46</sup> Subsequently, Congress adopted additional laws that have increased and extended that tax credit.<sup>47</sup>

While other initiatives laid the groundwork for the development of ethanol technologies, the real bulwark behind the continuation of ethanol promulgation is the Volumetric Ethanol Excise Tax Credit (VEETC).<sup>48</sup> This federal ethanol subsidy is directly tied to its use in gasoline.<sup>49</sup> The tax credit reached as high fifty-one cents per gallon.<sup>50</sup> In fact, the U.S. Government

---

2008), available at <http://tonto.eia.doe.gov/dnav/pet/hist/mcrfpus1a.htm>. By comparison, domestic production in 2007 was about half that number, at 1,848,450,000 barrels. *Id.*

39. Energy Tax Act of 1978, Pub. L. No. 95-618, 92 Stat. 3174 (1978) (current version at 26 U.S.C. § 4064 (2005)).

40. *Id.*

41. *Id.*

42. One example of this was President Carter's pleas for the conservation of energy in his "Crisis of Confidence" speech. Jimmy Carter, Crisis of Confidence (July 15, 1979) (transcript available at [http://www.cartercenter.org/news/editorials\\_speeches/crisis\\_of\\_confidence.html](http://www.cartercenter.org/news/editorials_speeches/crisis_of_confidence.html)).

43. Energy Security Act, Pub. L. No. 96-294, 94 Stat. 611 (1980) (codified as amended in scattered sections of 42 U.S.C.) [hereinafter Energy Security Act].

44. Robert W. Hahn, *Ethanol: Law, Economics and Politics*, 19 STAN. L. & POL'Y REV. 434, 439-41 (2008).

45. Energy Security Act, *supra* note 43.

46. Crude Oil Windfall Profit Tax Act of 1980, Pub. L. No. 96-223, 94 Stat. 229 (1980) (codified in scattered sections of 26 U.S.C.).

47. Duffield et al., *supra* note 30, at 429.

48. Hahn, *supra* note 44, at 437-38.

49. *Id.* at 437.

50. *Id.*

Accountability Office (GAO) estimates that the ethanol industry received more than \$10 billion in tax incentives between 1979 and 2000.<sup>51</sup>

In the mid-1980s, however, the rush to support ethanol production waned as crude oil prices dropped worldwide.<sup>52</sup> But, by the close of the decade there was a renewed desire on Capitol Hill to promote alternative energy. One important example of this was the Alternative Motor Fuels Act,<sup>53</sup> which gave automotive manufacturers breaks towards meeting their Corporate Average Fuel Economy (CAFE) standards<sup>54</sup> if they created vehicles that could operate using alternative or multiple fuel sources.<sup>55</sup> More than seven million of these flex-fuel vehicles were expected to be in service before the close of 2008.<sup>56</sup>

Not only does the federal government heavily subsidize ethanol, but it also implements measures that give strong protections to domestic producers at the expense of allowing international competition—subsidization through protectionism.<sup>57</sup> Congress created this protectionism by writing it into the initial subsidies to support domestic producers. For example, Congress placed a duty on foreign imports of ethanol so that those imports could not benefit from domestic subsidies.<sup>58</sup> While Congress has, to an extent, relaxed these duties through the Caribbean Basin Initiative (CBI),<sup>59</sup> ethanol imports are still very heavily regulated,

---

51. Letter from Jim Wells, U.S. Gen. Accounting Office, to Sen. Tom Harkin (Sept. 25, 2000), available at <http://www.gao.gov/new.items/rc00301r.pdf>.

52. Mark Clayton, *Are Alternative Fuels Reliving the 1980s? Today's Slumping Oil Prices May Undermine Viability of Alt-Fuel Programs—Again*, CHRISTIAN SCI. MONITOR, Nov. 6, 2008, available at <http://features.csmonitor.com/environment/2008/11/06/are-alternative-fuels-reliving-the-1980s/>. President Reagan ended the synthetic fuels program in 1986 in response to falling oil prices. *Id.*

53. Alternative Motor Fuels Act of 1988, Pub. L. No. 100-494, 102 Stat. 2441 (1988) (codified at 42 U.S.C. § 6374 (2006)).

54. The Corporate Average Fuel Economy (CAFE) standards are federal regulations which mandate the increased fuel-economy standards of cars and light trucks. Nat'l Highway Traffic Safety Admin., CAFE Overview, <http://www.nhtsa.dot.gov/portal/site/nhtsa/> (follow "Laws/Regulations/Guidance" hyperlink; then follow "CAFE" hyperlink under "Browse Topics"; then follow "CAFE Overview" hyperlink) (last visited Feb. 27, 2009). It is the sales-weighted-average fuel economy (in miles per gallon) of a manufacturer's fleet of passenger cars or light trucks with a gross vehicle rating of 8500 pounds or less, manufactured for sales in the United States, for any given model year. *Id.* The most recent change to CAFE standards occurred in 2007, when the Energy Independence and Security Act required that automobile manufacturers increase overall gas mileage across their product line to thirty-five miles per gallon by 2020. 49 U.S.C. § 32902 (Supp. 2008).

55. 15 U.S.C. § 2001 (2006).

56. U.S. Dep't of Energy, Energy Efficiency & Renewable Energy, Data, Analysis and Trends, Light-Duty E85 FFVs in Use, Trend of Total FFVs in Use from 1998–2008, Based on FFV Production Rates and Life Expectancy, Alternative Fuels and Advanced Vehicles Data Center (Jan. 2008), <http://www.eere.energy.gov/afdc/data/index.html>.

57. *See infra* note 59.

58. 23 U.S.C. § 120 (2006).

59. 6 U.S.C. § 212 (2006). This law allows for duty-free imports of a variety of goods produced in Caribbean Basin countries, including ethanol. *Id.* These countries and

thereby protecting domestic producers.<sup>60</sup> These subsidies are quite unpopular worldwide and present a real barrier in achieving progress in passing global free-trade initiatives.<sup>61</sup>

The ethanol industry also benefits from a form of double-dipping in governmental subsidies because ethanol producers can benefit at two different levels of the production cycle. In addition to receiving the subsidies given to ethanol producers, they also benefit from the generous governmental subsidies given to corn farmers.<sup>62</sup> It is estimated that 15% of ethanol subsidies come in the form of these agricultural subsidies to corn farmers.<sup>63</sup> Approximately one billion dollars are obtained in this manner each year.<sup>64</sup>

### ***B. Recent Developments in Federal Subsidies***

Two important pieces of legislation created in the last few years have been very generous to the ethanol production industry. This legislation is tied to the recent rise in oil prices and the continual fear of terrorism in the post-9/11 environment, which in turn has made ethanol a popular alternative to foreign-produced oil.<sup>65</sup>

The first of these is the Energy Policy Act of 2005.<sup>66</sup> This initiative attempted to alleviate America's energy problems by funding a wide variety of alternative-energy programs.<sup>67</sup> The component of the Act important to the ethanol sector is the renewable fuels standard provision.<sup>68</sup> This provision ensures that ethanol demand will exist well into the future through congressional mandates. Specifically, the Act requires American consumers to purchase 7.5 billion gallons in 2012.<sup>69</sup> In addition, the Act requires that 250 million gallons of cellulosic

---

territories include Antigua and Barbuda, Aruba, Bahamas, Barbados, Belize, British Virgin Islands, Costa Rica, Dominica, Dominican Republic, El Salvador, Grenada, Guatemala, Guyana, Haiti, Honduras, Jamaica, Montserrat, Netherlands Antilles, Nicaragua, Panama, St. Christopher and Nevis, St. Lucia, St. Vincent and the Grenadines, and Trinidad and Tobago. *Id.*

60. It is important to note that Brazil, the leading producer of ethanol worldwide, is excluded from this program and thus heavily disadvantaged in the U.S. market. Downie, *supra* note 27. Brazilian ethanol is taxed at fifty-four cents per gallon when imported into the United States. *Id.*

61. See discussion *infra* notes 142–144.

62. Robert Bryce, *The Stupidest Federal Subsidy*, SLATE, July 19, 2005, <http://www.slate.com/id/2122961/>.

63. KOPLOW, *supra* note 31, at 11.

64. *Id.*

65. See, e.g., John Gartner, *Ethanol Grows as Gas Alternative*, WIRED, May 4, 2005, available at <http://www.wired.com/science/planetearth/news/2005/05/67416>.

66. Energy Policy Act of 2005, Pub. L. No. 109-58, 119 Stat. 594 (2005) (codified in scattered sections of the U.S.C.) [hereinafter Energy Policy Act].

67. *Id.*

68. *Id.*

69. *Id.*

ethanol be produced by 2013.<sup>70</sup> These requirements were further increased by the Energy Independence and Security Act of 2007.<sup>71</sup> This Act raised the biofuel requirements to 36 billion gallons by 2022, and further provided that 22 billion gallons of that requirement had to be met from sources other than corn.<sup>72</sup>

The other important piece of ethanol-related regulation is the Food, Conservation, and Energy Act of 2008—more commonly known as the 2008 Farm Bill.<sup>73</sup> In the midst of this \$288-billion agricultural bill, Congress included various incentives for ethanol producers.<sup>74</sup> In many ways this inclusion was quite fitting, as the bill subsidizing the agricultural sector, despite record profits, also has the curious purpose of continuing to support the American ethanol industry.<sup>75</sup> The bill has important consequences for the ethanol industry. First, it provides grants and loans to refineries for developing advanced biofuels.<sup>76</sup> It also provides a new tax credit for producers of cellulosic biofuels.<sup>77</sup> While the Farm Bill did decrease the VEETC from fifty-one cents per gallon to forty-five cents per gallon,<sup>78</sup> it still represents a generous tax incentive, especially when viewed in light of other ethanol incentives such as the alternative fuels mandates<sup>79</sup> and the protection provided by heavy import tariffs on foreign ethanol.<sup>80</sup>

In addition to these federal subsidies, a bevy of state subsidies for ethanol exist in various forms. In total, thirty-nine states have some form of assistance for the ethanol industry, whether in the form of grants, loans, or tax incentives.<sup>81</sup>

As of February 2010, the Obama Administration appears to support the continued subsidization of corn-based ethanol. On one hand, the Administration has proposed a new series of renewable fuel standards that would markedly cut the

---

70. *Id.* In contrast with traditional ethanol, which is produced using sugars and starches, cellulosic ethanol is produced using cellulose, found in such materials as wood and straw. Hahn, *supra* note 44, at 444.

71. Energy Independence and Security Act of 2007, Pub. L. No. 110-140 (2007) (codified in scattered sections of the U.S.C.) [hereinafter Energy Independence and Security Act].

72. *Id.*

73. The Food, Conservation, and Energy Act of 2008, Pub. L. No. 110-246, 122 Stat. 1651 (2008) (codified in scattered sections of the U.S.C.) [hereinafter 2008 Farm Bill].

74. *Id.*

75. David Herszenhorn, *Tentative Deal Reached in Congress on Farm Bill*, N.Y. TIMES, Apr. 26, 2008, at A15. The bill contained \$5.2 billion in annual payments to farmers, despite the great profits of the American agricultural sector. *Id.*

76. *Id.* Grants covering up to 30% of development and construction of biorefineries for advanced biofuels were included in this piece of legislation. *Id.* Advanced biofuels are basically those made from cellulosic ethanol, although the term does encompass any form of ethanol produced from nontraditional means. 42 U.S.C. § 7545 (2008) (“The term ‘advanced biofuel’ means renewable fuel, other than ethanol derived from corn starch, that has life cycle greenhouse gas emissions . . . that are at least fifty percent less than baseline lifecycle greenhouse gas emissions.”).

77. 2008 Farm Bill, *supra* note 73.

78. *Id.*

79. Energy Independence and Security Act, *supra* note 71.

80. Downie, *supra* note 27.

81. Hahn, *supra* note 44, at 442.

present \$3 billion a year in subsidies for corn-based ethanol producers.<sup>82</sup> At the same time, however, in early February 2010, the Environmental Protection Agency (EPA) announced that it had changed the rules for meeting the past congressional mandate for advanced biofuels so that more corn ethanol could count toward that goal—something the Bush Administration EPA had deemed insufficient in achieving a reduction in greenhouse gases.<sup>83</sup> Further, President Obama has also stated that he supports the use of stimulus money for biofuels research and the preservation of ethanol industry jobs.<sup>84</sup> These early positions seem consistent with President Obama's statements as a candidate and as a senator when he stated that he considered himself a "strong supporter of ethanol" and that ethanol represented "the future of the auto industry."<sup>85</sup> But at the same time, the exact future of the support for corn ethanol, as well as that of other biofuels, remains very much a fluid issue at the time of this writing.

### *C. Rationale Behind Support for Ethanol Subsidy Programs*

Seemingly lost in the discussion of the quantification of all these ethanol subsidies is any discussion of the "why." Many politicians see ethanol as a universally popular issue supported by a wide spectrum of interest groups.<sup>86</sup> Ethanol subsidies appeal to environmentalists, national security interests, and the all-important agricultural sector at the same time.<sup>87</sup> Indeed, it would be an error to simplify ethanol support as just being a region-specific issue to the Midwest, driven by that region's agricultural sector.<sup>88</sup> As with any industrial growth, there is a corresponding increase in job growth in that sector.<sup>89</sup> Such an increase in

---

82. Jim Tankersley, *New Standards Could Cut Tax Breaks for Corn-based Ethanol*, L.A. TIMES, May 6, 2009, available at <http://articles.latimes.com/2009/may/06/nation/na-corn-ethanol6>.

83. Jonathan Fahey, *Corn Ethanol Gets Obama's Support*, FORBES, Feb. 9, 2010, available at <http://www.forbes.com/2010/02/08/corn-ethanol-obama-technology-ecotech-biofuels.html>.

84. *Obama Gives Support to Ethanol Initiatives*, RICHMOND TIMES DISPATCH, May 6, 2009, available at [http://www2.timesdispatch.com/rtd/news/national/article/ETHA06\\_20090505-220612/265933/](http://www2.timesdispatch.com/rtd/news/national/article/ETHA06_20090505-220612/265933/).

85. Editorial, *King Corn Cows Washington*, BOSTON GLOBE, Mar. 13, 2009, available at [http://www.boston.com/bostonglobe/editorial\\_opinion/editorials/articles/2009/03/13/king\\_corn\\_cows\\_washington/](http://www.boston.com/bostonglobe/editorial_opinion/editorials/articles/2009/03/13/king_corn_cows_washington/).

86. *Id.*

87. *Id.* This is not to say, however, that ethanol does not have vocal opponents as well. One example is Texas Governor Rick Perry who tried unsuccessfully to opt out of the increased Renewable Fuels Standard outlined in the Energy Independence and Security Act of 2007. Ayesha Rascoe, *Texas Governor Urges EPA to Grant Ethanol Waiver*, REUTERS, June 24, 2008, <http://www.reuters.com/article/environmentNews/idUSN2426314020080624>. Perry argued that the mandate would further increase the price of corn, which would be detrimental to both ranchers and consumers. *Id.*

88. Ethanol production is generally centered in that region, with more than forty plants in the state of Iowa alone. Duffield et al., *supra* note 30, at 436.

89. In 2006, the ethanol lobby contends that the industry increased gross economic output in excess of \$40 billion and was tied to the creation of more than 160,000 new jobs. Int'l Biofuels Comm'n, *Help Fuel the Future—Economic Development*, <http://helpfuelthefuture.org/web/content/view/21/33/> (last visited Feb. 27, 2010). Others,

employment leads to growth in the number of interested parties affected by the growth of ethanol. Therefore, it would be a mistake to narrowly define the groups directly dependent upon ethanol subsidies. Like most interest group issues, it is just not that simple.

Certainly the large campaign contributions of companies like Archer Daniels Midland (ADM), one of the nation's largest ethanol producers,<sup>90</sup> have not hurt ethanol's promulgation. But, there is no easily identifiable anti-ethanol-subsidy lobby. True, there is discernible opposition from ranchers,<sup>91</sup> libertarian economic groups,<sup>92</sup> and an increasing number of environmentalists,<sup>93</sup> among others, but there is no strident anti-ethanol tenor to counterbalance the loud chorus of voices supporting ethanol and its accompanying subsidies. Thus, when viewed from afar, a rather one-sided picture of the relative value of continued ethanol subsidization is all that is readily available.

Interest-group politics and ethanol go hand in hand, as politicians cannot easily cross these powerful groups without suffering electoral consequences. While the debate over ethanol subsidies was not a national front-burner issue, it was a pivotal one in farm-belt states, both in national<sup>94</sup> and local<sup>95</sup> elections in 2008. This

---

however, contend that these job-growth numbers are markedly overstated. *See, e.g.,* Nafeesa Syeed, *Report: Ethanol Industry's Job Impact Overstated*, ASSOCIATED PRESS, Feb. 12, 2008. The article cites an Iowa State University economist, David Swenson, who argues that "ethanol producers offer unrealistic labor numbers because they use misleading indicators." *Id.* For instance, he said, "existing farmers who provide corn are included in the job growth." *Id.*

90. JAMES BOVARD, CATO INST., ARCHER DANIELS MIDLAND: A CASE STUDY IN CORPORATE WELFARE, (1995), available at <http://www.cato.org/pubs/pas/pa-241.html>. ADM is estimated to control 25% to 30% of the domestic ethanol market. Christopher Cook, *Biofuel: Who Benefits – Smaller Growers or Just Large-Scale Producers and Agribusiness?*, AM. PROSPECT, Apr. 14, 2006, available at <http://www.commondreams.org/views06/0414-22.htm>. Fortune Magazine estimated that ADM earned a minimum of \$610 million before taxes from ethanol production in 2006 alone. ROBERT GLENNON, UNQUENCHABLE: AMERICA'S WATER CRISIS AND WHAT TO DO ABOUT IT 51 (2009) [hereinafter GLENNON, UNQUENCHABLE].

91. *Cattle Farmers See Lean Times*, AUGUSTA CHRON., Aug. 10, 2008, at F01 (attributing doubling in the price of corn and the ensuing economic hardships for ranchers to the congressional mandates for ethanol production).

92. *See, e.g.,* BOVARD, *supra* note 90.

93. *See, e.g.,* Rebecca Brooke et al., Nat'l Wildlife Found., *Corn Ethanol and Wildlife: How Increases in Corn Plantings Are Affecting Habitat and Wildlife in the Prairie Pothole Region 1*, 13 (2009) (describing how the movement to convert grasslands into farmlands for corn ethanol needs had profoundly affected sensitive wildlife species).

94. *See, e.g.,* Grant Schulte, *Tight Race in Iowa Could Make Ethanol a Key Issue; Candidates' Views on Biofuels May Sway Undecideds*, USA TODAY, Oct. 10, 2008, at 5A. Indeed, John McCain's opposition to ethanol subsidies may have prevented him from winning in Iowa, a state which George W. Bush had carried four years prior. Mike Glover, *Obama Claims Iowa's 7 Electoral Votes*, ASSOCIATED PRESS, Nov. 5, 2008.

95. For example, in the Republican gubernatorial primary election in Missouri, one of the principal differences between the two leading candidates was their differences on ethanol policy. The candidate supporting ethanol subsidies ultimately prevailed in that

status-quo situation regarding ethanol subsidies, supported by wide-ranging interest groups, appears to be something that will not change in the near term.

## II. THE FAR-REACHING EFFECTS OF ETHANOL SUBSIDIES

Due to its unnaturally large expansion caused by subsidies at the state and federal level, ethanol production has had effects across the entire national economy.<sup>96</sup> One interesting question is whether the increasing production of ethanol has had any effect on the demand for gasoline. In fact, it is quite possible that ethanol *has* changed domestic demand for gasoline.<sup>97</sup> Annual percentage increases in the demand for gasoline have slowed in recent years,<sup>98</sup> during the same period in which ethanol production has increased markedly.<sup>99</sup> This correlation does not unequivocally denote causation, however, because the change in gasoline demand can also be attributed to the changing demographics of the American population.<sup>100</sup>

But the argument can also be made that ethanol has in fact served as a substitute for gasoline. This can be seen as a positive transition away from gasoline, with its questionable origins around the globe, and toward ethanol from America's heartland. But ethanol's possible effect on gasoline demand is only a small part of ethanol's impact on the American landscape.

### A. Ethanol's Environmental Impact

Imagining a fuel created from corn immediately conjures an image of an environmentally friendly alternative to the carbon-dioxide emissions and smog that result from burning gasoline. That image, however, is very misleading because burning of ethanol is, in some ways, even more environmentally damaging than burning gasoline.<sup>101</sup> Based on emissions alone, it is unclear whether ethanol is a net plus or minus for the environment. It is important to examine, in detail, ethanol's environmental impact.

One of the big environmental issues gasoline presents is that its associated carbon emissions are closely linked to global warming. And indeed,

---

election. Tony Messenger & Virginia Young, *Hulshof Leads in GOP Contest*, ST. LOUIS POST-DISPATCH, Aug. 6, 2008, at A1.

96. See *infra* Part II.

97. Timothy Gardner & Rebekah Kebede, *Ethanol Boom May Stifle U.S. Gasoline Demand*, REUTERS, Feb. 14, 2008, <http://www.reuters.com/article/reutersEdge/idUSN1349602720080214>.

98. *Id.* Average gasoline demand growth has averaged at about 1.3% each year between 1971 and 2007 but was only at 0.7% in 2007. *Id.*

99. Renewable Fuels Ass'n, Industry Statistics, <http://www.ethanolrfa.org/industry/statistics/> (last visited Mar. 1, 2009). For example, in 1980, the United States produced 175 million gallons of ethanol. *Id.* By 2006, that number had skyrocketed to 4855 million gallons. *Id.* One year later, that number had further increased to 6500 million gallons. *Id.*

100. *Id.*

101. See EPA, REGULATORY IMPACT ANALYSIS: RENEWABLE FUEL STANDARD PROGRAM (2007), available at <http://www.epa.gov/otaq/renewablefuels/420r07004.pdf> [hereinafter EPA, REGULATORY IMPACT ANALYSIS].

ethanol likely results in a decrease in those carbon emissions when compared with the burning of gasoline.<sup>102</sup> Ethanol has other positive environmental effects as well. For example, it can be attributed to the reduction in other airborne pollutants, such as carbon monoxide and benzene emissions.<sup>103</sup> These are significant political considerations because curbing the effects of global warming is an important environmental concern.

But, there are disquieting downsides to ethanol that must also be assessed when considering whether it is a viable alternative to gasoline. For example, the EPA found that ethanol use is linked to increases in the emissions of nitrogen oxides, a pollutant.<sup>104</sup> In addition, it found that the production and transportation of ethanol results in increased emissions of sulfur oxides, particulate matter, and volatile organic compounds.<sup>105</sup> Further, ethanol may well be linked to groundwater contamination.<sup>106</sup>

Another environmental impact of ethanol is much more subtle. With the increase in domestic corn demand by ethanol producers, American corn exports are inevitably squeezed out.<sup>107</sup> With less imported American corn available, developing countries must allocate additional lands for farming and food production in order to meet their nations' food needs.<sup>108</sup> Corn crops are grown in the most fertile and traditionally used farming areas, forcing farmers of other crops to find alternative growing locations, leading to increased deforestation.<sup>109</sup> This resulting deforestation will decrease the levels of carbon dioxide exchanged by trees into oxygen, causing a possible increase in global warming.<sup>110</sup>

---

102. Jerry Taylor & Peter Van Doren, *The Ethanol Boondoggle*, MILKEN INST. REV., Jan. 2007, at 16, 16–27.

103. See EPA, REGULATORY IMPACT ANALYSIS, *supra* note 101.

104. *Id.*

105. *Id.*

106. See Robert K. Niven, *Ethanol in Gasoline: Environmental Impacts and Sustainability Review Article*, 9(6) RENEW. SUSTAIN. ENERGY REV. 535, 535–55 (2005).

107. Hahn, *supra* note 44, at 447.

108. *Id.*

109. For example, it has been argued that “[t]he U.S. might need to clear an additional 50 million acres of forest, or more, to produce economically significant amounts of liquid-transport biofuels.” DENNIS AVERY, COMPETITIVE ENTER. INST., BIOFUELS, FOOD, OR WILDLIFE? THE MASSIVE LAND COSTS OF U.S. ETHANOL 22 (2006). This transition from grasslands to farmlands has already been linked to harmful effects on sensitive wildlife. See BROOKE, *supra* note 93.

110. AVERY, *supra* note 109, at 22. Nor is this environmental degradation solely an American problem. For example, the increased deforestation of the rainforests to accommodate new sugar cane plantations is of great concern to many in the environmental community. See Peter Baker & Bill Brubaker, *Bush Hails International Ethanol Production*, WASH. POST, Mar. 9, 2007, available at <http://www.washingtonpost.com/wp-dyn/content/article/2007/03/09/AR2007030900767.html>. A recent study projected that the increased number of biofuel plantations would directly and indirectly result in a “projected deforestation of 121,970 km<sup>2</sup> by 2020.” David M. Lapola et al., *Indirect Land-use Changes Can Overcome Carbon Savings from Biofuels in Brazil*, PNAS Early Edition, at 1, <http://www.pnas.org/cgi/doi/10.1073/pnas.0907318107>. The authors of that study further

Another important consideration when weighing the relative value of ethanol is the large quantity of water needed for its production.<sup>111</sup> In fact, Robert Glennon has argued that water is ethanol's true Achilles heel.<sup>112</sup> While it takes ethanol plants approximately four gallons of water to produce one gallon of ethanol fuel, it takes up to 2500 gallons of water to grow a sufficient amount of corn to even produce one gallon of fuel.<sup>113</sup> When one considers that eleven billion gallons of ethanol are produced on an annual basis, this amounts to a tremendous amount of water usage.<sup>114</sup> This prodigious water consumption is especially troubling when viewed in light of present unsustainable levels of domestic water consumption.<sup>115</sup> When considering ethanol's overall environmental impact, it is important to properly weigh the very large quantities of water that are needed to sustain domestic ethanol production.<sup>116</sup> The cost of ethanol's water needs is an easily ignored, but very pertinent, problem in considering ethanol's environmental impact.

These tradeoffs between the benefits and burdens of increased ethanol production leave for consideration the relative net impact of ethanol upon the environment as a whole. While it is advantageous to achieve reductions in carbon emissions through ethanol use,<sup>117</sup> the impact upon air quality standards caused by ethanol's increased nitrogen oxides and fine particulate matter<sup>118</sup> draws pause. This tradeoff would only be deemed truly advantageous if an increase in air pollution is preferable to the alternative of a rise in carbon emissions. This is not a choice that many would consider clear-cut.

#### ***B. Effect on the Price of Corn and Other Related Products***

The production of American ethanol has also had a sizeable impact on the price demanded for corn. The price of corn has increased dramatically over the past two decades, during which time ethanol production really kicked into high

---

argued that indirect land-use changes due to crop expansion "could considerably compromise the [greenhouse gas emissions] savings from growing biofuels." *Id.* at 2.

111. Recall that water was one of the principal ingredients used to produce ethanol from corn. *See supra* Introduction, Part I.A.

112. GLENNON, UNQUENCHABLE, *supra* note 90, at 51–56.

113. *Id.* *See also* Robert Glennon, *Our Water Supply, Down the Drain*, WASH. POST, Aug. 23, 2009, available at <http://www.washingtonpost.com/wp-dyn/content/article/2009/08/21/AR2009082101773.html>.

114. *See* Renewable Fuels Ass'n, *supra* note 15. To reach 7.5 billion gallons of ethanol produced in 2012, the ethanol target proposed by the Energy Policy Act of 2005, 48 billion gallons of water would have to be consumed. GLENNON, UNQUENCHABLE, *supra* note 90, at 55. This water consumption figure does not include the water needed to grow the corn for the ethanol. *Id.*

115. GLENNON, UNQUENCHABLE, *supra* note 90, at 21–77.

116. This is especially true when this quantity is achieved by pumping groundwater, which has particular issues with unsustainability. *See* ROBERT GLENNON, *WATER FOLLIES: GROUNDWATER PUMPING AND THE FATE OF AMERICA'S FRESH WATERS* (2002).

117. *See* EPA, *REGULATORY IMPACT ANALYSIS*, *supra* note 101.

118. *Id.*

gear.<sup>119</sup> For example, in 1990 the average price for a bushel of corn was \$2.36.<sup>120</sup> Five years later, the price for a bushel of corn had increased to \$3.24.<sup>121</sup> While the price of corn did dip in the late 1990s,<sup>122</sup> by 2007 it had again returned to mid-1990s levels.<sup>123</sup> One year later, the price of corn had soared to record levels, which previously would have been virtually unthinkable.<sup>124</sup> The price of corn in September 2008 had reached \$5.37 per bushel.<sup>125</sup> In fact, this price approached corn's all-time high.<sup>126</sup> Some would argue that it is unfair to completely blame ethanol for this spike in corn prices.<sup>127</sup> After all, this was during a period of record-high gasoline prices, which made products across the economy more expensive.<sup>128</sup> In such a period of high fuel prices, it has to follow that the near-record high prices of corn have to be largely dependent upon those gasoline prices.

The problem with this argument, however, was revealed during the bursting of the price bubble on oil. While the price of oil fell markedly over the last quarter of 2008,<sup>129</sup> the price of corn, along with other food prices, remained relatively constant.<sup>130</sup> While to an extent it is fair to argue that some of this consistency in the price level of corn is due to the inherently inelastic demand for corn, it also shows that fluctuations in the price of corn are largely independent

---

119. US Corn: USDA Production History, The Hightower Report, [http://www.cmegroup.com/trading/commodities/files/corn\\_prod\\_history\\_cbt.pdf](http://www.cmegroup.com/trading/commodities/files/corn_prod_history_cbt.pdf) (last updated Feb. 9, 2010).

120. *Id.*

121. *Id.*

122. *Id.* For example, the price of a bushel of corn in 1999 was \$1.82. *Id.*

123. Editorial, *The Price of Corn*, N.Y. TIMES, Feb. 6, 2007, at A20.

124. The price of corn had stayed relatively steady over the course of the last few decades. See G.A. Barnaby, Kan. State Univ., Historical Corn and Soybean Market Prices, <http://www.agmanager.info/crops/insurance/workshops/filespdf/ABecorn.pdf> (last visited Jan. 25, 2009).

125. Moming Zhou, *Corn Contract Falls to One-Month Low as Dollar Strengthens*, MARKETWATCH, Sep. 10, 2008, available at [http://www.marketwatch.com/news/story/corn-contract-falls-one-month-low/story.aspx?guid=%7B8075EEA2-9FC8-48A4-82F3-FE056DA45CFC%7D&dist=msr\\_7](http://www.marketwatch.com/news/story/corn-contract-falls-one-month-low/story.aspx?guid=%7B8075EEA2-9FC8-48A4-82F3-FE056DA45CFC%7D&dist=msr_7).

126. Editorial, *The Price of Corn*, *supra* note 123. The record was \$5.545 set in July 1996. *Id.*

127. See, e.g., Duffield et al., *supra* note 30.

128. Jad Mouawad, *Oil Tops Inflation-Adjusted Record Set in 1980*, N.Y. TIMES, Mar. 4, 2008, at C1. Record high oil prices were tied to increased consumer prices. *Id.*

129. Jim Gallagher, *Gasoline Price War: Average of \$1.51 Is Near 5-year Low—Some Stations Are Selling Fuel Below Cost*, ST. LOUIS POST-DISPATCH, Nov. 28, 2008, at A1 (stating oil “is down from \$147 per barrel in July to \$51 on Wednesday, Nov. 26, 2008”).

130. Stevenson Jacobs, *Commodities Slump Won't Mean Lower Food Prices*, ASSOCIATED PRESS, Aug. 20, 2008 (“[W]hile easing prices for crude and other commodities have allowed retail gas prices to come down almost 10 percent from July highs, food prices have been more stubborn.”). Corn prices are no longer at record high levels but remain high relative to historical levels. See *Copper Rises as Demand from China Appears Strong*, NY TIMES, Feb. 18, 2010, available at <http://www.nytimes.com/aponline/2010/02/18/business/AP-US-Commodities-Review.html?scp=4&sq=price%20of%20corn&st=cse> (citing the price of corn at \$3.69 per bushel).

from shifts in the price of oil. While not entirely dispositive on the subject, this empirical evidence would suggest that the promulgation of ethanol has had a very important role in the increased food prices.<sup>131</sup> Indeed, the Congressional Budget Office has recognized the connection between higher food prices and ethanol.<sup>132</sup>

These changes in food prices are not limited solely to corn itself but affect all products which rely upon corn. Such products consist of both direct corn byproducts as well as products whose production is merely related to corn. One example of a corn product that has seen a rise in its price is tortillas.<sup>133</sup> For example, in Mexico, where tortillas are a dietary staple, prices have risen more than 60%.<sup>134</sup> This is an interesting linkage, as Mexico generally consumes a different type of corn than is used in ethanol, so the change in the price of tortillas results from substitution amongst different types of corn which are available in the global supply chain, thereby reflecting an interconnectedness between different agricultural products—as the price of one increases due to increased demand, the prices of its close substitutes will also increase.<sup>135</sup> This shows how widely the effects of a public policy on ethanol can be felt in the global economy.

Corn's impact on agricultural food prices is also a result of corn being one of the most common animal feeds.<sup>136</sup> Indeed, the Congressional Budget Office has noted this connection between ethanol and higher animal feed prices.<sup>137</sup> Cattle ranchers have been particularly concerned with how higher corn prices resulting from an increased subsidization of ethanol would affect demand for their

---

131. And while food prices did fall slightly in 2009 during the economic recession, this issue will soon return to the front burner as the Department of Agriculture estimates that food prices may rise by up to 4% in 2010. Dan Burrows, *Sticker Shock at the Supermarket: Food Prices Poised to Rise*, DAILY FIN., Oct. 15, 2009, <http://www.dailyfinance.com/story/why-do-you-pay-so-much-for-these-foods/19190587/>. See also William Neuman, *U.S. Expects Food Prices to Start Ticking Up*, N.Y. TIMES, Aug. 25, 2009, available at [http://www.nytimes.com/2009/08/26/business/economy/26food.html?\\_r=2&scp=2&sq=Lapp&st=cse](http://www.nytimes.com/2009/08/26/business/economy/26food.html?_r=2&scp=2&sq=Lapp&st=cse) (“Bill Lapp, president of Advanced Economic Solutions, a consulting firm that specializes in analysis of food commodity costs, . . . said that one reason food prices would continue to rise was that commodities like corn continued to trade above historical averages, even though they had come down from the unusually high levels they reached last year.”).

132. CONG. BUDGET OFFICE, ETHANOL REPORT, *supra* note 32, at 10.

133. Carolyn Said, *Nothing Flat About Tortilla Prices*, S.F. CHRON., Jan. 13, 2007, at C-1.

134. *Id.*

135. *Id.* “The price of oil is driving up the price of corn (because of increased ethanol production), which is driving up the price of tortillas,” said Peter Navarro, a business professor at UC Irvine. *Id.*

136. Ky. Corn Growers Ass’n, Livestock Feed Program, <http://www.kycorn.org/kycgaprojects/feedcorn.htm> (last visited Jan. 26, 2009). In fact, the livestock feed market is the largest domestic use for corn at 55% to 60% of the total annual corn market. *Id.* This fact makes the livestock feed market particularly susceptible to changes in price due to changes in overall demand for corn. Rascoe, *supra* note 87. The National Cattlemen’s Beef Association claimed that the cattle industry lost \$2 billion in the first half of 2008 due to increased feed prices. *Id.*

137. CONG. BUDGET OFFICE, ETHANOL REPORT, *supra* note 32, at 9.

product.<sup>138</sup> And it's not just cattle ranchers concerned about congressional pork benefiting ethanol producers; hog farmers are also concerned by the effects of ethanol subsidies.<sup>139</sup> Changes in overall demand for corn, which result in an increased price, will inevitably lead to an increase in all these related agricultural markets.<sup>140</sup> This is exactly what we have seen in the U.S. markets over the last several years. For example, Department of Agriculture data showed that U.S. egg prices increased by 29.2% in 2007.<sup>141</sup> This follows a previous increase in the domestic egg market of 4.9% in 2006.<sup>142</sup> But the domestic market for eggs is not alone in seeing higher prices. The Labor Department reported that food prices rose by a seasonally adjusted annual rate of 5.1% in the first quarter of 2008, higher than had been reported in either of the previous three years.<sup>143</sup> This is a very high shift that far outpaced the rate of inflation during that period.<sup>144</sup>

All this discussion of domestic subsidization of corn and ethanol must also be viewed against the backdrop of an international community that is becoming increasingly opposed to the subsidization of agriculture. U.S. corn subsidies are seen by many in the world community as distorting the worldwide price for corn and corn byproducts.<sup>145</sup> Many experts believe that if these subsidies were ever challenged by a WTO member nation, they would likely be held to violate WTO regulations.<sup>146</sup> This situation is especially galling to many in the international community because American farmers, who are generally quite

---

138. Rascoe, *supra* note 87. Gregg Doud, an economist with the National Cattlemen's Beef Association, argued that the requirements for increased ethanol production resulting from the Energy Independence and Security Act of 2007 would "shrink meat animal protein production not only in this country, but globally." *Id.*

139. Bob Burgdorfer, *As Grain Growers Profit, U.S. Hog Farmers Suffer*, REUTERS, Apr. 9, 2008, available at <http://www.reuters.com/article/domesticNews/idUSN0446825120080410?sp=true>.

140. This supposes that a more economical substitute for corn would not be possible. Certainly in the short term this does not appear to have happened in the domestic market for livestock feed.

141. Diana Furchgott-Roth, *The Case for Ending Ethanol Subsidies*, AM., Apr. 22, 2008, available at <http://www.american.com/archive/2008/april-04-08/the-case-for-ending-ethanol-subsidies>.

142. *Id.*

143. *Id.* By contrast, food prices rose 4.8% during the same period in 2007 and by 2.2% in that period in 2006. *Id.*

144. The rate of inflation for the year 2008, as measured by the Consumer Price Index, was 3.8%. Bureau of Labor Statistics, Consumer Price Index, available at <ftp://ftp.bls.gov/pub/special.requests/cpi/cpi.txt> (last visited Jan. 25, 2009).

145. William Hett, *U.S. Corn and Soybean Subsidies: WTO Litigation and Sustainable Protections*, 17 TRANSNAT'L L. & CONTEMP. PROBS. 775, 777 (2008).

146. *Id.* at 794. See also Phoenix X.F. Cai, *Think Big and Ignore the Law: U.S. Corn and Ethanol Subsidies and WTO Law*, 40 GEO. J. INT'L L. 865, 865 (2009); Panel Report, *United States—Subsidies on Upland Cotton*, WT/DS267/R (Sept. 8, 2004) (WTO case where Brazil successfully challenged U.S. cotton subsidies as having been a violation of WTO agreements).

efficient in their methods, benefit from having open access to other markets.<sup>147</sup> As such, this subsidization may be untenable from this perspective as well.

In sum, ethanol has had far-reaching impacts on the American landscape, some positive, but many more less so. Increased ethanol use has resulted in less overall carbon emissions and a reduction in the emission of some airborne pollutants, when viewed as a substitute for gasoline.<sup>148</sup> On the other hand, increased ethanol use is linked to higher amounts of other harmful pollutants,<sup>149</sup> as well as to a possible increase in groundwater contamination.<sup>150</sup> In addition, ethanol's significant water needs exacerbate the depletion of domestic water sources.<sup>151</sup>

Domestic effects, however, have not been merely environmental in nature. Ethanol, as a corn-based product, has raised the prices of food products relating to corn and resulting from the use of corn as animal feed.<sup>152</sup> Indeed, food prices as a whole, driven by all these ethanol-related increases, have increased markedly in the last few years, directly correlating with ethanol's increased promulgation.<sup>153</sup> And yet through all this, it does not seem that any vocal source has argued that this increased production of ethanol has led to a significant reduction in overall domestic crude oil consumption.

So while it would be untrue to say that ethanol has had no positive effects on the domestic economy, it is difficult to argue that ethanol has been a net positive in the United States. As such, it becomes of paramount importance to tweak the present situation so that ethanol's present benefits are maintained, while seeking to limit its negative consequences.

### III. POLICY SOLUTIONS FOR LIMITING THE NEGATIVE EFFECTS OF ETHANOL SUBSIDIES

So what is to be done to curb these unfortunate negative impacts in the United States? While the natural answer would be to suggest that ethanol subsidies be greatly reduced or eliminated, this is an all-but-impossible sell to politicians afraid of upsetting the powerful agricultural lobby. This is a rather sad state of affairs, especially given that in a time of economic recession, there are far better uses for tax dollars than to subsidize successful agricultural conglomerates. Also, it would be difficult to portray an elimination of ethanol subsidies as a forward-

---

147. Hett, *supra* note 145, at 778. *See also* Leslie Moore Mira, *Brazil Ethanol Sector Vies to Win over US; Wants Tariff Dropped on Exports*, PLATTS OILGRAM NEWS, June 23, 2008, at 9 (describing Brazilian opposition to U.S. ethanol tariffs).

148. Taylor & Van Doren, *supra* note 102; *see* EPA, *supra* note 101.

149. *See* EPA, *supra* note 101.

150. Niven, *supra* note 106.

151. GLENNON, UNQUENCHABLE, *supra* note 90, at 51–56.

152. Said, *supra* note 133; Furchgott-Roth, *supra* note 141. Other commentators point to other factors to explain the rise in food prices including higher transportation costs, higher processing costs, higher fertilizer prices, and several consecutive poor growing seasons. John Sterlicchi, *Inside the Ethanol Subsidies Controversy*, BUS. GREEN, Jan. 8, 2009, <http://www.climatebiz.com/feature/2009/01/08/inside-ethanol-subsidies-controversy>.

153. Said, *supra* note 133.

thinking policy approach if nothing was put forth as an alternative. So rather than seeking a halt to ethanol subsidies, the real question is how to support alternatives to ethanol that share its advantages (as a domestically produced product which lessens foreign oil imports), while not possessing its disadvantages regarding the environment and international trade relations. This section will argue that these changes can best be effectuated by a two-pronged approach: by decreasing governmental assistance to corn ethanol producers and by supporting alternative technologies that have the potential to be a better substitute for oil.

#### *A. Decreasing Governmental Intervention in the Agricultural Market*

One somewhat palatable solution would be to limit, if not completely eliminate, agricultural subsidies. Ignoring the imprudence of subsidizing an industry that is presently enjoying record profits<sup>154</sup> and is in no real need of protection, ethanol producers should not be able to double-dip in both agricultural and ethanol subsidies.<sup>155</sup> With one billion dollars worth of agricultural subsidies benefitting ethanol producers each year, this would be a significant improvement over the status quo.<sup>156</sup> And since there is already a trend toward eliminating agricultural subsidies, a requirement forbidding agricultural interests from double-dipping in both forms of subsidies is something that could be accomplished.<sup>157</sup> Eliminating this type of subsidy would make it less attractive for farmers to grow corn for ethanol, as growing corn would thereby be less profitable.<sup>158</sup>

Another good policy shift would be to eliminate the onerous tariffs on imported ethanol. Brazilian ethanol is taxed at fifty-four cents per gallon when imported into the United States.<sup>159</sup> There is a reason for this, as Brazilian ethanol producers have a significant competitive advantage compared with U.S. producers. Using the example of sugar cane, the gross feedstock costs of Brazilian ethanol are

---

154. See, e.g., *Monsanto Quarterly Profit Jumps 71 Per Cent*, GLOBE & MAIL, June 29, 2007, at B7; Barrie McKenna, *Few Headaches in the Heartland, So Why the Added Subsidies*, GLOBE & MAIL, May 20, 2008, at B11. On the other hand, agricultural producers have not been immune to the global recession. See, e.g., Carey Gillam, *Credit Crisis Hits Global Farming Sector*, GLOBE & MAIL, Oct. 3, 2008, at B9. See also GLENNON, UNQUENCHABLE, *supra* note 90, at 51 (describing the profits of ADM).

155. Bryce, *supra* note 62.

156. Koplw, *supra* note 31. These agricultural subsidies amount to 15% of total ethanol subsidies. *Id.*

157. See, e.g., Andrew Martin, *Drilling Down on the Budget*, N.Y. TIMES, Feb. 27, 2009, at A16. President Obama has proposed that farm subsidies which are not dependent upon crop prices be eliminated for agribusinesses with annual sales revenue exceeding \$500,000. *Id.*

158. And any reduction in farm subsidies would play well on the international stage where American farm subsidies are a major stumbling block. See, e.g., Sid Marris, *Trade Warning for U.S.*, AUSTRALIAN, July 4, 2007, at 2 (describing how Australian officials had warned then-U.S. Trade Representative Susan Schwab and Agriculture Secretary Mike Johanns that U.S. farm subsidies would sideline WTO trade negotiations).

159. Downie, *supra* note 27.

about thirty cents per gallon of ethanol produced.<sup>160</sup> This is only slightly more than one-third the cost of producing a gallon of ethanol from corn in the United States.<sup>161</sup> So as it presently stands, the Brazilians simply have a more efficient system for producing ethanol. Accordingly, it would be a very positive signal to the world community if the United States were to reduce, or eliminate entirely, the tariffs on Brazilian ethanol. First, it would be a boon to American consumers: not only would they have access to cheaper ethanol, but domestic corn prices would fall, leading to less expensive visits to the grocery store. Second, relaxing the tariffs would have a great impact on our global trading relationships, especially with Brazil, which has loudly complained about the ethanol tariffs and may be considering a WTO challenge of said tariffs.<sup>162</sup> And with all the controversy in the world community regarding U.S. farm subsidies, this would be a tangible gesture to which the U.S. could point.<sup>163</sup> By opening up the ethanol market to foreign competitors, American consumers would benefit from this increased competition, as would this country's international reputation.

In addition to opening up the domestic market to foreign ethanol producers, the United States must look to more efficient ethanol technologies for domestic ethanol production that will render a final product that is more beneficial to the American consumer.<sup>164</sup> Since ethanol can be made with most sugar-containing plant materials, not just corn and sugar cane,<sup>165</sup> finding the feedstock that produces the best ethanol product, the highest-energy-producing product with the fewest liabilities, would increase overall efficiency.

### ***B. Investing in Nascent and Existing Technologies with Untapped Potential***

One promising alternative is cellulosic ethanol. Cellulosic ethanol differs from traditional sugar-based ethanol in that it is produced using cellulose, which is

---

160. USDA, THE ECONOMIC FEASIBILITY OF ETHANOL PRODUCTION FROM SUGAR IN THE UNITED STATES 3 (July 2006), available at <http://www.usda.gov/oce/reports/energy/EthanolSugarFeasibilityReport3.pdf>.

161. *Id.*

162. Cai, *supra* note 146, at 865; Moore Mira, *supra* note 147.

163. See, e.g., *Emerging Economies Slam New US Farm Bill at WTO*, INT'L HERALD TRIB., June 3, 2008, available at <http://www.iht.com/articles/ap/2008/06/03/business/EU-FIN-ECO-WTO-US-Farm-Bill.php>. Unfortunately, this does not appear to be quickly forthcoming as President Obama has indicated that he does not intend to press for a unilateral end to these subsidies, absent progress in the Doha trade negotiations. Alan Beattie, *Obama Says No Quick End to Ethanol Dispute*, FIN. TIMES, Mar. 15, 2009, available at [http://www.ft.com/cms/s/0/7f40b194-1109-11de-994a-0000779fd2ac.html?nclick\\_check=1](http://www.ft.com/cms/s/0/7f40b194-1109-11de-994a-0000779fd2ac.html?nclick_check=1).

164. This is not to say, however, that all new biofuel technologies are beneficial to the consumer. For example, Tyson Foods and Conoco have created a method for transforming animal fat into diesel fuel, using traditional refining methods. Rina Palta, *Lipstick on a Pig*, AM. PROSPECT, May, 17, 2007, [http://www.prospect.org/cs/articles?article=lipstick\\_on\\_a\\_pig](http://www.prospect.org/cs/articles?article=lipstick_on_a_pig). Critics across the political spectrum argue that the resulting fuel is not clean burning and has many efficiency concerns. *Id.*

165. Ethanol Promotion & Info. Council, *Producing Ethanol*, [http://www.drivingethanol.org/ethanol\\_facts/producing\\_ethanol.aspx](http://www.drivingethanol.org/ethanol_facts/producing_ethanol.aspx) (last visited Mar. 1, 2009).

a component of plants such as wood and straw.<sup>166</sup> One foreseeable way of using this technology would be to produce cellulosic ethanol using switchgrass.<sup>167</sup> Switchgrass is particularly well-suited as a biomass energy crop because it produces more biomass than most other native grasses.<sup>168</sup> Switchgrass is also appealing based upon its environmental benefits. It is very good at holding topsoil and, thus, at preventing soil erosion.<sup>169</sup> In addition, switchgrass is excellent at capturing carbon in the air and, as such, is a good alternative to burning fossil fuels.<sup>170</sup> Moreover, it uses less energy in its production process than traditional ethanol, thereby resulting in lower greenhouse gas emissions.<sup>171</sup> The Congressional Budget Office recently acknowledged cellulosic ethanol's potential to result in lower greenhouse gas emissions.<sup>172</sup> Switchgrass is also a great habitat for indigenous wildlife during all stages of its growth and harvesting process.<sup>173</sup> And just as importantly, switchgrass can be grown on marginal tracts of land, thereby freeing up traditional farm lands for the growth and harvesting of food crops.<sup>174</sup> While cellulosic ethanol is more difficult than corn to break down into simple sugars,<sup>175</sup> it is a technological innovation that has potential as a viable alternative fuel source.

Much interest already exists in the potential of cellulosic ethanol. For example, the Energy Policy Act of 2005 created demand by requiring 250 million gallons of cellulosic ethanol by 2013.<sup>176</sup> Indeed, hundreds of millions of dollars have been allocated towards developing cellulosic ethanol technology.<sup>177</sup> This is a very interesting technology that is worthy of being funded and may very well

---

166. Hahn, *supra* note 44, at 444.

167. Don Comis, USDA, *Scientists Study Feasibility of Switchgrass for Energy Production*, Mar. 10, 2006, available at <http://www.ars.usda.gov/is/pr/2006/060310.htm>. Switchgrass is a native prairie grass presently used for cattle feed and for conservation plantings. *Id.*

168. U.S. Dep't of Energy, Bioenergy Research Ctr., *An Overview of the Science*, Feb. 2008, <http://genomicsgtl.energy.gov/centers/brcbrochure.pdf>. Scientists are also researching making cellulosic ethanol out of poplar trees. *Id.*

169. David Bransby, *Switchgrass Profile*, <http://bioenergy.ornl.gov/papers/misc/switchgrass-profile.html> (last visited Mar. 1, 2009).

170. *Id.*

171. See Alexander E. Farrell et al., *Ethanol Can Contribute to Energy and Environmental Goals*, 311 *SCIENCE* 506, 506–08 (2006).

172. CONG. BUDGET OFFICE, *ETHANOL REPORT*, *supra* note 32, at 10.

173. *Id.*

174. *Id.*

175. Roel Hammerschlag, *Ethanol's Energy Return on Investment: A Survey of the Literature 1990–Present*, 40 *ENVTL. SCI. & TECH.* 1744, 1745 (2006).

176. Hahn, *supra* note 44, at 444.

177. *Id.* For example, in 2006 the Biorefinery Initiative granted about \$150 million towards developing cellulosic technologies. Press Release, Office of the Press Sec'y, *State of the Union: The Advanced Energy Initiative*, Jan. 31, 2006, available at <http://www.whitehouse.gov/news/releases/2006/01/20060131-6.html>. The following year, the Department of Energy allocated \$385 million to six cellulosic ethanol plants. Press Release, Dep't of Energy, *DOE Selects Six Cellulosic Ethanol Plants for Up to \$385 Million in Federal Funding*, Feb. 28, 2007, available at <http://www.energy.gov/news/4827.htm>.

render traditional corn-based ethanol obsolete. This would enable ethanol's advantages to be retained, while utilizing a crop that does not have ethanol's traditional negative impacts.

Other fuel technologies may exist that enable energy-producing crops to be grown on marginal tracts of land, thereby retaining traditional farmlands for agricultural uses. One of the most interesting biofuels presently in development is that made from jatropha oil. Jatropha is a green shrub that originated in the Caribbean and is presently most commonly grown in India.<sup>178</sup> The seeds from jatropha's fruit contain a yellowish liquid that can be made into biodiesel.<sup>179</sup> What is particularly exceptional about jatropha is that it can be grown almost anywhere, without the need of substantial water or fertilizer.<sup>180</sup> Fuel produced from jatropha is estimated to be half the price of fuel produced from corn, and there is hope that it could be financially competitive with crude oil, even without government subsidies.<sup>181</sup>

There is much hope and exuberance about the possibilities of addressing large-scale energy concerns with jatropha oil. One Florida jatropha company chose to name their business "My Dream Fuel."<sup>182</sup> One industry that is already experimenting with jatropha oil is the airline industry, where planes using jatropha oil are presently being tested.<sup>183</sup> While more needs to be known about the costs and practical expectations of using jatropha oil as a fuel, it is emblematic of the types of alternative fuel technologies which could serve as a real alternative to both corn-based ethanol and fossil fuels.

Jatropha is just one example of an alternative fuel technology that could render corn ethanol obsolete. Many different alternative-fuel technologies show great promise as viable alternatives to crude oil and are much more efficient than traditional ethanol. While the Dickensian images of coal-clouded skies are difficult

---

178. Patrick Barta, *Promising Crop: Jatropha Plant Gains Steam in Global Race for Biofuels; Hardy Shrub Is Tapped for Energy-Rich Seeds; Indian Farmers' Big Bet*, WALL ST. J., Aug. 14, 2007, at A1. However, the crop is also presently being grown in Thailand, the Philippines, Swaziland, Saudi Arabia, and the United States, among other places. *Id.*; see also Bagani, *The Jatropha System*, <http://www.jatropha.de/> (last visited Mar. 1, 2009).

179. Barta, *supra* note 178.

180. *Id.*

181. *Id.* It is estimated that jatropha could cost about \$43 per barrel to produce. *Id.* The present, and relatively depressed, price of a barrel of oil is \$79.77 as of mid-February 2010. U.S. Energy Info. Admin., *supra* note 5. While jatropha would be an improvement over present oil prices, it would be a marked improvement over the peak price of oil. *Id.*

182. Tim Padgett, *The Next Big Biofuel?*, TIME, Feb. 9, 2009, at 50.

183. James Kanter, *Air New Zealand Flies on Engine with Jatropha Biofuel Blend*, N.Y. TIMES, Dec. 30, 2008, available at <http://greeninc.blogs.nytimes.com/2008/12/30/air-new-zealand-flies-on-engine-with-jatropha-biofuel-blend/?hp>. Air New Zealand is not alone in its experiments with running airplanes on jatropha fuel blends. In 2008, Continental and Virgin Atlantic also tested planes running partially on biofuels. Clifford Krauss, *Taking Flight on Jatropha Fuel*, N.Y. TIMES, Dec. 9, 2008, available at <http://greeninc.blogs.nytimes.com/2008/12/09/taking-flight-on-jatropha-fuel/>.

to overcome, much progress has been made with modern coal technology with reducing its carbon emissions throughout the burning process.<sup>184</sup>

The idea of clean coal technology is actually a combination of technologies used to reduce the environmental footprint of coal-fired power plants.<sup>185</sup> Carbon Capture and Storage (CCS) technology involves capturing the carbon dioxide produced by the burning of coal and then storing it underground.<sup>186</sup> Coal can also be prepared in such a way to eliminate unnecessary minerals that would produce more carbon if left on the coal.<sup>187</sup> That process is known as coal washing.<sup>188</sup> Coal can be gasified in order to produce an end product with very few emissions, although these low-emission coal gasification technologies are in the early stages of development.<sup>189</sup> At the same time, however, clean coal technology has been progressing markedly in recent years. For example, a public-private partnership between the State of New York and a group of businesses called the Oxy-Coal Alliance is in the initial stages of building a coal plant utilizing CCS technology.<sup>190</sup> The great benefit to coal is twofold: it is plentiful domestically, and these coal deposits are located mainly in economically hard-hit rust belt states.<sup>191</sup>

Many other alternative fuel technologies also could be solid alternatives to imported crude oil and ethanol. Wind power has gained strength in recent years as an alternative fuel source. In fact, wind power is the fastest growing sector of renewable energy in the United States and accounts for just over 1% of domestic electric utility power.<sup>192</sup> Some, including T. Boone Pickens, believe that the United States can generate 20% of its domestic energy needs from wind within the next decade.<sup>193</sup> While this may seem unattainable, other countries are already close to achieving that goal. For example, Germany already generates 14% of its electricity from wind.<sup>194</sup> For the United States to reach such a goal, however, there would need to be strong public and private support. When so much money is tied into propping up ethanol and its agribusinesses, that popular support becomes much more difficult to accomplish.

---

184. *Governors: Black Coal Must Be Part of the Energy Debate*, INT'L HERALD TRIB., Feb. 23, 2008, available at <http://www.iht.com/articles/ap/2008/02/23/america/Governors-Global-Warming.php>.

185. *Clean Coal Technology: How It Works*, BBC NEWS, Nov. 28, 2005, available at [http://news.bbc.co.uk/1/hi/news/ukfs\\_news/hi/newsid\\_4468000/4468076.stm](http://news.bbc.co.uk/1/hi/news/ukfs_news/hi/newsid_4468000/4468076.stm).

186. *Id.*

187. *Id.*

188. *Id.*

189. *Id.*

190. Press Release, N.Y. State, Governor Paterson Announces Support for New Advanced Coal Power Plant for Jamestown—First of Its Kind in the World (June 10, 2008) available at [http://www.ny.gov/governor/press/press\\_0610081.html](http://www.ny.gov/governor/press/press_0610081.html).

191. *Governors*, *supra* note 184.

192. Sarah Terry-Cobo, *Power in the Air*, FORBES, July 22, 2008, available at [http://www.forbes.com/2008/07/21/wind-power-pickens-tech-science-cx\\_stc\\_0721wind.html](http://www.forbes.com/2008/07/21/wind-power-pickens-tech-science-cx_stc_0721wind.html).

193. *Id.*

194. *Id.*

Solar power is another technology that shows promise as an alternative energy source. One of the traditional drawbacks of solar power is that it is unreliable, as it is only functional on sunny days.<sup>195</sup> Companies are presently experimenting with different ways to store solar energy in salt, so that energy can later be tapped for energy production.<sup>196</sup> With proper investments and development, solar power could be a great component of an energy-independent future.

While nuclear power also carries with it a number of bad associations, many view an increased reliance on nuclear power as a part of our energy future. Even the founder of Greenpeace, Patrick Moore, has concluded that “[n]uclear energy is the only large-scale, cost-effective energy source that can reduce these emissions while continuing to satisfy a growing demand for power. And these days it can do so safely.”<sup>197</sup> While nuclear power comes with the expensive fixed-cost price tag, it is a technology that does not produce greenhouse gases.<sup>198</sup> While nuclear power alone may not be the future of domestic energy production and distribution, it is a more environmentally friendly technology than corn-based ethanol, and it has great potential for large-scale energy production.

At the end of the day, Montana Governor Brian Schweitzer may have put it best: coal “has a CO<sub>2</sub> problem, wind has a reliability problem, solar has a price problem, nukes have a price and radiation problem. So all of these technologies have opportunities, but they all have problems.”<sup>199</sup> The key going forward with alternative fuel technologies will be to refine them in such a way as to maximize their benefits, while seeking to reduce their liabilities. By adequately funding research into alternative fuel technologies, we can create an alternative to the questionable associations of imported crude oil and the technological limitations of corn-based ethanol.

### CONCLUSION

Ethanol has proven successful as a limited substitute for imported crude oil. Made from corn, ethanol has been heavily subsidized by federal and state tax dollars<sup>200</sup> and has been further supported by federal mandates requiring the use of alternative fuels.<sup>201</sup> Some continue to argue that “[t]hanks in part to biofuels, the economic picture in the U.S. farm sector has never been brighter, with the farm economy witnessing ‘unprecedented increases in income and asset values [over]

---

195. Matthew L. Wald, *Storing Solar Power in Salt*, N.Y. TIMES, Mar. 2, 2009, available at <http://greeninc.blogs.nytimes.com/2009/03/02/storing-solar-power-in-salt/>.

196. *Id.*

197. Steven Mufson, *Warming up to Nuclear Power: Energy Source Gets Another Look as Fuel Costs Reach New Heights*, WASH. POST, Apr. 27, 2006, at D01.

198. Stephen Mufson, *U.S. Nuclear Power Revival Grows: Permission Sought to Build 2 More Reactors at Texas Facility*, WASH. POST, Sep. 25, 2007, at D01. This is in sharp contrast to ethanol’s murky effect upon greenhouse gas emissions. See CONG. BUDGET OFFICE, ETHANOL REPORT, *supra* note 32, at 10.

199. *Governors*, *supra* note 184.

200. See *supra* Part I.B.

201. See, e.g., Energy Independence and Security Act, *supra* note 71.

the past few years.”<sup>202</sup> While this may be true for the farmers and the agribusinesses that receive huge subsidies year after year, this is not true for other Americans. Even government experts admit that “given its costs, environmental issues, and the inability to grow enough feedstock, ethanol produced from corn is unlikely ever to supplement gasoline supplies to the degree necessary to meet national environmental and energy independence goals.”<sup>203</sup> That being the case, we need to be looking to alternative technologies, which do not have these substantial liabilities if we are ever going to find an alternative which will render the United States energy independent.

The profound disconnect between the costs and benefits of corn ethanol subsidies demands a reconsideration of the usefulness of these programs. Billions spent on an annual basis in ethanol subsidies could be used for more worthwhile purposes, including those which could ultimately move America further toward energy independence. Robert Hahn did a cost-benefit analysis on the effects of ethanol subsidies and concluded that:

The total costs are significantly higher than the total benefits, ranging from about \$1.5 billion . . . to about \$3 billion . . . . The main costs are the direct production costs associated with the fuel changes resulting from expanded use of ethanol over oil, the excess burden associated with the government subsidies, and the negative air quality impacts, most importantly the increased nitrogen oxides emissions from ethanol use that contribute to fine particulate matter formation, which can have negative human health effects.<sup>204</sup>

In dealing with ethanol subsidies, a good policy would be to require the government to undertake improved and more comprehensive cost-benefit analyses that better consider the full impact of subsidies before any new programs are implemented.

Ethanol is not an altogether bad technology. The problem lies in the production of ethanol from corn. Corn is simply not an energy-efficient ethanol source, and this type of ethanol has collateral effects that transcend the energy market. As a corn product, increased demand for ethanol has inevitably affected the price for corn. This has not just caused a rise in the price of corn, but it has affected the prices of all the products made with corn, such as tortillas.<sup>205</sup> As corn is one of the most common animal feeds, corn-based ethanol also has the effect of increasing the prices of goods, such as pork and livestock products and byproducts, which are dependent on this animal feed.<sup>206</sup> As food prices grow higher, the only people to benefit from this state of affairs are the ethanol lobby and agribusiness.

---

202. Duffield et al., *supra* note 30, at 443–44 (citing *Changing Agricultural Economy: Hearing Before the H. Comm. on Agriculture*, 2007 WL 3037167 (2007) (statement of Keith Collins, Chief Economist, U.S. Dep’t of Agric.)).

203. See *Alternative Fuels: Beyond Corn-Based Ethanol*, Gasoline Column, Oct. 9, 2007, <http://www.ftc.gov/ftc/oilgas/archive/071009.htm>.

204. Hahn, *supra* note 44, at 457.

205. Said, *supra* note 133.

206. Furchgott-Roth, *supra* note 141.

As billions of dollars are poured annually into corn ethanol subsidies, a real opportunity is being missed. Corn ethanol is never going to be a substitute for gasoline.<sup>207</sup> It is too expensive, too inefficient, too environmentally destructive, and requires too much land to produce.<sup>208</sup> It is simply a dead-end technology that is diverting governmental resources from supporting other more promising technologies.

The best solution to this problem is to abandon, or markedly decrease, subsidies to the corn-based ethanol industry. Given ethanol's political support, however, this would be extremely difficult to accomplish without demonstrating that other alternatives to ethanol can be put into practice. Thus, the best thing that can be done is to actively support technologies that possess ethanol's benefits, but with less of its inherent limitations. These technologies include wind, solar, and nuclear power, clean coal technologies, cellulosic ethanol, and other biofuels, such as jatropha.

An energy-independent future will almost certainly include a combination of many of these energy sources. Corn-based ethanol, given its high level of infrastructure development, will likely play some part in this energy future. It will remain, however, a limited technology with little room for development. It is important that we actively pursue technologies that can produce an energy-independent future. We should not be tied to the Betamax of energy technologies, while neglecting far more promising ones, and we certainly should not be doing so at the cost of billions of dollars every year.

---

207. Alternative Fuels, *supra* note 203.

208. *Id.*