

*The Crutch of Corn-based Ethanol*

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Political Ecology of Food

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## I. Introduction

Corn, as we know it today, was born from the cultivation and development of humans. Because of corn's inability to plant itself, it cannot exist naturally in the wild.<sup>1</sup> Scientists believe people living in central Mexico developed corn at least 7000 years ago. Starting from a wild grass called *teosinte*, the derivation of the product became known as maize to the Indians throughout North and South America, whom eventually depended upon the crop for much of their food. About 1000 years ago, as Indian people migrated north from Mexico to the eastern woodlands of present day North America, they brought maize with them. When Columbus discovered America he also discovered maize, later referred to the Europeans as corn.<sup>2</sup> The first Thanksgiving was held in 1621. While the Pilgrims did not enjoy sweet potatoes, cranberry sauce and pumpkin pie, Indian corn was certainly enjoyed by all. Centuries later, corn is still served as a Thanksgiving side dish. While humans today still depend upon the crop for much of their food, they also depend on corn for many other uses including glue, shoe polish, aspirin, ink, marshmallows, ice cream and cosmetics to name a few. New ways of using corn are being developed every day. Seemingly, the imagination and technology are the only barriers to extracting anything out of the golden nugget of corn.

According to the United States Department of Agriculture, corn is the most widely produced feed grain in the United States. Corn accounts for more than 90 percent of total value and production of feed grains in the United States, equating to more than ten billion bushels of corn during the 2006 marketing year.<sup>3</sup> The three most common types of corn grown are flint, sweet and dent corn. Flint corn is the closest form to Indian maize today. Most flint corn is

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<sup>1</sup> Michael Pollan, *The Omnivore's Dilemma* (London: Penguin Press, 2006), p. 29.

<sup>2</sup> *In the Beginning*, accessed 12 Oct. 2007; available from [http://www.campsilos.org/mod3/students/c\\_history.shtml](http://www.campsilos.org/mod3/students/c_history.shtml).

<sup>3</sup> A marketing year is abbreviated with MY and signifies September of the previous year, to August of the same year for which the marketing year is name. *Feed Grains Database: Yearbook Tables*, accessed 15 Oct. 2007; available from <http://www.ers.usda.gov/Data/feedgrains/StandardReports/YBtable4.htm>

grown in Central and South America. More prominent in the U.S. is sweet corn, which is often eaten, in its unrefined form off the cob or from a can or frozen state. Dent corn, also referred to as field corn, is also heavily produced in the U.S. and is mostly exploited for livestock feed and industrial purposes. Either white or yellow, flint corn is seldom used in its unprocessed state.<sup>4</sup>

The ten billion bushels of flint corn produced in MY 2006 was used for a variety of purposes, as

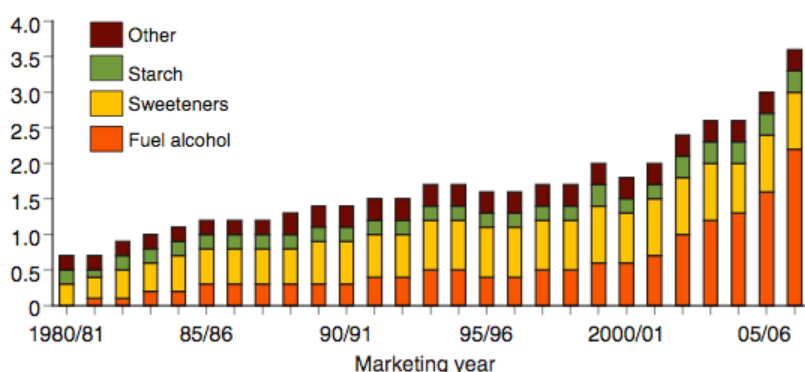
represented in Figure 1. From MY 1981 to MY 2006 the corn utilization in fuel alcohol has experienced rapid growth.

**Figure 1**

“Other” includes cereals, beverages, alcohol and seed.  
Source: USDA, Economic Research Service, *Feed Grain Database* at [www.ers.usda.gov/data/feedgrains](http://www.ers.usda.gov/data/feedgrains)

**Corn utilization in food, seed, and industrial**

Bil. bushels



Biofuel, referenced in this paper as ethanol, is derived from biomass. Biomass can be defined as recently living organisms or their metabolic byproducts.<sup>5</sup> Biofuel is a

renewable energy source because its inputs effectively utilizes natural resources such as sunlight, wind, tides and geothermal heat, which are naturally replenished, compared to other natural energy assets such as coal, petroleum and nuclear fuels which draw from limited sources. In the United States, the most common agricultural product grown specifically to become biofuel is corn because of its abundance and low cost—at least by the wallet’s standard.<sup>6</sup> The biofuel corn creates is called ethanol.

<sup>4</sup> *In the Beginning*, *supra* note 2.

<sup>5</sup> *Merriam-Webster’s Dictionary*, Online ed., s.v. “biomass.”

<sup>6</sup> *Ethanol made from Corn and Other Crops*, accessed 13 Oct 2007; available from <http://www.eia.doe.gov/kids/energyfacts/sources/renewable/ethanol.html>.

Ethanol is a clear, colorless alcohol fuel made from the sugars found in grains. Although corn is the favored grain in the U.S., sorghum, wheat, as well as potato skins, rice, and wood stock are used throughout the world as inputs for ethanol. The most commonly used processes today use yeast to ferment the sugars and starch in corn. Most ethanol is produced in the corn-growing states in the Midwest. The starch in the corn is fermented into sugar, which is then fermented into alcohol.<sup>7</sup> The alcohol becomes a transportation fuel, and is used as an almost complete or partial replacement for gasoline.

Gasoline containing ten percent ethanol - E10 - is used in many urban areas that don't meet clean air standards. Some states promote more widespread use of E10 such as Minnesota, which requires almost all gasoline sold in the state to contain 10 percent ethanol. All vehicles that run on gasoline can use E10 without alterations to their engines. Over 99 percent of the ethanol produced in the United States is mixed with gasoline to make E-10. E85 is an alternative fuel that is 85 percent ethanol and 15 percent gasoline, used mainly in the Midwest and Southern states. Vehicles are not modified to run on E85; they are specially manufactured as a flexible fuel vehicle (FFV). The National Ethanol Vehicle Coalition estimates that there are approximately six million E85-capable vehicles on U.S. roads,<sup>8</sup> as compared to approximately 230 million gasoline- and diesel-fueled vehicles.<sup>9</sup> The FFVs are versatile with the ability to operate on any mixture of gasoline between 0 and 85 percent ethanol.

The ethanol industry is rapidly growing as corn's use in U.S. ethanol production rose from 35 million bushels producing 175 million gallons of ethanol in 1980 to a projected 2.15

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<sup>7</sup> *Ethanol made from Corn and Other Crops*, *supra* note 6.

<sup>8</sup> National Ethanol Vehicle Coalition, *Frequently Asked Questions*, accessed 25 Oct. 2007; available from <http://www.e85fuel.com/e85101/faq.php>.

<sup>9</sup> Federal Highway Administration, *Highway Statistics 2003*, accessed 25 Oct. 2007; available from <http://www.fhwa.dot.gov/policy/ohim/hs03/index.htm>

billion bushels, producing 5 billion gallons in 2006.<sup>10</sup> The surge in production has been recent, as the 5 billion gallons produced in 2006 was up a billion gallons from 2005.<sup>11</sup> Still, even with the accelerated ethanol production of recent years, ethanol only accounts for about 3.6 percent of the U.S. gasoline supply by volume, but it demands a much larger share of corn, a projected 20 percent of the total production in MY 2007.<sup>12</sup> And this seems to be only the beginning. As of June 1<sup>st</sup>, 2007, existing ethanol plant capacity was reported at 6.4 billion gallons per year (bgy) with an additional production capacity of 6.4 bgy under construction, for a total potential production capacity of 12.6 bgy.<sup>13</sup> At the current rate of plant construction, the demand on corn will likely require more than four billion bushels of corn in 2008.<sup>14</sup>

The National Corn Growers Association has predicted that production capacity could reach between 13 billion gallons to 18 billion gallons per year by 2015 without having adverse affects on agricultural markets or environmental indicators.<sup>15</sup> However, there is already evidence of adverse affects from increased production of ethanol in the United States. The rate of the increase in ethanol production is unprecedented and yet, expected to continue. The blessing from the government for the use of corn to produce fuel is unsustainable, from an environmental and economic standpoint, because links in and around the production chain are disrupted. Gro Harlem Brundtland, former Norwegian Prime Minister and creator of the United Nations' Commission for Environment and Development, defined sustainability as development that "meets the needs of the present without compromising the ability of future generations to meet

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<sup>10</sup> Michael Wang, *Life-cycle energy and greenhouse gas emission impacts of different corn ethanol plant types*, (Argonne National Laboratory, 12 March 2007, accessed Oct 16 2007); available at <<http://www.iop.org/EJ/abstract/1748-9326/2/2/024001/>>.

<sup>11</sup> National Corn Growers Association, *How much Ethanol Can Come from Corn?*, accessed 15 Oct 2007; available at <[www.ncga.com/ethanol/pdfs/2007/howmuchethanolcancomefromcorn0207.pdf](http://www.ncga.com/ethanol/pdfs/2007/howmuchethanolcancomefromcorn0207.pdf)>.

<sup>12</sup> Brent D. Yacobucci & Randy Schnepf, *Ethanol Biofuels: Agriculture, Infrastructure, and Market Constraints Related to Expanded Production*, CRS Report to Congress, CRS-2 (March 16 2007 [RL33928]).

<sup>13</sup> Id. CRS-4.

<sup>14</sup> Paul Westcott, *Ethanol Expansion in the United States, How will the Agricultural Sector Adjust?* (United States Department of Agriculture: Outlook, May 2007, accessed 16 Oct 2007); available at <http://www.ers.usda.gov/Publications/FDS/2007/05May/FDS07D01/>

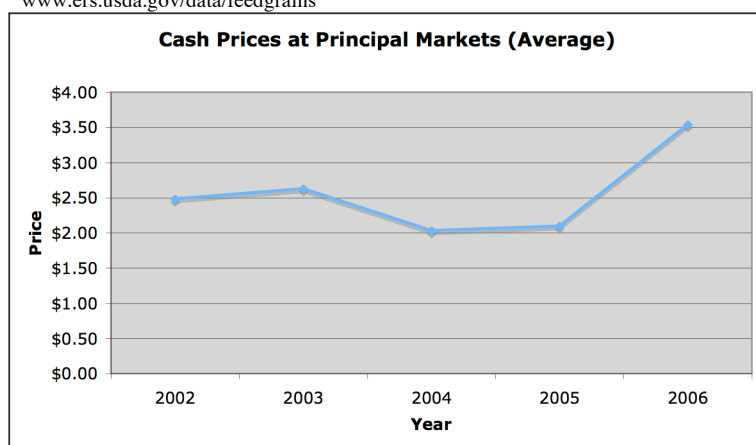
<sup>15</sup> National Corn Growers Association, *supra* note 11.

their own needs."<sup>16</sup> This paper refers to ethanol as unsustainable for two reasons; ethanol, at the current time does not meet the needs of the present, nor does it provide future generations with the ability to meet their own.

An inherent flaw to the U.S. strategy is that the supply of corn is limited in comparison to the U.S. gasoline demand. The increase in production of ethanol has already led to a dramatic

**Figure 1**

Average prices from the 10 markets in the United States. Price is per bushel.  
Source: USDA, Economic Research Service, *Feed Grain Database* at [www.ers.usda.gov/data/feedgrains](http://www.ers.usda.gov/data/feedgrains)



increase in the cost of corn as the available supply is now split between food and fuel sectors. As seen in Figure 2, prices have increase by a dollar per bushel within the past 4 years. This has led to higher prices for corn products and corn-fed meat.<sup>17</sup> The

USDA predicts that the increase in ethanol production will only increasingly pressure food prices in the coming years.<sup>18</sup> These predictions bear dire consequences that will not only affect domestic food markets, but also the markets of close trading partners to the U.S. as well.

The United Nations and other humanitarian groups have publicly warned against untenable bioenergy growth, defined as growing biological matter to turn to fuel, because it could cause serious food security and environmental degradation issues.<sup>19</sup> Mexico has already seen an increasing cost as the price for tortillas made from corn, the dietary staple for low-

<sup>16</sup> *Rio Earth Summit*, accessed on 14 Oct. 2007; available at <<http://www.usda.gov/sustainable/background.htm>>.

<sup>17</sup> Keith Collins, *Statement before the committee on Agriculture*, accessed on 13 Oct. 2007; available at <[www.usda.gov/oce/newsroom/congressional\\_testimony/Collins\\_0112007.pdf](http://www.usda.gov/oce/newsroom/congressional_testimony/Collins_0112007.pdf)>.

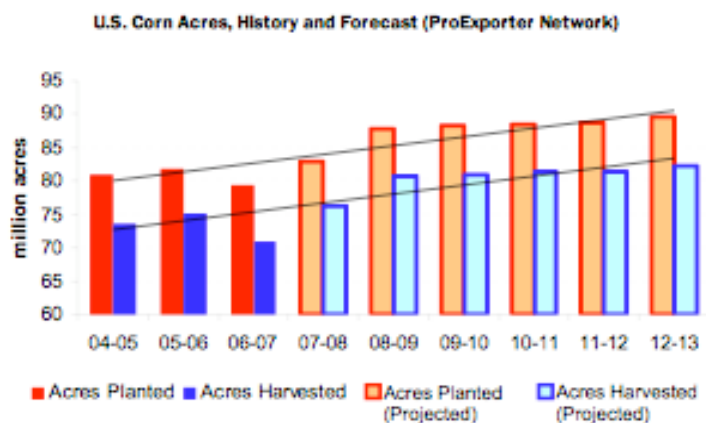
<sup>18</sup> *Agricultural Projections to 2016*, p 20-26 (USDA: February 2007); available from <[www.ers.usda.gov/publications/oce071.pdf](http://www.ers.usda.gov/publications/oce071.pdf)>.

<sup>19</sup> *Sustainable Bio-Energy: A Framework for Decision Makers*, (UN Energy: April 2007 accessed on 17 Oct. 2007); available from [esa.un.org/un-energy/pdf/susdev.biofuels.fao.pdf](http://esa.un.org/un-energy/pdf/susdev.biofuels.fao.pdf)

income Mexicans, jumped over 50 percent.<sup>20</sup> This was due to an acreage shift by Mexican farmers from flint corn to the dent corn to meet U.S. demand. In years to come, those same Mexican farmers may choose to replace their entire mix of agricultural products to dent corn. As the demand for dent corn increases, there are grave agricultural and environmental concerns that need to be considered by U.S. policy officials.

**Figure 2**

Source: National Corn Growers Association, *How much Ethanol Can Come from Corn?* At [www.ncga.com/ethanol/pdfs/2007/howmuchethanolcancomefromcorn0207.pdf](http://www.ncga.com/ethanol/pdfs/2007/howmuchethanolcancomefromcorn0207.pdf), February 2007.



The Mexican scenario can explain the correlation between an increase in the ethanol sector's demand for corn and the farmer's willingness to produce as high a yield as possible. Higher prices brought on by demand will make corn production more attractive relative to competing crops. The USDA reveals that in 2003, U.S.

feed grain farmers had an average annual net cash flow income of \$45,916, compared with the \$8,875 for non-feed grain farms. Because U.S. farmers make their planting decisions based on demand signals from the marketplace, if the demand for corn is high and projected revenue-per-acre is encouraging, corn acres will likely increase, as projected in Figure 3. This choice to increase corn growth will create implications for other agriculture markets, as the acreage of [more] corn will be less of another crop, thereby increasing the price of the original crop on the market.<sup>21</sup> Analysts predict that 89.7 million acres of corn will be planted by 2012-2013 crop

<sup>20</sup> Noam Chomsky, *Starving The Poor*, (The International News: 16 May 2007).

<sup>21</sup> Linwood Hoffman, et al, *Feed Grain Backgrounder*, p. 1 (United States Department of Agriculture: March 2007 [FPS-07c-01]).

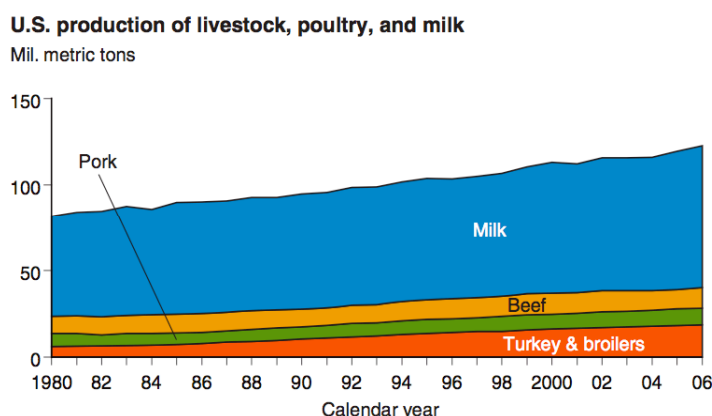
year, an increase of about 9 percent from the 2005-2006 mark of 81.8 million.<sup>22</sup> Although the shift is from comparable grains such as soybean and to a lesser extent wheat and cotton, the discarded crops will have incremental cost increases on the market.

Processes that demand U.S. feed grains directly such as those for meat, milk, eggs, sweeteners and ethanol are affected by the price of grains by a direct correlation. Returns to U.S. meat and poultry production are expected to decline in the next several years, thereby raising the cost of beef, pork and poultry on a domestic and international level.<sup>23</sup> The cost increase to those producers will certainly be passed on to the consumer meaning higher meat and poultry prices. Foreign countries with faster growing economies, seen in much of the developing world, already include more meat and dairy consumption in their diets.<sup>24</sup> This contributes to the demand for U.S. feed grains. With less grain available, exports will be restricted over the next several years due to the impacts of higher feed grain prices.

While the increase appears sizeable in ink, the National Corn Growers Association (NCGA) assures there will be no impact on agricultural markets due to the increased demand of corn from ethanol because “U.S. producers will continue to adequately supply all markets with high quality corn.”<sup>25</sup> In the same report, the association

**Figure 3**

Source: USDA, Economic Research Service, USDA Agricultural Agricultural Projections to 2016, February 2007, at [www.ers.usda.gov/briefing/baseline/](http://www.ers.usda.gov/briefing/baseline/)



<sup>22</sup> National Corn Growers Association, *supra* note 11.

<sup>23</sup> U.S. Department of Agriculture, *USDA Agricultural Projections to 2016, Long-Term Projections Report OCE-2007-1*, p 11, accessed 14 Oct 2007; available from [www.ers.usda.gov/publications/oce071/oce20071.pdf](http://www.ers.usda.gov/publications/oce071/oce20071.pdf).

<sup>24</sup> Id. p. 29.

<sup>25</sup> National Corn Growers Association, *supra* note 11.



states that demand for non-ethanol corn has remained constant for the past 15 years. The NCGA is making the assumption that corn usage for livestock feed and human food processing will not grow in demand—in the United States. The assumption of the demand not growing is misleading, especially because USDA data shows there is a steady growth in corn-derived markets as revealed in Figure 4.<sup>26</sup> To a certain but still limited extent, the NCGA will meet higher demands because technology is on their side. The association boasts of a new hybrid corn designed to achieve higher yields at a faster rate along with new technology delivered by fertilizers.<sup>27</sup> The farmers may be able to get more corn out of each plant, but with incremental acreage shifts, they will also have incremental increases in fertilizer usage.

Already farmers, such as George Naylor, the star of Michael Pollan's The Omnivore's Dilemma, admit to overusing fertilizers. "They say you only need one hundred pounds per acre. I don't know. I'm putting on closer to one hundred eighty [per acre]. You don't want to err on the side of too little." The increased use of fertilizer has already caused environmental issues by way of polluting the Nation's streams, rivers and lakes. Over applying will only make the affects of the fertilizer exponentially worse. Pollan describes fertilizers affect:

What happens to the one hundred pounds of synthetic nitrogen that Naylor's corn plants don't take up? Some of it evaporates in the air, where it acidifies the rain and contributes to global warming. Some seeps down to the water table [polluting drinking water]. As for the rest of the excess nitrogen, the spring rains wash it off [Farmer] Naylor's field, carrying it into drainage ditches that eventually spill into the Raccoon River. From there it flows into the Des Moines River, down to the city of Des Moines—which drinks from the Des Moines River...The flood of synthetic nitrogen has fertilized not just the farm fields but the forests and the oceans too...to the detriment of countless others. The ultimate fate of the nitrates that George Naylor spreads on his cornfield in Iowa is to flow down the Mississippi into the Gulf of Mexico, where their deadly fertility poisons the marine ecosystem. The nitrogen tide stimulates the wild

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<sup>26</sup> Linwood Hoffman, *supra* note 21, p. 15.

<sup>27</sup> National Corn Growers Association, *supra* note 11.

growth of algae, and the algae smother the fish, creating a 'hypoxic,' or dead, zone as big as the state of New Jersey—and still growing. By fertilizing the world, we alter the planet's composition of species and shrink its biodiversity.<sup>28</sup>

The long-term effects of fertilizer, although unknown, are predicted to eventually lead to the deterioration of global systems upon which virtually every form of life depends. Worse is the fact that these detrimental effects are being used on a crop that environmentalists and various agencies argue against as an ineffective feedstock to ethanol.

The USDA report regarding other possible ethanol feedstock includes sugarcane, a product that offers a much higher energy return than corn.<sup>29</sup> Countries, such as Brazil, where sugarcane is favorable to the climate, can produce cheaper ethanol than the U.S. corn-based counterpart for two main reasons. Corn only produces one harvest per plant while sugarcane is a perennial crop that can be harvested four-to-five times before replanting. In addition to requiring replanting, corn is among the most energy intensive field crop. Various studies indicate that making ethanol from corn results in less energy than required to harvest the crop.

A study conducted by Professors David Pimentel of Cornell University and Tadeusz W. Patzek of the University of California at Berkley revealed that when producing corn-based ethanol, 29 percent more energy is required than is produced by ethanol; in other words, when summing the energy of the inputs and comparing that figure to the energy level of the output, the result is a negative net energy balance (NEB).<sup>30</sup> NEB can be defined as the difference between the energy required to harvest an energy source and the energy provided by that same source. This study considers the energy needed to produce fertilizers, operate farm equipment, transport the corn, convert the corn to ethanol, and distribute the final product.

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<sup>28</sup> Pollan, *supra* note 1, p. 46.

<sup>29</sup> *The Economic Feasibility of Ethanol Production From Sugar in the United States*, (U.S. Department of Agriculture: 2006; accessed 14 Oct. 2007); available from <[www.usda.gov/oce/EthanolSugarFeasibilityReport3.pdf](http://www.usda.gov/oce/EthanolSugarFeasibilityReport3.pdf)>.

<sup>30</sup> David Pimental and Tad W. Patzek, *Ethanol Production Using Corn, Switchgrass, and Wood; Biodiesel Production Using Soybean and Sunflower*, p 14 (Natural Resources Research: Vol. 65, March 2005).

In a phone interview with Mr. David Weintraub, the Director of External Communications for the Archer Daniels Midland Company, the leading U.S. ethanol producer, disagreed with the report by the two scientists. Mr. Weintraub cited another study proving that “when by-products from the ethanol process are accounted for, the ethanol production process results in a positive balance.”<sup>31</sup> The other source was that of Michael Wang’s, a scientist at the Dept. of Energy’s Argonne National Lab, who Weintraub considers to be the “top expert in energy balance research.” Wang’s report includes the processes of Pimental and Patzek’s study, however, it also includes the energy of the by-products in the ethanol production. Wang proved that when calculating “the total energy output” by including the fuel energy and the calories of the feedstock, ethanol does have a positive NEB of approximately 1.2. Wang offers one caveat that to some discredits his entire study. He states “although self evaluation of a fuel’s energy balance is easy to understand, to do so for a fuel in isolation could be arbitrary.” The arbitrary factor he is referring to is the variation of energy usage in the process.

The varying viewpoints are converging on point that corns’ heavy dependence on fertilizer, chemicals and energy by way of natural gas in the production process and petroleum in the transporting of the feedstock and ethanol can result in an NEB less than 1.0. Both studies also reveal that although the ethanol production process diminishes petroleum usage relative to gasoline production, it does so at the expense of increasing natural gas usage. Process fuel costs, ironically, are the second largest expense after the cost for corn feedstock.<sup>32</sup> Additionally, both studies did not account for future plant expansion, which will increase the use and environmental impact of natural gas.

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<sup>31</sup> Phone Interview, Mr. David Weintraub, conducted 13 Nov 2007.

<sup>32</sup> Michael Wang, *supra* note 10.

The corn-into-fuel scenario also creates a unique connection between natural adversities and the fuel source. Any limitation to the corn supply, such as a drought, fire or change in production pattern will negatively affect the supply of corn thereby increasing the cost of ethanol.<sup>33</sup> Already, there is a direct correlation between carryover stocks, or the amount of corn left from the last MY and the marketing year average farm price. As displayed in Figure 5, ending stocks of corn have been around 2 billion bushels the past 2 years (MY 2005 and MY 2006) due to 2 consecutive years of large production, keeping prices low. Strong demand is expected to draw down these stocks and keep them lower over the next several years. For example, ending stocks

for MY 2007 are

projected to be less than

half the level for MY

2006 and already

season-average prices

are estimated to be

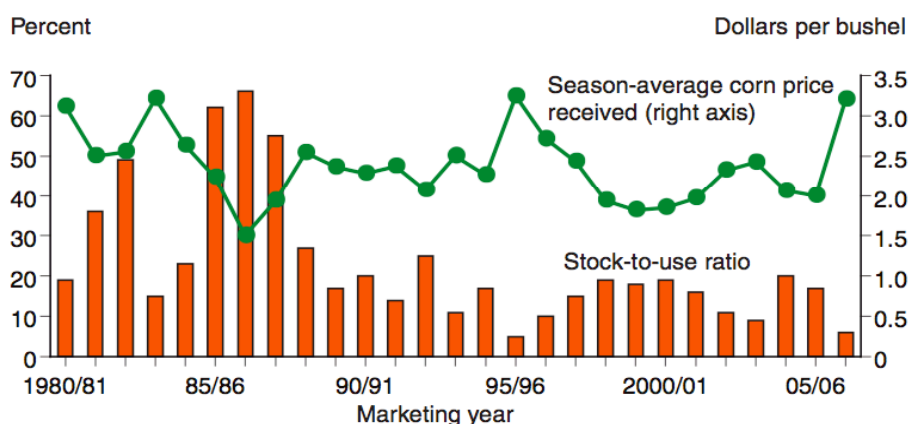
more than 50 percent

above the MY 2006

**Figure 4**

Source: USDA, Economic Research Service, *Feed Grains Database* at [www.ers.usda.gov/data/feedgrains/](http://www.ers.usda.gov/data/feedgrains/)

**U.S. corn price and stocks-to-use ratio**



price of \$2.00 per bushel.<sup>34</sup> Instead of an emergency supply of crude oil, the U.S. will need to keep an emergency supply of the crude ethanol—in the form of corn.

In addition to natural disasters, the cost of ethanol production for some companies is offset by the revenue received for ingredients used in livestock and poultry feed. For this reason,

<sup>33</sup> Brent D. Yacobucci & Randy Schnepf, *supra* note 12, CRS-14.

<sup>34</sup> Linwood Hoffman, et al *supra* note 21, p. 13.

the Company is subject to risks associated with the outbreak of disease in livestock and poultry, including, but not limited to, mad-cow disease and avian influenza.<sup>35</sup>

The immediate upsurge from 2005-to-present took place because of the perfect, non-competitive market the U.S. government lawfully created in order for the ethanol fuel industry to grow in size. One explanation for the protection of the ethanol industry can be justified by quantifying U.S. dependence on foreign energy. Legislation to advance and increase energy production domestically came in the wake of high petroleum and gasoline prices, violence in the Middle East, new concerns about American energy security and continuity, rising anti-American sentiment in Venezuela and Iran, surging energy demand from China and India and overall discontent with U.S. Foreign Policy by nations belonging to the Organization of the Petroleum Exporting Countries (OPEC). This paper will outline the actions taken by the U.S. government to increase ethanol production and show that from this aspect, the upsurge is a desperate attempt by Congress to curtail U.S. energy dependence on foreign states.

The basis of this paper is that ethanol, in its current production from corn, is unsustainable and therefore cannot alone accomplish the energy and national security goals of the United States. Furthermore, by investigating the true costs of ethanol, both short and long term, the paper will prove that ethanol is not only insufficient, but it is also an unsustainable solution to meeting the energy needs of the United States. In an attempt to prove this point further, the paper will reveal the supporters behind the upsurge and attempt to uncover and compare their motivation to that of the U.S. government.

Part II of this paper will provide a timeline of government legislation that has led to a rapid growth in the ethanol industry in the United States. Furthermore, the results of a discourse

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<sup>35</sup> Archer-Midland-Daniels, *Annual 10-K Report*, accessed on 18 Oct. 2007; available from <<http://yahoo.brand.edgar-online.com/fetchFilingFrameset.aspx?dcn=0000007084-07-000166&Type=HTML>>.

analysis on reports regarding ethanol of the *Government Accountability Office* (GAO) and the *Congressional Research Service* (CRS) will serve as a literature review on the subject. This will present the nonpartisan view on the ethanol industry. Part III will examine the politics behind the ethanol industries growth in the United States. This section will also reveal the major players and faces involved in that growth and disseminate their interests to the industry. Part IV will present the true costs of ethanol to prove that ethanol is neither a sustainable solution, nor one to advance national energy security. This section will also explain how the U.S. has build up an industry that is bound for failure.

## **II. The Timeline of Ethanol**

### **A. The Timeline of Ethanol and Government Legislation Surrounding the Industry<sup>36</sup>**

Use of ethanol as a fuel in the United States dates back to 1826, when New Hampshire mill owner, Samuel Morey developed a rudimentary internal combustion engine that ran on ethanol and turpentine. Before being used as a fuel, ethanol was the major illuminating oil in the United States. With the onset of the Civil War, the Union Congress imposed a \$2 per gallon excise tax on ethanol to help pay for the war. American's responded and quickly switched to the cheaper alternative because ethanol became too expensive to be used for illumination. It was not until 1896, when Henry Ford built his first vehicle, the quadricycle, that ethanol again became used regularly for commercial purposes. A decade later, Henry Ford produced the Model T as a flexible fuel vehicle, between ethanol and gasoline.

Becoming a commodity, Congress decided to remove the excise tax allowing ethanol to compete as an alternative to gasoline. The beginning of World War I drove up ethanol demand to 50-60 million gallons per year until Prohibition ended the widespread distribution of alcohol—and therefore ethanol—leaving gasoline as the fuel of choice. Even the small

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<sup>36</sup> *Ethanol Timeline*, accessed 18 Oct. 2007; available from <<http://www.eia.doe.gov/kids/history/timelines/ethanol.html>>.

percentage of ethanol that was added to gasoline to increase octane and reduce engine knocking was switched to lead in the fear of gas stations becoming speakeasies. This pause in demand did not last long, however, due to the ending of the Prohibition in 1933 and the outbreak of World War II, ethanol was employed to relieve the massive demand for fuel.

After World War II, interest in the production of ethanol from agricultural crops began to dissipate because fuel sources from petroleum and natural gas became available in large quantities and at lower costs. As a result, from the late 1940s until the late 1970s, virtually no commercial fuel ethanol was available anywhere in the United States.

The lack of commercial fuel ethanol changed in 1973, as the affects of lead in gasoline were being seen and felt in many cities around the United States in the form neurological, kidney and cardiovascular damage.<sup>37</sup> Again ethanol became the attractive alternative to boosting octane in gasoline. The Environmental Protection Agency's initial regulation requiring reduced levels of lead in gasoline in early 1973 soon became an ultimatum for gasoline suppliers eliminate lead from gasoline by 1986.

Beyond ethanol being used for a blending agent, a new focus on renewable fuels was ushered in after the 1973 Arab oil embargo. Imported crude oil costs surged due a limited supply of gasoline and in response to what was later deemed an energy crises, Congress approved the Energy Tax Act of 1978. The act included a federal tax exemption for gasoline containing 10 percent alcohol, to reduce the cost of ethanol to the wholesale price of gasoline, making it economically practical to use as a blending agent.<sup>38</sup> Because the alcohol was to be derived from an agent other than petroleum, natural gas and coal, biomass feedstock was chosen as the only viable option. The Carter administration, after the fall of the Shah in Iran in 1979 again

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<sup>37</sup> *Who We Are*, Get the Lead Out! accessed 19 Oct. 2007 available from < [http://gettheleadout.net/who\\_we\\_are.sstg](http://gettheleadout.net/who_we_are.sstg)>.

<sup>38</sup> Petroleum and Ethanol Fuels: Tax Incentives and Related GAO Work, GAO Report to Senator Harkin, GAO B-286311 (Sept. 2000), Pg. 25.

disrupted the flow of oil to world markets, made efforts to promote conservation by defining the first fuel-economy standards in the Energy Policy and Conservation Act of 1975. Both Federal and State programs were developed to provide incentives to ethanol producers helping the ethanol industry grow. As a result, ethanol production jumped from approximately 50 million gallons in 1979 to 175 million gallons in 1980.<sup>39</sup>

Congress continued to enact a series of tax benefits to ethanol producers and blenders, which encouraged the growth of its production. Loans were offered to small ethanol producers of up to \$1 million per project to expand production. Projects included construction of a new ethanol plant, biomass energy projects and purchase agreements for biomass energy invented by federal or independent agencies. To protect the domestic ethanol market, Congress placed a tariff on foreign-produced ethanol to impede countries such as Brazil from shipping less expensive ethanol to the United States. Even with a subsidy as high as 60 cents per gallon during the 1980s, ethanol producers were still closing down due to the very low price ethanol was valued on the market. Ethanol could not command a high rate because it was compared to the low price of crude oil and gasoline.

In 1990 Congress gave the hurting industry another boost with the passage of the Clean Air Act Amendments (CAAA), which mandated the use of oxygenated fuels in specific regions of the U.S. during the winter months to reduce carbon emissions and increase air quality.<sup>40</sup> The CAAA left specific details of the clean fuels program to be worked out by the Environmental Protection Agency (EPA). The CAAA and the subsequent regulations are primarily intended to prevent ozone formation, as ozone is a major contributor to urban smog. Carbon monoxide is another important air pollutant, not related to ozone. Ethanol is quite effective in reducing

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<sup>39</sup> *Industry Statistics*, Renewable Fuel Association accessed 22 Oct. 2007; available from <<http://www.ethanolrfa.org/industry/statistics/#A>>.

<sup>40</sup> Clean Air Act (CAA) Amendments of 1990, accessed 23 Oct. 2007; available from <<http://www.epa.gov/air/caa/>>.



carbon monoxide pollution, however, with regard to ozone reduction ethanol increases the volatility of the mixture in higher altitudes due to less pressure. The blend has a higher tendency to evaporate than straight gasoline, and thus more volatile organic hydrocarbons (VOCs) are emitted. Therefore, ethanol needed an exemption waiver from the established volatility limits. In October 1992, under the pressures of the Presidential election campaign, President Bush granted the ethanol waiver, structured to put the burden on the oil industry by requiring that less volatile gasoline to be sold.<sup>41</sup> Even with the exemption, Ethanol was second in use to another oxygenate added to gasoline, Methyl Tertiary Butyl Ether (MTBE) due to its high price.

The nineties presented tough market conditions for the ethanol industry due to corn shortages and recurrent low usage. With the continued uncertainty of the foreign oil supply, Congress continued supporting the industry passing aggressive laws, including a mandate that certain fleet cars be FFVs. The ethanol protection tax credit extends all ethanol producers 51-cents per gallon of every gallon produced. In addition, producers of 60 million gallons or less were given an added incentive of 10 cents per gallon on the first 15 million gallons of ethanol produced in a year.<sup>42</sup> If the quota was met, the producer receives a check for \$32,100,000 from the U.S. government.

In 1999, some states began to pass bans on MTBE, which was found to be a carcinogen because of traces found in drinking water sources. Ethanol emerged as the predominant alternative to the chemical. The EPA recommended the elimination of MTBE in gasoline and called for the use of ethanol as an alternative. This was mainly because in a diluted state, ethanol can be consumed without health affects. This recommendation, seen as an eco-friendly fuel, seemed to secure ethanol's spot on the U.S. energy matrix.

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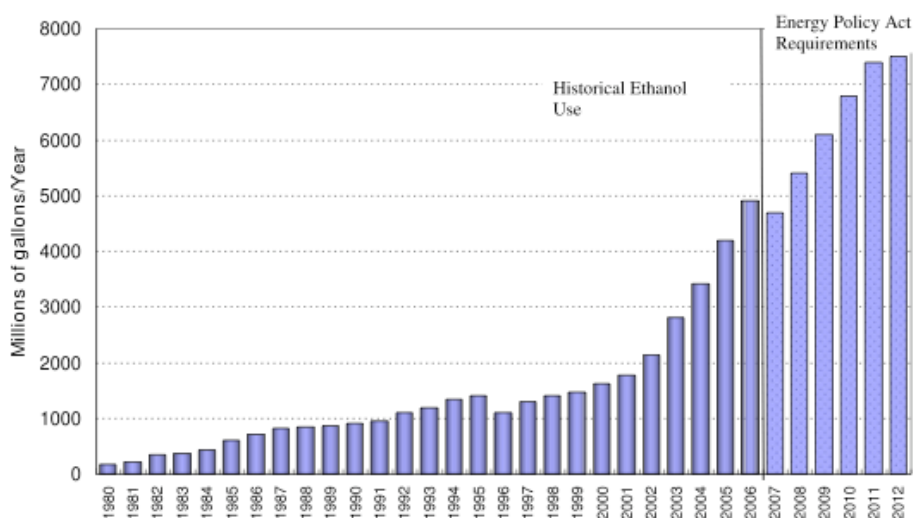
<sup>41</sup> Migdon Segal, *Ethanol and Clean Air: The Reg-Neg Controversy and Subsequent Events*, accessed 22 Oct. 2007; available from <<http://ncseonline.org/nle/crs/abstract.cfm?NLEid=523>>.

<sup>42</sup> *American Jobs Creation Act*, accessed 24 Oct. 2007; available from <[thomas.loc.gov/cgi-bin/bdquery/z?d108:h.r.04520](http://thomas.loc.gov/cgi-bin/bdquery/z?d108:h.r.04520)>.

In 2005, ethanol percentage on the matrix began to increase. In passing the Energy Policy Act of 2005 (EPACT), Congress created a demand for 4.0 billion gallons of renewable

**Figure 6**

Source: Wang



fuel to be used in

gasoline in 2006,

increasing each year to

7.5 billion gallons by

2012.<sup>43</sup> The bar was

raised in President

George W. Bush's 2007

State of the Union

Address. President

Bush charged Congress

to “increase the supply of alternative fuels, by setting a mandatory fuels standard to require 35 billion gallons of renewable and alternative fuels in 2017 -- and that is nearly five times the current target.”<sup>44</sup> President Bush added, “Achieving these ambitious goals will dramatically reduce our dependence on foreign oil.”<sup>45</sup> With a charge from the President, ethanol was now cemented as an American ideal.

## **B. A Discourse Analysis of U.S. Government Accountability Office and the Congressional Research Service reports regarding Ethanol**

The scholarly literature at the current time regarding the ethanol industry is largely based around the science of the industry. A search on any database will result in an extensive list of literature regarding the fuel itself, and much less on the economic, political and social effects of

<sup>43</sup> *State of the Union 2007*, accessed 27 Oct. 2007, available from <<http://www.whitehouse.gov/news/releases/2007/01/20070123-2.html>>.

<sup>44</sup> Id.

<sup>45</sup> Id.

the industry on the world. The recent spotlight put on the ethanol industry by the Bush administration has given American media the stimulant needed to sensualize the subject. In an effort to gain the most accurate information available about the industry, this paper will scrutinize research provided by the U.S. Government Accountability Office (GAO) and the Congressional Research Service (CSR). The two organizations were chosen for their non-partisan approach to research and due to the fact that both are research organizations employed by Congressional members. This section will provide the results of a discourse analysis conducted on GAO and CRS reports in order to highlight main themes presented. In comparing those results to the actual decisions made in Congress, the motives behind those decisions will be realized.

According to its website, the GAO is known as "the investigative arm of Congress" and "the congressional watchdog." The GAO's analysts, auditors, lawyers, economists, information technology specialists, investigators, and other multidisciplinary professionals support Congress by providing "oversight of federal programs; insight into ways to make government more efficient, effective, ethical and equitable; and foresight of long-term trends and challenges."<sup>46</sup> Additionally, the GAO takes a professional, objective, fact-based, nonpartisan, nonideological, fair, and balanced approach to all of its activities.<sup>47</sup> Founded in 1921, the organization at present has a budget of \$488.6 million and estimates its measurable financial benefit to the American people to be close to \$46 billion dollars since its inception.<sup>48</sup> GAO reports are made public immediately upon completion and are available at through a search engine at its website.

The CRS provides Congress with analytical support, however works exclusively for the U.S. Congress holding its work in confidential state. Its reports incorporate program and

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<sup>46</sup> *Welcome to the GAO*, accessed 15 Oct 2007; available from <<http://www.gao.gov/index.html>>.

<sup>47</sup> *GAO Core Values*, accessed 16 Oct 2007; available from <<http://www.gao.gov/values/>>.

<sup>48</sup> *GAO at a Glance*, accessed 16 Oct 2007; available from <http://www.gao.gov/about/ggglance.html>

legislative expertise, quantitative methodologies, and legal and economic analysis. Smaller in size, CRS was chartered in 1914 when Congress passed legislation to establish a separate department within the Library of Congress. Much like the GAO, CRS approaches complex topics from a variety of perspectives and examines all sides of an issue. By analyzing current policies, CRS presents the impact of proposed policy alternatives. According to its website, CRS “experts are vigilant in evaluating issues without bias,” adding “A multi-layered review process also helps ensure that CRS products present issues and analysis in a manner that is fair, considered and reliable.”<sup>49</sup>

Contrary to the GAO reports, CRS reports are not made directly available to members of the public by long tradition and congressional rules. Instead, the public must request individual reports from their Senators and Representatives in Congress or become a subscriber to the Penny Hill Press.<sup>50</sup> *The National Council for Science and the Environment* (NCSB) holds the largest database of CRS reports about the environment. The Councils mission is to improve the scientific basis of environmental decision-making.<sup>51</sup> The reports examined in this paper were collected from the NCSB database.

The reports were found at the respective search points of the GAO<sup>52</sup> and the CRS,<sup>53</sup> by entering the search item “Corn Ethanol.” At the GAO, dating from June 1980, 79 hits were found on the subject: 27 from the 1980s, 19 from the 1990s and 23 from January 2000 to the most recent report published in September of 2007. From CRS, dating from February 1992, 45 hits were found on the subject: 8 from the 1990s, 37 from January 2000 to the most recent report

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<sup>49</sup> *About CRS*, accessed 15 Oct 2007; available from <<http://www.loc.gov/crsinfo/aboutcrs.html>>.

<sup>50</sup> *About CRS Reports*, accessed 15 Oct. 2007; available from <<http://www.pennyhill.com/aboutcrs.php>>.

<sup>51</sup> *Overview*, accessed 16 Oct. 2007; available from <<http://www.ncseonline.org/01about/cms.cfm?id=1189>>.

<sup>52</sup> *Reports and Testimonies*, accessed 17 Oct. 2007; available from <<http://www.gao.gov/docsearch/repandtest.html>>.

<sup>53</sup> *CRS Reports*, accessed 17 Oct. 2007; available from <<http://www.ncseonline.org/NLE/CRS/>>.

published in October of 2007.<sup>54</sup> The recent influx in reports by the CRS equates from the current administrations focus on corn ethanol. This paper will examine the first and last report from each organization as well as define the major themes throughout the timeline of publications focused on the corn ethanol industry.

The first report published by GAO had the generic title of “Potential of Ethanol as a Motor Vehicle Fuel.” The GAO review of ethanol's potential for widespread use as a motor vehicle fuel showed that ethanol cannot meet all of the Nation's motor vehicle fuel needs due to limited raw materials such as grains, sugar crops, and agricultural processing wastes. However, it appeared entirely feasible that the Nation's vehicle fleet could be operating on a blend of 10 percent ethanol, 90 percent unleaded gasoline by the year 2000. The report speculated that the high plant price of ethanol could be explained by “indications that a considerable amount of profit-taking is occurring.” GAO predicted that as more efficient distilleries are put into use and if sufficient quantities of relatively inexpensive feedstocks are available, the price of ethanol could decline to the point where its use in a 10-percent blend will have a negligible economic impact on the fuel consumer.<sup>55</sup> This report highlighted the feasibility of the fuel being used in the U.S. by defining supply limitations and price restrictions to the consumer.

The first CRS report titled “Ethanol and Clean Air: The Reg-Neg Controversy and Subsequent Events,” explains the benefit of ethanol as an oxygenate. Ethanol is quite effective in reducing carbon monoxide pollution, and has been used for that purpose in many Western cities. The report finds that in regards to ozone reduction when added to gasoline in the 10% blend, ethanol increases the volatility of the mixture. The blend then has a higher tendency to

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<sup>54</sup> Both sites were searched on October 16<sup>th</sup> 2007 at 9:16 pm to ensure accuracy of comparison. More reports may have been published by CRS because NCSE only has reports made available to the public.

<sup>55</sup> *Potential of Enthalol as a Motor Vehicle Fuel*, (GAO Report to Congress: 3 June 1980, accessed 1 Nov. 2007); available from <<http://www.gao.gov/docdblite/summary.php?rptno=EMD-80-73&accno=112588>>.

evaporate than straight gasoline, and thus more volatile organic hydrocarbons (VOCs) are emitted.<sup>56</sup> The underlying issue to be decided is whether ethanol should have a preferential position among the possible alternative automotive fuels because of its status as a "home-grown" product of American agriculture, or should be treated the same as the other potential sources of oxygen for reformulated gasoline, such as MTBE. The report was informative in nature, presenting the advice of the Bush, Sr. administration, the Clinton administration and the Environmental Protection Agency but not any of its writers.

The timeline of reports after the initial were quite similar between the CRS and the GAO. Ethanol started out as a viable solution to the MTBE contamination issue plaguing some water supplies throughout the United States. CRS found that overall, the use of ethanol was recommended by CRS because it would lower carbon emissions, thereby meeting the standards set forth by the Clean Air Act.<sup>57</sup> By 2000, the discussion of ethanol was no longer only about its role as an oxygenate, but rather as a fuel source. In its 2004 report, the CRS addressed the issue of the growing demand for gasoline in the United States. The study proved that between 1999 and 2003, gasoline consumption grew by 500,000 barrels per day, accounting for all of the increase in petroleum consumption during that period.<sup>58</sup> The study was written in response to a bill, that had passed in the house but not in the senate that would provide for easier permitting for refinery capacity expansion. CRS provided the data for the projected increased capacity and proved why it would not have a large impact on the ethanol market due to a lack of infrastructure throughout the United States. This report also shunned the idea of using "boutique fuels" or fuels with any range of ethanol based on current supply. There major reasoning not using

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<sup>56</sup> Midgon Segal, *Ethanol and Clean Air: The Reg-Neg Controversy and Subsequent Events*, CRS-4 (22 Jun 1993 [93-614]).

<sup>57</sup> James McCarthy, *Clean Air Act Issues for the 104<sup>th</sup> Congress*, Congressional Research Service Report for Congress, CRS-2, (2 Dec 1996 [IB95034]).

<sup>58</sup> Lawrence C Kumins, *Gasoline Supply: The Role of Imports*, Congressional Research Service Report for Congress, CRS-4, (14 Sept 2004 [RL32583]).

mixtures was that in doing so, there would be no way of labeling the compound and therefore no standardization throughout the industry.<sup>59</sup>

The second most recent report presents the biofuel incentives currently in practice. The report is a summary providing the administering agency, the authorizing statute, annual funding and expiration date of each Federal program.<sup>60</sup> Considering that a member of Congress requested to see this report signals that the ethanol incentives were either coming under review or scrutiny. In either case, the cost effectiveness of ethanol was being address.

The information timeline of the GAO reports presented similar themes to those of the CRS. Although the reports start out much earlier, the reports before 2000 presented ethanol as a possible alternate to MTBE. A report that received much attention was that of the effects of the alcohol fuel tax incentives on ethanol growth and its effects on the environment. In the report, the GAO revealed that the ethanol tax incentives had little effect on the environment.<sup>61</sup> The report also stated that: “Although available evidence suggests that the tax incentives for alcohol fuels increase ethanol fuel use, it also indicates that these incentives do not significantly reduce petroleum imports.” This was the first report, by either organization, to question the effectiveness of the fuel, therefore calling out the generous tax incentives.<sup>62</sup> Congress took the report lightly and being advised with the straightforward and balanced discussion, disagreed by writing responses in which can be seen two rebuttal GAO reports.

The final report by the GAO, presented in August of 2007 was on the scenario of creating more demand for renewable fuel by mandating certain vehicles to meet a lower emission

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<sup>59</sup> Lawrence C Kumins, *supra* note 59, CRS-14.

<sup>60</sup> Brent D. Yacobucci, *Biofuels Incentives: A Summary of Federal Programs*, Congressional Research Service Report for Congress, CRS-11, (3 Jan 2007 [RL33572]).

<sup>61</sup> *Affects of the Alcohol Fuel Tax Incentives*, Government Accountability Office Report to Congress, Pg. 5, (6 March, 2007 [B-271977]).

<sup>62</sup> *Id.*, p 6.

through the use of renewable fuel sources.<sup>63</sup> Like the final CRS report, this was discussing how to increase demand for ethanol.

The common theme throughout the earliest reports and the later reports were those of monetary tone. Congress is most concerned about the fuel because of its high costs. The fuel is disadvantaged by its high cost, both as a fuel and in production, in its pursuit to become a national fuel source. Congress seemed most concerned about whether the industry would ever sustain itself without the need of tax incentives and heavy subsidies, and if not, whether legislation should keep various federal programs intact.

### **III. The Politics Behind the Ethanol Industry**

Throughout the history of ethanol, a prominent theme to the industry was that of government intervention. Ethanol's market has been sparked by U.S. government policies and global events more so than by domestic demand for biofuel technology. Without constant government protectionism, the industry would have failed decades ago due to its inefficiencies and cost compared to alternatives. In a country where the economy was based on laissez-faire principals, the government interactions raise a stark question as to why the industry has been protected for over a century. Underlying the politics of ethanol is a vexing question: who is behind it?

The most recent reports as discussed in the previous section proves that ethanol, although an alternative to gasoline in some cases (E85), was not the favored nor the most effective. If the two researching arms of Congress did not give raving reviews about the alternative, why has its use grown tremendously over the recent past? To answer this question the players behind the industry, including members of the government, organizations and companies must be explored. In doing so, the results will explain why an energy bound to fail has been given government

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<sup>63</sup> *Vehicle Fuel Economy*, Government Accountability Office Report to Congress, Pg. 13 (2 August 2007 [GAO-07-921]).



subsidies, legislation and exclusivity to succeed. Rational behind the government's eventual decision will dictate if those actions were based on protecting a viable industry or protecting the people behind it.

Within the government subsection, the relations of major players to the industry, such as senators, representatives and presidential candidates will be explored. major companies within the ethanol industry will be identified and the biggest producer will be dissected to showcase if their values include that of sustainability and environmental wellbeing. Nonpartisan and government oriented organizations in support of the ethanol industry will be probed to draw the connections between the organization and the industry and to see if those same connections provide major financial support. Finally, political positions, monetary support and recent decisions will be scrutinized to see if those players are making decisions based on the public interest or rather to increase their own utility.

#### **A. Corporation**

The interests of agri-businesses have long shaped the growth of the biofuel industry in the United States. Publicly traded Ethanol Companies in the U.S. include: Abengoa Bioenergy, Archer Daniels Midland (ADM), Aventine Renewable Energy Holdings, Green Plains Renewable Energy, Pacific Ethanol, Renova Energy (Wyoming Ethanol), The Andersons, U.S. BioEnergy, VeraSun Energy, and Xethanol BioFuels. Although each is powerful by association, which will be discussed in detail in the later section, none can compete with ADM, positioned as the largest producer of ethanol in the United States. In 2006, the company produced 1.07 billion gallons of ethanol, which was over four times more than its nearest rival, VeraSun Energy.<sup>64</sup> On its 2007 Financial Statement the company has stated that in constructing two corn dry-milling plants, the Company's annual ethanol production capacity will grow by 550 million gallons to

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<sup>64</sup> Renewable Fuels Associations, *Industry Statistics*, accessed 15 Oct. 2007; available from <<http://www.ethanolrfa.org>>.

1.7 billion gallons.<sup>65</sup> This paper will focus on ADM, being the largest producer in the United States.

ADM has referred to itself as “the supermarket of the world” since the 1960s and has set out to create value from bulk commodities by transforming them into processed products that command larger value. ADM operates more than 270 plants worldwide, where cereal grains and oilseeds are processed into numerous products used in the food, beverage, nutraceutical, industrial and animal feed markets worldwide.<sup>66</sup> Its history with ethanol began in 1970 after perfecting the wet milling of corn in the production of high fructose corn syrup. Both products subsequently launched ADM into a majority position in the feed market because of the animal feed by-products derived from both products. Over 35 years later, ADM has grown itself into a global powerhouse, creating revenues for fiscal year 2007 (ending June 30, 2007) of \$44 billion.<sup>67</sup> It has also made that revenue at the expense of the environment.

In an attempt to discover if a company that produces a renewable fuel source is standing by Brundt’s sustainable definition ADM’s environmental records were explored. The results, unfortunately, proved the lack of an environmental conscience. With its slogan of “Resourceful by Nature,” ADM must be referring to its nature of exploitation. In 2002, ADM was the tenth largest air polluter in the U.S. according to the Political Economy Research Institute. ADM has been involved in two major federal lawsuits related to air pollution. The company was responsible for releasing 12.4 million pounds of toxic chemicals per year.<sup>68</sup> In 2001 the company paid \$1.46 million for violating federal and Illinois clean-air regulations at its Decatur feed plant.

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<sup>65</sup> Archer-Daniels-Midland Company, *supra* note 35.

<sup>66</sup> Archer-Daniels-Midland Company, *supra* note 35.

<sup>67</sup> Archer-Daniels-Midland Company, *supra* note 35.

<sup>68</sup> *THE TOXIC 100: Top Corporate Air Polluters in the United States*, (Political Economy Research Institute, accessed 31, Oct. 2007); available from < [www.peri.umass.edu/Toxic-100-Table.265.0.html](http://www.peri.umass.edu/Toxic-100-Table.265.0.html) >.

To prevent more pollution, the company was required to invest \$1.6 million to reduce air pollution at the site.<sup>69</sup> The additional investment proved fruitless as in 2003, ADM was in violation of federal air pollution compliance related to its pollution control upgrades. The company paid a \$4.5 million penalty and more than \$6 million to support environmental projects.<sup>70</sup> In response to a recent public criticism by the Rainforest Action Network its website refutes, “ADM believes in the responsible and sustainable development of agriculture and bioenergy throughout the world.” With its previous violations in mind, it is difficult to find credibility in the statement.

Political connections, especially with legislators who have had significant influence over specific subsidies, have contributed to ADM’s growth. Dwayne Orville Andreas, one of the most prominent political campaign donors in the United States, has contributed millions of dollars to Democratic and Republican candidates alike. For thirty years, he was also in the leadership of ADM. Changes during his time include: the Food for Peace legislation of the 1960s which allowed the federal program to use processed food and the action by Richard Nixon to open China's wheat markets to ADM-supplied grain. Former Vice President Hubert Humphrey, also godfather to Andreas’s son, advanced many measures when he served as a senator to Minnesota. Senator Bob Dole (R-Kansas) advocated for the company during his long political career. Donations made directly to him include: \$200,000 to two campaigns, \$275,000 to the Dole Foundation, and \$500,000 to the Red Cross when Elizabeth Dole took heed of the organization. ADM received political support in return. Senator Dole was ethanol's steadfast sponsor. An example of his dedication to the company was his impediment of a steel import bill

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<sup>69</sup> *Archer Daniels Fined Over Clean-Air Rules*. (The Los Angeles Times, 13 Jan 2001, accessed 28 Oct. 2007); available from <<http://www.latimes.com>>.

<sup>70</sup> *2 Companies Said to Agree To Settle Suits on Emission*. (The New York Times, April 9, 2003 accessed on 6 Nov 2007); available from <<http://select.nytimes.com>>.

until his colleagues agreed to extend the ethanol excise tax credit to the year 2000. In a ten-year period beginning in 1985, ADM received \$424.5 million in other federal subsidies, from corporate welfare plans such as the Export Enhancement Program (EEP). All of these programs were approved by the Senate Agriculture Committee, of which Dole was a senior member.<sup>71</sup> Nearly half of ADM's profits are derived from products that the U.S. government has either subsidized or protected.<sup>72</sup>

The company has donated close to \$8 million to politicians since 1990. Its donations by year are shown in Table 1. The even split in contribution demonstrates ADMs attempt to keep both parties on its side. This stems from the volatility in the availability and prices of inputs to its own products. A majority of its risks, as materialized on its financial statement, come from factors within control of the U.S. Government quantifying ADMs heavy dependence on the government.

**Table 1: Archer Daniel Midland Total Contributions**

Source: <http://www.opensecrets.org/orgs/summary.asp?ID=D000000132&Name=Archer+Daniels+Midland>

<b>Election Cycle</b>	<b>Total Contributions</b>	<b>Dems</b>	<b>Repubs</b>	<b>% to Dems</b>	<b>% to Repubs</b>
2008	\$20,300	\$13,800	\$6,500	68%	32%
2006	\$163,850	\$69,200	\$94,650	42%	58%
2004	\$104,125	\$42,400	\$61,725	41%	59%
2002	\$1,970,060	\$733,810	\$1,236,250	37%	63%
2000	\$950,650	\$419,450	\$528,700	44%	56%
1998	\$759,525	\$389,525	\$370,000	51%	49%
1996	\$1,009,601	\$467,650	\$541,951	46%	54%
1994	\$1,096,503	\$677,270	\$418,733	62%	38%
1992	\$1,530,425	\$455,100	\$1,075,325	30%	70%
1990	\$312,425	\$172,500	\$139,925	55%	45%
<b>TOTAL</b>	<b>\$7,917,464</b>	<b>\$3,440,705</b>	<b>\$4,473,759</b>	<b>44%</b>	<b>57%</b>

<sup>71</sup> Charles Lewis, *The Buying of a President*, (The Center of Public Integrity, accessed 3 Nov. 2007); available from <<http://www.publicintegrity.org/bop2004/>>.

<sup>72</sup> James Bovard, *Archer Daniels Midland: A Case Study in Corporate Welfare*, p. 14 (Cato Policy Analysis, 1995, No. 241).

ADM relies on the U.S. government to stabilize its inputs' markets. The availability and price of agricultural commodities are subject to unpredictable factors including both domestic and foreign government farm program and policies. A reduction in either of those factors has historically had an impact to agricultural commodities resulting in the company having a net operating loss. The U.S. government is ADM's protection to the market as biofuels are highly sensitive in relations to gasoline and diesel prices. ADM's ethanol and biodiesel uses are closely related to petroleum uses and therefore the selling prices of ethanol and biodiesel are closely related to the price of petroleum fuel. A significant drop in the cost of gasoline could result in a significant loss in revenue for ethanol and biodiesel because more consumers will go for the cheaper alternative.

The U.S. government keeps Ethanol's prices artificially high with a variety of trade, monetary and fiscal policies, laws and regulations. This includes taxes, tariffs, duties, subsidies and import and export restrictions on commodity products. A significant impact could be made on ADM's production of biofuel in changing any of those conditions due because ethanol would no longer be sustainable without those high subsidies and protectionist tariff.

There are currently five Federal tax incentives or subsidies for alcohol fuels in the tax code. In order of importance to alcohol fuels development, they are: (1) the excise tax exemptions; (2) the blender's tax credits; (3) the small ethanol producer's tax credit; (4) the tax deduction for clean-fuel burning vehicles; and (5) the alternative fuels production tax credit. Many times throughout recent history, the industry expected the five subsidies to receive greater scrutiny by the Congress as a result of the EPA and the USDA mandating the use of renewable fuels to meet the oxygenate requirements and mandating its use in fleet vehicles.<sup>73</sup> But the tax

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<sup>73</sup> Salvatore Lazzari, *Alcohol Fuels Tax Incentives and The EPA Renewable Oxygenate Requirement*, Congressional Research Service Report for Congress, CRS-12, (7 Oct 1994 [RL94785]).

credits have not dissipated, signaling that ADM's donations are making a difference in the Capitol.

The U.S. ethanol industry is further protected from competition by imported ethanol, disadvantaged by a 54-cent tariff per gallon in the United States. The tariff, originally set in place to protect corn farmers and the domestic ethanol industry, is now a blockade to the U.S. striving to meet its own fuel consumption with renewable energy. In February of 2007, President George W. Bush went to Brazil in order to form an agreement for a closer cooperation on researching production of energy from alternative sources. Although the agreement will benefit Brazil by way of foreign investment, its ethanol would be artificially higher in cost than domestic ethanol when crossing into the United States.

The tariff was a topic the President avoided when talking to Brazilian President Luiz Inácio Lula da Silva. The unwillingness of the U.S. to lower tariffs creates a disparity that will not be ignored by any state—or actor within the United States. Environmentalists, energy experts and economists are beginning to see the cynicism in the U.S. pushing the use of renewable fuels while proactively impeding the fuels importation from countries who can produce at a higher efficiency and environmentally sustainable level. As those formidable opponents reach lawmakers' desks by way of letters, briefings and the media, ADM might have to write a few more checks.

## **B. Organization**

As with virtually every industry in the United States today, ethanol has its own voice in Washington by way of a lobbying firm. Two lobby groups promote ethanol: The National Corn Growers Association and the Renewable Fuels Association (RFA). Although both represent distinct products, corn and ethanol, their connection to ethanol on the Capitol floor is very direct.

Most recently both groups have formed a coalition to unify the voices in the ethanol community. Although the coalition is an important consideration of the current industry, this paper will dissect ethanol's main lobbyist, the RFA, to see if its mission to promote a renewable fuel source is also one to inspire sustainable principles.

Organized in 1981, RFA serves as the voice of the ethanol industry. The organization, according to its website promotes policies, regulations and research and development initiatives that will lead to the increased production and use of fuel ethanol. The RFA is governed by a Board of Directors comprised of a representative from each producer member, representing 90% of the total industry. Out of its four objectives, "environment" is mentioned once in the context of increasing public awareness of the renewable fuel—not actually promoting it.<sup>74</sup> While navigating around the website with pages of serene pictures of nature, one cannot help but notice the ambiguity presented by the organization. Using the website's search engine no hits were found for "subsidy," "government intervention" or "tax incentive."<sup>75</sup> Features of the ethanol industry the group does not want to highlight.

In order to truly understand the mission of an organization, its sponsors must be examined to see if their motives are for the expansion of the fuel as a renewable fuel source or the expansion of the fuel to drive their own profits. In RFA's recent publication of "The Ethanol Fact Book", sponsors include seven ethanol producers, seven organizations supporting the use of ethanol, four innovators in the ethanol industry, and finally four major companies supporting the development of ethanol fuel. Those four companies were: Chrysler, Ford Motor Company, General Motors Corporation, that now mass produce Flexible Fuel Vehicles (able to use up to 85% ethanol) and the John Deere & Company that has been integral to corn production since .

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<sup>74</sup> *Philosophy*, accessed on 16 Oct. 2007; available at <<http://www.ethanolrfa.org/about/philosophy/>>.

<sup>75</sup> *About Us*, accessed on 16 Oct 2007; available at <<http://www.ethanolrfa.org>>.

Chrysler now offers 17 FFVs over its three brands: Chrysler, Dodge and Jeep.<sup>76</sup> In early 2006, the company pledged to build 500,000 ethanol-fuel vehicles annually by 2008. Thomas W. LaSorda, chief executive of Chrysler, made the pledge while at a meeting of the Renewable Fuels Association in Washington where Bush had announced measures aimed at reducing the countries dependence on foreign oil.<sup>77</sup> One of those measures was the production of flex fuel vehicles. Chrysler ingeniously added the feature that if your car can use the higher percentage, the gas cap is yellow making ethanol a fad, not just a fuel.<sup>78</sup> To show its support, the Whitehouse recently added 30 ethanol-fuel-compatible Chrysler mini vans to its fleet. Currently however, the vans operate on gasoline because the nearest fueling facility is over 20 miles from the downtown area of the District of Columbia.<sup>79</sup>

The Ford Motor Company is expected to build 250,000 vehicles annually and now offers four FFVs over four brands: Ford, Mercury and Lincoln. Ford also has more liabilities on ethanol than just its core competency of building vehicles. In January, Ford announced a partnership with VeraSun Energy Corporation of Brookings, S.D., to increase the number of ethanol fueling stations in the Midwest. Ford is helping to underwrite the addition of 20 fueling stations in Illinois, 30 in Missouri and six in Iowa. A company spokesman said the automaker plans to have more than 60 stations in the United States over the next few years.<sup>80</sup> Ford was also the first automaker to offer a full-size truck as a FFV. The truck was hoped to be a sweeping victory in those farming region, though current numbers show otherwise. Still, the chairman of the Ford Motor Company, William Clay Ford, Jr. seems to be a skeptic of corn-based ethanol. “It

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<sup>76</sup> *Fuel for Thought*, accessed on 17 Oct 2007; available at <<http://www.chrysler.com/flexfuel/>>.

<sup>77</sup> Sholnn Freeman, *Chrysler Expanding its Ethanol Model Line*, (The Washington Post, 26 April 2006, D01); accessed on 21 Oct. 2007.

<sup>78</sup> *If your car uses ethanol, Chrysler's gonna cap yo' gas*, accessed Oct 23 2007; available from <<http://jalopnik.com/cars/news/if-your-car-uses-ethanol-chryslers-gonna-cap-yo-gas-179412.php>>.

<sup>79</sup> *Corn-Powered cars – White House adds ethanol-fuel-compatible mini vans to its fleet*, accessed on 25 Oct 2007; available at <[http://findarticles.com/p/articles/mi\\_m3289/is\\_n3\\_v167/ai\\_21203947](http://findarticles.com/p/articles/mi_m3289/is_n3_v167/ai_21203947)>.

<sup>80</sup> *Greener Miles*, accessed on Oct. 23 2007, available at <<http://www.ford.com/innovation/environmentally-friendly>>.



certainly appeared a year ago that we were going to have a national push on ethanol, and we wanted to have the vehicles ready,” Mr. Ford said. “But we always knew that food-based ethanol would not be the answer. The shift to cellulosic ethanol has been slower than we were led to believe.” He added: “If we don’t end up with cellulosic ethanol quickly, we are going to hit the wall on ethanol.” And if drivers wait too long for new fuels or have trouble finding them, Ford said it could be hard to persuade them to switch from lower-priced gasoline.<sup>81</sup> These inefficiencies are also the reason why that Ford is actively pursuing Hybrid vehicles as an alternative to gasoline.

General Motors turned out 400,000 FFV in 2006 and is expected to end 2007 with a production level of over 500,000 FFVs. General Motors offers 16 vehicles across three brands: Buick, Chevrolet and GMC.<sup>82</sup> General Motor’s “Live Green, Go Yellow” public relation campaign began during the 2006 Olympics and has continued throughout the years. The campaign was designed to make consumers, energy producers and policy makers aware of GM’s E85 capability.<sup>83</sup> General Motors likes ethanol as an alternative to gasoline because it’s a fuel source that would be virtually transparent to drivers, and is less costly than other methods of reducing oil consumption, such as the development and manufacture of a full hybrid power train for mass-produced cars, or the development of hydrogen-based fuel cell systems.<sup>84</sup> Or maybe General Motors is reactive to the fuel because the fuel is less cost to them. General Motors can have an effective environmental sustainability campaign while its customers face hidden costs. Consumer Reports discovered that the Chevrolet Impala FFV delivers 19 mpg with E85, versus

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<sup>81</sup> Micheline Maynard, *Ford Chairman says new fuels are developing too slowly*, accessed 18 Oct 2007; available from <<http://www.nytimes.com/>>.

<sup>82</sup> *Shop GM Vehicles*, accessed 18 Oct. 2007; available at <<http://www.gm.com/shop>>.

<sup>83</sup> GM: “Live Green Go Yellow,” accessed 19 Oct 2007; available at <[http://www.greencarcongress.com/2006/01/gm\\_live\\_green\\_g.html](http://www.greencarcongress.com/2006/01/gm_live_green_g.html)>.

<sup>84</sup> Brian Chee, *General Motors Launches Bio-Ethanol Initiative*, (autobytel.com, accessed on 16 Oct 2007); available at [http://www.autobytel.com/content/shared/articles/templates/index.cfm/article\\_id\\_int/966](http://www.autobytel.com/content/shared/articles/templates/index.cfm/article_id_int/966)>.

24 mpg with gasoline.<sup>85</sup> Five miles for every gallon equates to a dire cost being put on the customers of General Motors.

The upgrade for a vehicle to become a FFV vehicle costs less than \$500 during the production process; however, the marketable strength to the car is much higher with the FFV credential.<sup>86</sup> Since Chrysler, Ford, and General Motors all recommend ethanol fuels, and nearly every car manufacturer in the world approves ethanol blends in their warranty coverage it is no surprise why the car manufacturers support the ethanol movement in order to tap an additional market segment. Still, the companies seem skeptic to concentrate solely on ethanol as all three companies have continued their pursuit to develop Hybrid vehicles, those that utilize both gas and battery power. The same skepticism explains why Honda, one of the leaders in Hybrid technology, decided against E85 vehicles as an investment priority.<sup>87</sup>

One of RFA major focus is to create demand for ethanol in other industries, such as the automobile industry and also the industries involved in the co-products of ethanol. In this role, RFA is responsible for taking a proactive role in providing sound industry data regarding the production, distribution, trade and performance of these products.<sup>88</sup> Ethanol relies on the consumer having the means to use the fuel. Ford, Chrysler and General Motors, among others, have given the consumer those means. Fueling stations, ethanol producers and automobile manufacturers are connected as complementary products. Not one of those entities can survive without the increase in demand for the other. For this reason, the RFA website lists vehicles

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<sup>85</sup> *The Ethanol Myth*, (Consumer Reports Oct. 2006, accessed 17 Oct. 2007); available at <[http://www.consumerreports.org/cro/cars/new-cars/ethanol-10-06/overview/1006\\_ethanol\\_ov1\\_1.htm](http://www.consumerreports.org/cro/cars/new-cars/ethanol-10-06/overview/1006_ethanol_ov1_1.htm)>.

<sup>86</sup> Sholnn Freeman, *Chrysler Expnding its Ethanol Model Line* (The Washington Post, 26 April 2006, accessed 17 Oct. 2007); available from <<http://www.washingtonpost.com/wp-dyn/content/article/2006/04/25/AR2006042501737.html>>.

<sup>87</sup> Ryan Keefe, Jay Griffin, and John D. Graham, *The Benefits and Costs of New Fuels and Engines for Cars and Light Trucks* (Rand Corporation, Nov. 2007).

<sup>88</sup> *Committees*, accessed 22 Oct. 2007; available from <<http://www.ethanolrfa.org/about/committees/#FCPC>>.

with the ability to use E10 and E85 in the hopes to widen the infrastructure and tools needed to increase ethanol usage.

John Deere & Company, as the world's leading manufacturer of agricultural and forestry equipment, considers that farmers increasingly are becoming producers of energy as well as food to be great news. Mr. Robert Lane, in delivering his 2006 Annual Report considers ethanol a favorable trend to his company's net earnings. "Well over 10 percent of the U.S. corn crop now goes to the production of ethanol and that percentage could be in the 25 percent range by the end of the decade as a result of legislative mandates," Lane says, "Needless to say, John Deere is lending its full support to renewable fuel sources."<sup>89</sup> John Deere's innovations that make corn harvesting more productive than ever is the tool farmers use to make their livelihood. Again, like the automobile industry, ethanol and the agricultural machinery industry are exponentially connected. John Deere just happens to be one of the leading producers of combines for harvesting corn.

The four major company sponsors of the RFA all may have a genuine interest in the ethanol industry in America, but they also have a financial connection to the industry as well. Because of those close-connectedness between ethanol and the automobile industry as well as the agricultural machinery industry, the decision by these companies to sponsor the RFA must be judged as means to only further their vested interest in the ethanol industry. For this reason, the interest of the RFA, which lies in the hands of ethanol producers and sponsors that would have financial gains from the growing industry, cannot be trusted to provide clean, unbiased information to Congress or the American people through its literature. Supporting the industry is

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<sup>89</sup> Robert Lane, *2006 Annual Meeting of Shareholders*, accessed 22 Oct. 2007; available from <[http://www.deere.com/en\\_US/compinfo/speeches/2006/060222\\_lane.html](http://www.deere.com/en_US/compinfo/speeches/2006/060222_lane.html)>.

not about providing the U.S. with the most sustainable fuel option, but rather, the only alternative fuel source that has been sustained.

Another advocate to the ethanol industry is the National Corn Growers Association based in St. Louis Missouri. Living by their mission “to create and increase opportunities for corn growers,” the group has recently lobbied congress to establish a renewable fuels standard as part of a comprehensive energy.<sup>90</sup> The group, which represents more than 33,000 dues-paying corn growers from 48 states, has immense political power due to its vast membership.

### C. Government

The Center for Responsive Politics is a non-partisan, non-profit research group based in Washington, D.C. that tracks money in politics, and its effect on elections and public policy. Its website, [opensecrets.org](http://www.opensecrets.org) provides databases on donations by company, by industry and by lobbying firms to campaigns.<sup>91</sup> This paper will utilize those databases to determine links between legislation and the ethanol industry. In the hopes to target as many political figures as possible, this paper will utilize the *alternative energy producers* grouping which includes a variety of domestic ethanol producers, supporting organizations and alternative energy consulting firms.<sup>92</sup>

Alternative energy producers’ campaign donations are still small in comparison with the fossil fuel industries, giving \$339,000 to federal parties and candidates in 2006 compared to \$19 million from the oil and gas industry that year.<sup>93</sup> Alternative energy producers, however, have seen no less action than its oil counterpart in Washington during the 110th Congress. The industry strongly supported the provisions mandating usage of renewable fuels. The industry

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<sup>90</sup> *NCGA’s Mission*, accessed 2 Nov. 2007; available from <<http://www.ncga.com/aboutus/main/index.asp>>.

<sup>91</sup> *About the Center*, accessed 14 Nov. 2007; available from <<http://www.opensecrets.org/about/index.asp>>.

<sup>92</sup> *Alternative Energy Production & Services: Background*, accessed 14 Nov. 2007; available from <<http://www.opensecrets.org/industries/background.asp?Ind=E1500>>.

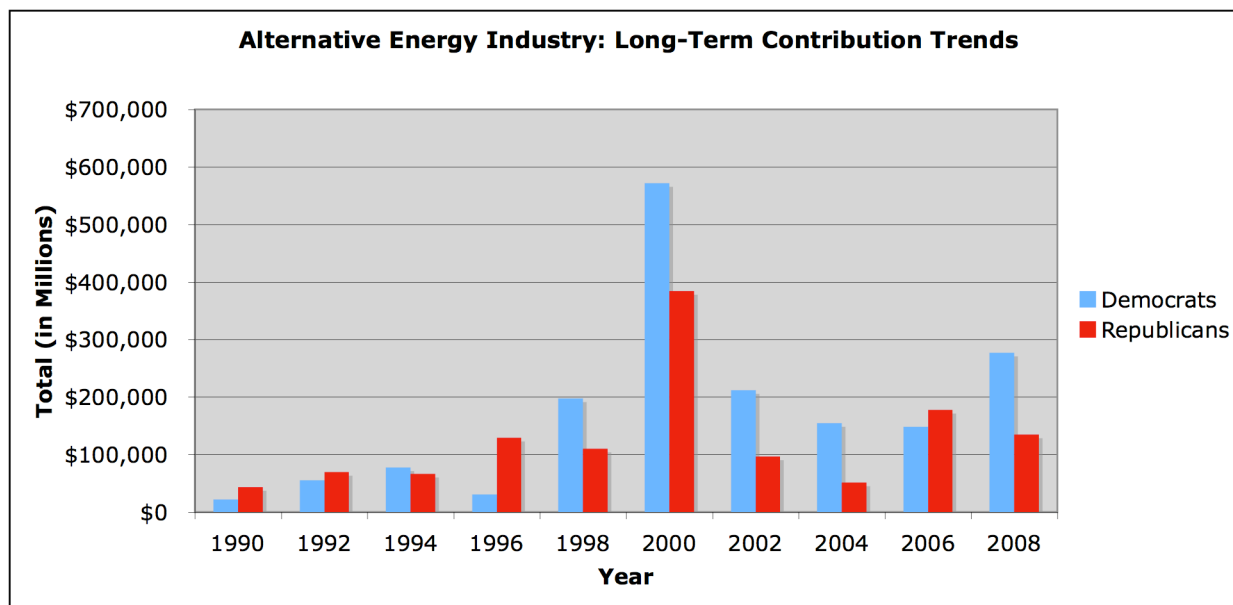
<sup>93</sup> *Id.*

has urged Congress to increase the nation's production of biofuels to 36 billion gallons by 2020, part of which was seen with President Bush call for a 20 percent reduction in gasoline consumption by 2017. The *Clean Energy Group*, the *National Biodiesel Board* and the *Council for Energy Independence* were alternative energy industry's top spenders on lobbying in 2006.<sup>94</sup> The industry is expected to spend close to \$412,156 in 2008, marking a steady increase over the last five years.

As shown in Figure 7, the industry has traditionally sent more than two-thirds of their political contributions to Democrats, however, the tables turned in 2006 when the industry gave more heavily to the GOP for the first time in a decade. This has to do with the political volatility around fuel legislation of recent. The industry needs the support of both parties and their checkbook shows. There has also been an increase from the 1990s to the present, in direct correlation to the increased attention on ethanol in Congress.

**Table 2:** Alternative Energy Industry's Long-Term Contribution Trends, amounts to Democratic and Republican Members

Source: <http://www.opensecrets.org/industries/indus.asp?Ind=E1500>



<sup>94</sup> *Alternative Energy Production & Services: Background, supra* note 92.

More important than which party the industry gives to, are the people within those parties that receive donations. In reviewing the list of recipients for 2008 election year, the top 20 list reveals interesting connections between laws and ethanol. The recipient of most funds from the alternative energy industry in 2008, at this time, is Max Baucus (D-MT) totaling \$49,100.<sup>95</sup> Max Baucus is also the senior member of the Senate Committee of Agriculture, Nutrition and Forestry. The Committee is empowered with legislative oversight of all matters relating to the nation's agriculture, farming programs, forestry and logging, and legislation relating to nutrition and health.<sup>96</sup> The second highest recipient of funds is John Kerry (R-MA) totaling \$40,561.<sup>97</sup> Similarly, Senator Kerry holds a position on the Committee on Commerce, Science and Transportation. The committee has legislative oversight on matters relating to, among other things, the regulation of science, engineering, and technology research and development and policy and transportation matters.<sup>98</sup> These positions give the two senators access to virtually every piece of legislation relating to renewable energy.

The third highest recipient is presidential hopeful Barack Obama (D-IL), who is already public supporter of ethanol. In February 2006, Obama made advertised the product: "All kinds of technology can reduce our reliance on oil, but if we want to do something that's fast and effective, ethanol is the way to go." Obama is also a member of the Senate Energy and Public Works Committee, that was instrumental in setting the targets for ethanol production in the 2004 Energy Bill.<sup>99</sup> He was the highest presidential hopeful to receive money from the industry, but not the only one. Hilary Clinton (D), Rudolph Giuliani (R), Mitt Romney (R), John McCain (R),

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<sup>95</sup> *Alternative Energy Production & Services: Top 20 Recipients*, accessed 14 Nov. 2007; available from <<http://www.opensecrets.org/industries/recips.asp?Ind=E1500&cycle=ALL&recipdetail=A&sortorder=U>>.

<sup>96</sup> *The United States Committee on Agriculture, Nutrition and Forestry 1825-1998*, accessed 21 Oct. 2007; available from <[http://www.access.gpo.gov/congress/senate/sen\\_agriculture/gjurisdi.html](http://www.access.gpo.gov/congress/senate/sen_agriculture/gjurisdi.html)>.

<sup>97</sup> *Alternative Energy Production & Services: Top 20 Recipients*, *supra* noted 95.

<sup>98</sup> *About the Committee Jurisdiction*, accessed 21 Nov. 2007; available from <<http://commerce.senate.gov/public/index.cfm?FuseAction=About.Jurisdiction>>.

<sup>99</sup> Jason Carson Wilson, *Senator Obama praises ethanol*, (obama.com, 16 March 2005, accessed 23 Nov. 2007); available from <[http://obama.senate.gov/news/050316-senator\\_obama\\_praises\\_ethanol/](http://obama.senate.gov/news/050316-senator_obama_praises_ethanol/)>.

Christopher Dodd (D), Joseph Biden Jr (D) and Bill Richardson (D) all received sizable donations from the industry. These donations are for the continued support of the ethanol industry, a good investment to the industry, especially from the results of President George W. Bush's avid support during his presidential term.

One of the most important senators to the ethanol industry is the senator of the Corn Belt region: Chuck Grassley (R-IA) gained \$26,095 from the alternative energy industry for his campaign in 2008.<sup>100</sup> Senator Grassley is a staunch supporter and one of the most vocal politicians in the advances of ethanol as seen in his recent conflict with oil executives over a contradiction made by the oil companies when supplying ethanol products at their stations.<sup>101</sup> A top contributor to his campaign also includes Xcel Energy. Xcel Energy is a publicly traded utility company based in Minneapolis, Minnesota that is a large producer of light, fuel, electricity and natural gas serving the Midwest region of the United States.<sup>102</sup> The largest input next to corn in the production of ethanol is natural gas. When the production of ethanol increases, so will the demand of natural gas.

In examining the relationships of ethanol and with its corporations, the organizations that support it and the politicians involved in the legislation that affect it all have one interest in mind: capital. The industry is being supported by those institutions in the interest of the groups' own capital gain, not on the actual sustainable qualities of the product. This is also noted by environmental groups such as the Sierra Club that has taken a stance against the expansion of

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<sup>100</sup> *Chuck Grassley Top Contributors*, accessed 28 Nov. 2007; available at <<http://www.opensecrets.org/politicians/contrib.asp?CID=N00001758&cycle=2008>>.

<sup>101</sup> Jeremy Jacobs, *Grassley demands answers on ethanol from oil execs* (thehill.com, 4 May 2007, accessed 15 Oct. 2007); available from <<http://thehill.com/business--lobby/grassley-demands-answers-on-ethanol-from-oil-execs-2007-05-04.html>>.

<sup>102</sup> *About Xcel Energy*, accessed 28 Oct. 2007; available from <<http://www.xcelenergy.com/>>.

corn ethanol industry.<sup>103</sup> In section IV, the paper will address the true costs of ethanol to prove its unsustainable qualities further.

#### IV. The True Costs of Ethanol

The true costs of ethanol stems being different then the market price stems from its derivation. It was regulatory pressure, not consumer interest that increased the development of ethanol as a motor fuel in the United States. The true costs of ethanol considered in this paper will be those costs that are considered hindrances to ethanol, specifically E85, becoming a more deliverable fuel source in the United States.

The biggest caveat to the industry is provided by the Sierra Club that warns, “If every vehicle in the United States were powered by ethanol, only one of eight would be driveable,” in response to General Motors’ advertisement asking “What if every vehicle in America was yellow?,” or able to use ethanol. The organization continues, “Already, 20 percent of the nation's corn goes to ethanol production. Replacing just one-eighth of U.S. gasoline consumption would require the country's entire corn crop.”<sup>104</sup> The bottom line is that there is not enough corn in the United States, at current level of production or ethanol technology, to allow for every car to use E85. Even at the current use of 20% of total corn yields, competition for corn supplies among fuel, food and export markets, along with a decline in the marginal value of ethanol co-products, is expected to make production of ethanol more expensive.<sup>105</sup> And higher costs could only hinder the use of ethanol further.

There is diminished energy content of ethanol in comparison to gasoline. Researchers at the Rand Corporation conducted a cost-benefit analysis of the top alternatives to standard

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<sup>103</sup> *Switch to Switchgrass*, accessed 25 Oct 2007; available from <<http://www.sierraclub.org/compass/2006/01/switch-to-switchgrass.asp>>.

<sup>104</sup> Paul Rauber, *Decoder: Corn-Fed Cars*, p 1 (Sierra, January/February 2006, accessed 15 Oct. 2007); available from <<http://www.sierraclub.org/sierra/200701/decoder.asp>>.

<sup>105</sup> A. Baker and S. Zahniser, *Ethanol Reshapes the Corn Market*, p. 29-35 (*Amber Waves Magazine*, Vol. 4., No. 2 (2006) accessed 16 Oct. 2007); available from <<http://www.ers.usda.gov/AmberWaves/April06/Features/Ethanol.htm>>.



gasoline looking at fuel savings, technology costs and performance. They also factored in societal costs in the form of noxious pollutants, greenhouse gas emissions and energy security costs. The analysis was performed for a mid-sized car, a mid-sized SUV and a large pickup truck. Based on the consumer factors, modern clean diesels yielded net savings over the life of the vehicle ranging from \$460 to \$2,289 for the different vehicle types. Hybrids yielded smaller but still net positive savings of \$198 to \$1,066. In spite of the relatively small cost to create an E85 capable vehicle, ethanol wound up costing substantially more over the life of the car. Due in large part to the increased fuel consumption of E85, it will cost from \$1,034 to \$1,632 more than gasoline to operate.<sup>106</sup> The biggest cost is represented by the fact that ethanol has about two-thirds less energy than a gallon of gasoline. An 85 percent blend, leads to a 5 percent to 15 percent decrease in miles per gallon of fuel.<sup>107</sup> Putting this to a dollar figure, in July 2007 the gasoline price was \$3.03 per gallon and the ethanol price was \$2.63 per gallon. However, when equating energy to that of gasoline, the price for ethanol is \$3.72 cents per gallon.<sup>108</sup> This is a 69-cent cost per gallon that is passed to the consumer. For this reason, ethanol is not a solution from a cost-benefit perspective unless the costs of ethanol production decline significantly or the price of gasoline stabilizes near \$3.50 a gallon.<sup>109</sup>

The infrastructure of the current ethanol production line is disruptive to its own market. The lack of biorefineries along the east, west and gulf coast of the United States creates empty pockets in the ethanol distribution chain. According to the RFA, as of 28 November 2007, only 8 out of 128 biorefineries in the U.S. are located along those coasts.<sup>110</sup> This leads to pockets of unavailability because ethanol cannot be shipped cost-effectively to the consumer from the mid-

<sup>106</sup> Ryan Keefe, Jay Griffin, and John D. Graham, *supra* note 87, p. 12.

<sup>107</sup> Brent D. Yacobucci, "Fuel Ethanol: Background and Public Policy Issues," Congressional Research Service Report for Congress, CRS 5-6, updated 24 Jan. 2007, Pg. 14

<sup>108</sup> *Clean Cities Alternative Fuel Price Report, March 2007*, accessed 23 Oct. 2007; available at <<http://www.eere.energy.gov>>.

<sup>109</sup> *Id.*, pg. 24.

<sup>110</sup> *Ethanol Biorefinery Locations*, accessed 28 Nov. 2007; available from <<http://ethanolrfa.org>>.

west region. Since the alcohol portion of E85 is water-soluble with water, the fuel will become contaminated due to condensation. The remaining modes of transportation are railcar and truck, increasing ethanol's transportation cost and unsustainable properties.<sup>111</sup>

A major obstacle to greater use of E85 is the lack of availability of the product at refueling stations. Only about 1,000 of the 170,000 fueling stations in the United States, most of them located in the Midwest, have E85 pumps for motorists. Many station owners are averse to carrying the product because of the unique properties of the blend that require costly retrofits to storage and dispensing equipment.<sup>112</sup> Recent EIA estimates for replacing one gasoline dispenser and retrofitting existing equipment to carry E85 costs between \$22,000 and \$80,000, depending on the scale of the retrofit. Investment in an E85 pump that dispenses one-half the volume, on average, of an unleaded gasoline pump would require an increase in retail prices of 2 to 7 cents per gallon if the costs were to be recouped over a 15 year period.<sup>113</sup> In 2005, Congress made fueling stations eligible for a tax credit through 2010 that equals up to 30% of the cost of installing the refueling station, however owners argue the incentive is not enough, especially when E85 is not selling in the stations where it is available.

According to a study by the Department of Energy conducted in 2005, a large majority of FFVs on U.S. roads are fueled exclusively by gasoline. The study showed that only 146,000 FFVs are fueled by E85 out of a total 750,000 are fueled by E85.<sup>114</sup> At the present, E85 represents approximately 1 percent of ethanol consumption in the United States.<sup>115</sup> The disconnect between purchasing a FFV and actually using the E85 is based on two theories. The first is that owners

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<sup>111</sup> *Federal Agencies' Use of Gasohol Limited by High Price and Other Factors*, Government Accountability Office Report to Senate, GAO -95-41 (Dec 1994). Pg. 5.

<sup>112</sup> Energy Information Administration, *Annual Energy Outlook 2007*, 7 Feb. 2007, accessed 29 Nov. 2007; available from <<http://www.ei.doe.gov>>, p. 63-64.

<sup>113</sup> *Id.*, pg. 64.

<sup>114</sup> *Alternatives to Traditional Transportation Fuels*, accessed 13 Oct. 2007; available from <[http://www.eia.doe.gov/cneaf/alternate/page/datatables/atf14-20\\_05.html](http://www.eia.doe.gov/cneaf/alternate/page/datatables/atf14-20_05.html)>.

<sup>115</sup> Yacobucci, *supra* note 107, p. 10.

may not be aware of their vehicles' flexible fuel capability. The second and more probable is the cost difference between E85 and its alternative, gasoline.

Even federal agencies are hesitant to use E85 due to its high costs. Federal agencies with large vehicle fleets started purchasing FFV vehicles as their availability increased. Still however, out of the three agencies with the largest fleets, the U.S. Department of Agriculture (USDA), the Department of Defense and the U.S. General Service Administration, only the USDA held a mandatory internal requirement to use E85 fuel, where available. Still, the employees may only purchase and use E85 where the price is the same or lower to gasoline prices. In addition, employees may only refuel at locations on their normal route.<sup>116</sup> This severely limits the employee's ability to use E85 because of the low number of fueling stations.

The hidden cost of the ethanol industry is also a consideration to the industry's sustainability. The value of the ethanol tax incentives is shared among different groups in the economy including: ethanol fuel blenders, ethanol producers, and corn farmers. According to the GAO's estimates, the partial exemption for alcohol fuels reduced motor fuels excise tax revenues by about \$7.1 billion dollars from fiscal year 1979 through fiscal year 1995. Worse is the evidence that suggests that the tax incentives, while increasing ethanol fuel use across the United States, has not significantly contributed to U.S. energy independence. The share of oil imports in total U.S. energy or petroleum consumption has remained the same or higher that it was before ethanol incentives were offered.<sup>117</sup> The fuel, which is costing U.S. taxpayers billions of dollars in lost tax revenue, is sadly the same fuel considered by some proponents to be our future.

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<sup>116</sup> *Federal Agencies' Use of Gasohol Limited by High Price and Other Factors*, *supra* note 111, p. 8.

<sup>117</sup> *Petroleum and Ethanol Fuels: Tax Incentives and Related GAO Work*, *supra* note 38, p. 25.

## V. Conclusion

In essence, the U.S. government has traded one national security issue for another. Instead of depending on the rest of the world for fuel, U.S. citizens may instead depend on foreign nations for their food, or at least the variety to the market. Ethanol

Success in the biofuel industry and ultimately any energy security for reducing the United States' dependence on foreign oil relies on consumer confidence, responsiveness and demand in the biofuel brand being marketed. Price, availability and familiarity are the primary attributes by which many consumers judge value in any new product. Heightened demand for ethanol resulting from any additional tax, mandate or subsidy will not sustain the biofuel industry. Consumer attitudes about prices, fuel performance, biofuel capable vehicles and the environment will affect the volume and type of biofuels sold. The skepticism surrounding corn-ethanol has branded the product unmarketable.

Ethanol is not the solution to diminishing American dependence on oil. The fuel is renewable, but the ecosystems it destroys with its by-products are not. Its vitality is based on the price of oil, as the ethanol industry in the U.S. will not survive if and when the oil prices decrease below \$35 a barrel. The U.S. government is spending countless dollars on a fuel that could not even be in existence without its support. And still, the ethanol industry is holding on as seen with the proposed Biofuels Security Act of 2007. Under the act, 10 billion gallons of renewable fuel would have to be mixed into gasoline by 2010, 30 billion by 2020 and 60 billion by 2030. The mandate, like its predecessors, does not include a plan for the building of an infrastructure or distribution networks.<sup>118</sup> Without addressing even the minimum inadequacies of the fuel, ethanol will continue to be a lame product being supported by crutches. Those crutches

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<sup>118</sup> Biofuels Security Act of 2007, H.R. 559, S. 23, 110 Cong., accessed on 21 Nov. 2007; available from <<http://thomas.loc.gov/cgi-bin/query/z?c110:s.23>>.

are the high subsidies, tax incentives and mandates in place by the U.S. Government. Inflated fuel costs, both at the pump and the paycheck, are now part of the American dream.

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