

November 16, 2009

The Honorable Al Gore
2100 West End Avenue
Suite 620
Nashville, TN 37203

Dear Vice President Gore:

As President and CEO of the Renewable Fuels Association, I admire your advocacy and activism on energy and environmental issues. I'm impressed by your commitment and passion for addressing global climate change.

Over the years, you have insisted that energy security, environmental sustainability, and economic growth can and must go hand-in-hand. You have also asserted that public policies should be debated and decided on the basis of careful study of the facts and reasoned presentation of the arguments, not emotional appeals and personal attacks.

Given your attention to science and the facts, I am disappointed by the treatment of ethanol and other biofuels in your new book, ***Our Choice***. Many of your characterizations of today's American ethanol industry are out of date or simply wrong. With 10.5 billion gallons produced and sold this year, ethanol is a major factor in America's motor fuel supply and is helping eliminate the need for increasing environmentally damaging sources of crude oil.

Your history of keeping an open mind to new facts makes me confident that you are interested in the facts about these fuels and their benefits for what we all agree is a world in need of affordable food, renewable energy, and responsible stewardship of our natural resources. In that spirit, I am presenting what I hope you will consider encouraging, not inconvenient, truths about biofuels.

As you write, with commendable honesty, in ***Our Choice***, you were an early supporter of grain-based ethanol and other efforts to promote biofuels during the late 1970s. But, by the mid-1990s, you came to believe that the potential of ethanol was unrealized and began to have misgivings about your earlier support.

I truly believe that the facts I'm sharing with you will persuade you that you were right to be optimistic about grain ethanol and other biofuels and that your ensuing doubts have been refuted by more recent progress. You write in *Our Choice*, "...my political desire to help the farm economy, coupled with my optimism that improvements in the efficiency with which the crop feedstocks were grown and processed, partly accounted for my desire to go forward with the large-scale development of the technology." You can take pride that your instincts and impulses were correct, and your support for biofuels was good policy.

To sum up these encouraging truths:

- American agriculture and the US ethanol industry have made remarkable progress in their productivity without jeopardizing the natural environment.
- Expanded ethanol production does not reduce food supplies or raise food prices.
- Ethanol production does not increase greenhouse gas emissions or waste water.
- And grain ethanol production builds a strong foundation for future feedstocks.

Moreover, as the citations for all these points reveal, much expert opinion does, in fact, support the benefits of biofuels for energy, the environment and the economy.

Agriculture and Ethanol: Historic Progress Since the 1970's

American agriculture and the US biofuels industry have both achieved tremendous gains in efficiency and advancements in technology since you first demonstrated your commitment to ethanol by organizing a "gasohol" workshop in 1978.

When it comes to agriculture, average corn yield in 1978 was 101 bushels per acre. At that time, this was a new record – the first time in history that farmers produced an average yield of over 100 bushels per acre. Since then, agricultural productivity has continued to improve. In fact, this season, some 30 years later, average yield is 163 bushels per acre.

There's more good news. These improvements in productivity have not come at the expense of sustainability. Higher yields have been achieved through better technology and farming practices, not through increased use of fertilizers, pesticides and other inputs.

As an example, the average amount of nitrogen fertilizer used to produce a bushel of corn has dropped 30% since 1980. According to a recent ground-breaking report (Keystone Alliance, 2009) released by a multi-stakeholder group that included Conservation International, the Nature Conservancy, Environmental Defense Fund, World Wildlife Funds and others, the following improvements in corn production occurred between 1987 and 2007:

- 27% decrease in irrigation water use per bushel
- 30% reduction in GHG emissions per bushel

- 37% decrease in the land required per bushel
- 37% decrease in energy required per bushel
- 69% reduction in soil loss per bushel

Meanwhile, similar advancements have occurred in corn ethanol production efficiency at the biorefinery. A 2008 report by Argonne National Laboratory (Wu, 2008) noted the following improvements between 2001 and 2007:

- 27% decrease in consumptive water use
- 22% reduction in fossil energy use
- 7% increase in the amount of ethanol produced per bushel of grain

Indeed, in 1978, an acre of corn yielded approximately 240 gallons of ethanol. In 2009, this amount has nearly doubled to a national average of 460 gallons per acre, thanks to higher corn yield and improved ethanol yield per bushel. In the central Corn Belt, where most corn for ethanol is produced, the average acre of corn is yielding at least 525 gallons of ethanol.

Food vs. Fuels: A False Choice

You write in ***Our Choice***: "...further diversion of cropland from food to fuel will put upward pressure on food prices at a time when many impoverished regions of the world are facing growing concerns about food security." And you continue: "...the significant increase in world food prices during 2007-08 was partly blamed on the diversion of cultivated land at the margins from the growing of food to the growing of crops for ethanol."

Once again, there are encouraging truths: The increased use of grain for ethanol in the United States has not reduced the amount of grain available for livestock feed, food processing, or exports. Furthermore, cropland is not being "diverted" from food and feed production.

Instead, increased productivity per unit of land has ensured that adequate supplies of grain are available for all uses, including biofuels. It is noteworthy that the United States achieved a new record for corn exports in 2007, amid a significant biofuels boom. Corn exports have topped 2 billion bushels in four of the last five years, the first time in history that such volumes have occurred in a five-year span.

To put corn production in perspective, corn exports feed livestock in developed nations, not malnourished humans in underdeveloped and impoverished countries. Less than 2% of U.S. corn exports are shipped to countries classified as "low development" by the United Nations.

None of this obscures the moral and practical urgency of world hunger. But, as you well know, the limits of the global supply of food are not the underlying cause of world hunger. The amount of food produced globally and per capita caloric intake both are at record high levels, according to the United Nations and World Health Organization. Instead, the problems are access to food and food security. These problems must be addressed. But producing ethanol is not the cause of

these crises, and curtailing the production of biofuels is not the cure. There cannot be food security without energy security. Around the world, sustainable production of biofuels is helping developing nations increase crop productivity and energy security.

As you rightly acknowledge, more careful analyses of the food price spike in 2007-08 revealed a host of other causes. Record high oil prices, drought and crop disease in some regions, agricultural production costs, rising labor costs, restrictive trade policies, currency fluctuations, speculative investing, and profiteering likely all played a role. Increased use of grain for ethanol played a trivial role in the dramatic food price increases witnessed in that period.

In fact, a joint analysis of the causes of higher food prices by the US Department of Agriculture and the Department of Energy found, "...current biofuels-related feedstock demand plays only a small role in global food supply and pricing. ...increased ethanol and biodiesel consumption account[ed] for only about 4-5% of the total increase while other factors accounted for 95-96%..." (DOE-USDA, 2008) Analyses by the White House Council of Economic Advisors and Congressional Budget Office arrived at similar conclusions (CEA, 2008; CBO, 2009).

Finally, let me correct what I believe is a misconception that may contribute to misunderstandings of these issues. You refer to field corn as a "food crop" and suggest "nonfood" feedstocks are preferable.

Yes, sweet corn is a food crop. But field corn (from which ethanol is made) is not. Field corn is used primarily to feed meat-producing animals, but also for a wide variety of non-feed industrial uses. Less than 8 percent of the 2009 U.S. corn crop will be used for human food products, ingredients and sweeteners like cereal, dextrose, glucose, high fructose corn syrup, and starch.

Further, one of the benefits of using corn as a feedstock for ethanol is that the protein, fat and other important nutrients in the grain are still available to the livestock feed market after the starch in the grain has been converted to ethanol. Every 56-pound bushel of corn used for ethanol produces approximately 2.8 gallons of ethanol and 17 pounds of residual livestock feed, known primarily as distillers grains. These distillers grains displace corn and soybean meal in feed rations for beef, dairy, swine and poultry.

Ethanol Production: No Increases in Greenhouse Gas Emissions or Water Usage

On yet another issue, you write in *Our Choice*: "largely because modern agriculture is so petroleum intensive, net greenhouse gas emissions from corn-based ethanol turn out to be almost equal to the emissions from gasoline." And: "...repeated life-cycle analyses of this process have led to the realization that it usually releases almost as much CO₂ into the atmosphere as does the production and use of the petroleum-based fuels being displaced."

Fortunately, corn ethanol production is *not* a "petroleum intensive" process. In a 2006 analysis, a group of researchers at U.C. Berkeley found that producing one unit of ethanol energy requires 20 times less petroleum than producing one unit of gasoline energy (Farrell, 2006). Thus, the team concluded, "...producing one MJ (mega joule) of ethanol requires far less petroleum than is required to produce one MJ of gasoline."

Other researchers have come to similar conclusions. One recent analysis found that only one barrel of petroleum is needed to produce 13-19 barrels of ethanol (Liska, 2009). Rather, most of the fossil fuel energy required to produce a gallon of ethanol comes from natural gas, which is inherently cleaner than petroleum fuels. Natural gas provides nearly 90% of the energy needs for today's ethanol biorefineries.

Nor are fertilizers "petroleum-intensive." In fact, the overwhelming majority of inorganic fertilizers are produced using natural gas. Not only is natural gas a cleaner fossil fuel than crude oil, it is also largely a domestic energy resource. In 2008, 87 percent of the natural gas consumed in the United States was produced domestically, according to the Department of Energy.

Net greenhouse gas emissions from corn ethanol are significantly lower than gasoline. Most recent analyses suggest corn ethanol reduces lifecycle GHGs 40-60% compared to gasoline. For example, one recent study published in Yale University's Journal of Industrial Ecology found that the lifecycle GHG emissions associated with modern corn ethanol are "...equivalent to a 48% to 59% reduction compared to gasoline, a twofold to threefold greater reduction than reported in previous studies." (Liska, 2009)

Another recent analysis, commissioned by the International Energy Agency, found similar results. The IEA report found that 2005-era corn ethanol reduced GHGs by an average of 39% relative to gasoline, with GHG reductions potentially reaching 55% by 2015 (IEA, 2009).

Further, recent analysis by the Department of Energy's Argonne National Laboratory shows that ethanol produced using one of the most common modern production methods (dry mill producing wet distillers grains) reduces GHGs by 57% compared to gasoline (Wang, 2009). Finally, a 2007 case study using actual production data from a modern corn ethanol facility in Illinois found that the biofuel produced by the facility reduces GHGs by 40% compared to gasoline (Mueller, 2008).

The expansion of American production of ethanol is not contributing to accelerated deforestation. In fact, according to a new report from the National Institute for Space Research in Brazil, deforestation rates from August 2008 through July 2009 dropped nearly 46 percent to the lowest levels since 1988. During this same period, ethanol production rose by nearly 13 percent.

Similarly, you write: "...on average national basis, each gallon of corn ethanol requires four gallons of water at the refinery (compared with one and a half gallons of water for the refining of each gallon gasoline) and 142 gallons on average for the growing of corn."

According to the National Renewable Energy Laboratory, 96% of the corn used for ethanol is purely rain-fed and is not irrigated (Aden, 2007). Further, a report by Argonne National Laboratory based on a survey of the ethanol industry found that average water use is approximately 3 gallons per gallon of ethanol, which compares with 2.5 gallons of water per gallon of gasoline.

Most importantly, water requirements for ethanol production are falling. As Argonne National Laboratory reports, ethanol use at plants operating today has fallen nearly 26 percent in the last five years. This trend compares favorably to the increasing water requirements to produce crude oil from sources such as tar sands and shale. According to researchers at the University of Alberta, the production of one barrel of oil from tar sands requires up to seven barrels of freshwater. When the environmental attributes of biofuels are fairly compared to those of the marginal, unconventional petroleum fuels that are being displaced by ethanol, the benefits are staggering.

As you correctly point out, ethanol project developers must obtain water use permits before building facilities. If local permitting authorities find that the presence of an ethanol facility – one that uses about as much water as a typical golf course annually – would jeopardize local water supplies, they rightly deny the permit. Simply put, ethanol plants are not being built in areas where water resources are questionable.

Today's Ethanol: Building the Foundation for the Next Generation of Biofuels

I'm sure it doesn't surprise you that I disagree with your statement that "The production of ethanol in first generation biorefineries has been a disappointment." But I quite agree when you go on to write: "However, it has...led to the emergence of an infrastructure that will prove highly valuable when second generation technologies are available to produce ethanol from nonfood crops." This includes shipping ethanol via pipelines, which occurs today all across Brazil and in the state of Florida.

Your support of American ethanol production is something in which you should take pride. Today's industry is helping support nearly 500,000 jobs, many of which are in small, hard-hit rural communities, providing more than \$20 billion in new household incomes. The use of ethanol last year alone reduced emissions by the equivalent of removing 2.1 million cars from American highways.

When it comes to reducing our dependence on foreign oil, ethanol has no equal. The use of nine billion gallons in 2008 backed out more than 300 million barrels of imported oil, saving the nation in excess of \$16 billion. Similarly, a London-based Merrill Lynch analyst estimated global biofuel production helps lower world oil price by 15 percent than it might otherwise be.

Based on an objective review of the industry as it exists today, I sincerely hope that we can both agree that corn-based ethanol is not a mistake. Rather, it is providing a strong economic and environmentally sustainable foundation upon which the next generation of biofuels, including improvements in existing technologies, will be built. Therefore, utilizing what is available today, the US should expand the demand, distribution and transportation of ethanol so that we can build a strong foundation for the next generation of biofuels.

We are in agreement that our nation can and must pursue public policies which do not make the theoretical be the enemy of the actual, the perfect be the enemy of the good or the present be the enemy of the future.

I would be honored to discuss these issues further with you and your colleagues. Best wishes for all your efforts to promote awareness and activism about energy and the environment.

Sincerely,

A handwritten signature in black ink that reads "Bob Dinneen". The signature is written in a cursive style with a long horizontal stroke at the end.

Robert Dinneen
President & CEO, Renewable Fuels Association

Enclosure

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