



Ethanol From Biomass

How to Get to a Biofuels Future
Recommendations

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Governors' Ethanol Coalition
www.ethanol-gec.org

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2007 Recommendations



...the governors believe providing decisive leadership to further expand production in ways that deliver this renewable fuel to consumers at lower prices, more efficiently, and in greater quantities is fundamental to achieving a biofuels future for America.

Two years ago, the Governors' Ethanol Coalition recommended several policies to dramatically expand the production and use of ethanol. The recommendations – *Ethanol from Biomass: America's 21st Century Transportation Fuel* – emerged from the governors' deep concern that the combination of increasing global competition for oil, higher prices, and the massive transfer of their states' wealth to unstable oil producing nations, as well as the impact of oil use on our environment, was untenable. With the governors' encouragement, Congress and the President enacted the Renewable Fuels Standard (RFS) and authorized expanded ethanol research efforts and production incentives as a part of the *Energy Policy Act of 2005*. These and other efforts resulted in the production of 5.0 billion gallons of ethanol in 2006, the addition of 3.5 billion gallons of new production capacity under construction today, and the likelihood the nation will exceed the 2012 goal of the RFS of 7.5 billion gallons of annual ethanol production in 2008.

Even as more ethanol is produced, the governors believe providing decisive leadership to further expand production in ways that deliver this renewable fuel to consumers at lower prices, more efficiently, and in greater quantities is fundamental to achieving a biofuels future for America. The governors envision increasing ethanol's contribution to the U.S. motor fuel supply from the few percentage points of today, to replace 25 percent of U.S. motor fuel demand by 2025. According to a study commissioned by the Governors' Ethanol Coalition, the resulting growth from providing only 20 percent of the nation's gasoline supply with biofuels would reduce the oil trade deficit by \$52 billion annually.¹ Strikingly, this amount would displace about 10 billion barrels of oil over 20 years or an amount equal to one third of the United States' proven oil reserves.

Realizing this vision requires bold policies, including the following provisions:

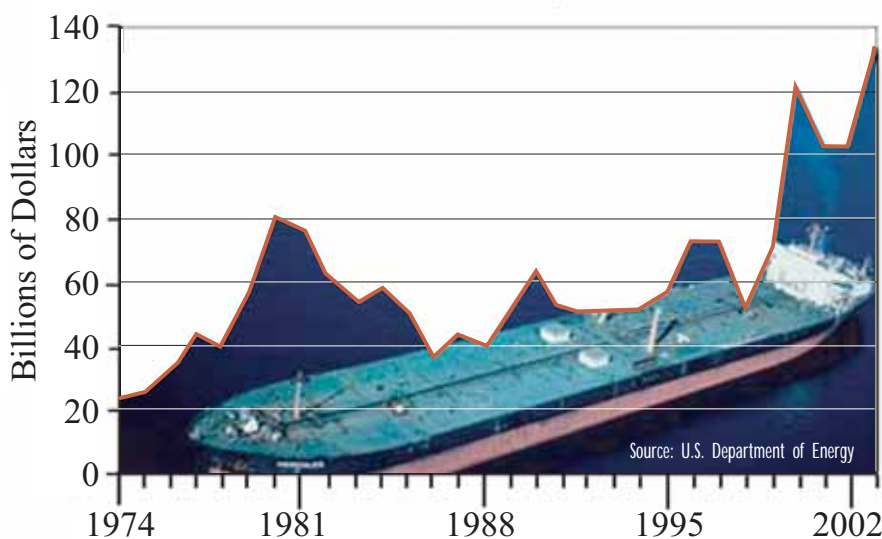
- Expanding the Renewable Fuels Standard to include a short-term target of 12 billion gallons a year of ethanol and biodiesel utilization by 2010, and longer-term British thermal unit-based targets of 15 percent of total motor

fuels consumption by 2015 and 25 percent by 2025, with equal incremental steps provided for each year in between;

- Assigning a financial value to the RFS cellulosic ethanol 2.5:1 trading credit by converting the credit into a more practical Cellulosic Ethanol Production Tax Credit (“CETOH PTC”) valued at 1.5 times the current Volumetric Ethanol Excise Tax Credit (VEETC) level (\$0.765/gal.). Cellulosic ethanol producers would also be eligible for the traditional VEETC as discussed below, and would therefore benefit from a total value of \$0.765 plus the value of VEETC at that time;
- Establishing a timetable for delivering 85% Ethanol/15% gasoline infrastructure on a regional basis — expanding from several major metropolitan areas to an entire region or regions within five years. This expansion would be synchronized with the production of not less than 70 percent of new vehicles sold being ethanol flex-fuel capable within 10 years; and
- Providing adequate funding for the *Energy Policy Act of 2005* authorized biofuel research, demonstration, and incentive programs.

Ethanol is now a mainstream American fuel that has been met with enthusiasm by consumers as they seek choices in the fuel they purchase and vehicles they drive. These choices are driven by price, national security and environmental concerns, and a desire to keep money working at home creating jobs rather than turning it over to oil exporting regimes.

Annual Cost of Oil Imports, 1974-2003



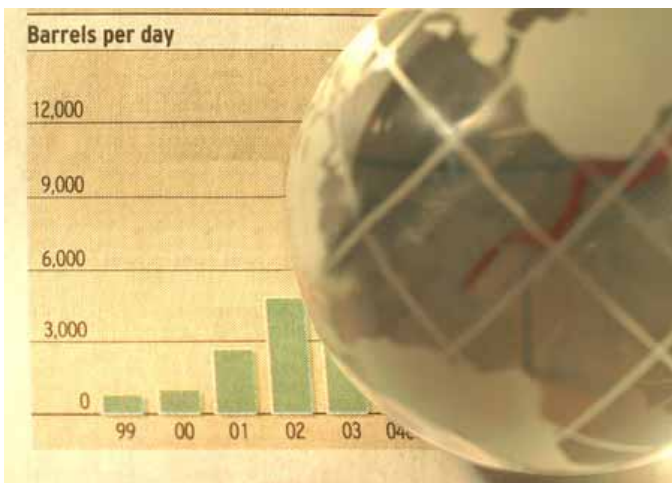
Background

The consequences of the United States' reliance on oil has brought together the nation's leaders in ways that few issues have in decades. The call for action to deliver advanced biofuels and efficient flex-fuel vehicles now comes from national security experts, business leaders, members of Congress, governors, environmental advocates, forestry and agricultural sector leaders, and consumers. All believe that we must transform both the transportation fuel system and the vehicle fleet to ensure that the fuel we use does not threaten our way of life. In early 2006, the President supported the governors' recommendations by endorsing ethanol as the primary means to begin this transformation and end the nation's addiction to oil.

The governors realize that as each day passes more of the nation's wealth is lost and complacency thwarts critical national policy changes that are urgently needed. Consider the following:

- Oil is the largest contributor to our trade deficit, accounting for more than \$1 billion a day in funds that are largely sent — not to the shareholders of major publicly owned oil companies — but to unstable oil exporting countries;
- Oil accounts for more than 32 percent of U.S. carbon dioxide emissions, with each gallon of gasoline burned producing 28 pounds of carbon dioxide from the combination of tailpipe emissions and the refining and distribution of gasoline; and
- Oil is the unquestionable epicenter of national security crises that distorts the foreign policy of many nations and that suggest potential scenarios for economic disaster.

Experts agree that national security is the most eminent risk created by our dependency on oil. Senator Richard Lugar identified these risks before the Senate in September 2006, saying:



“...hundreds of billions of dollars in oil export revenues flowing to authoritarian regimes increase corruption and hurt democratic reform. Some oil-rich nations are using this money to invest in terrorism, instability, or demagogic appeals to populism.”

In the absence of revolutionary changes in energy policy, we are risking multiple disasters for our country that will constrain living standards, undermine our foreign policy goals, and leave us highly vulnerable to the machinations of rogue states. There are at least six threats posed by oil dependence.

First, oil is vulnerable to supply disruption as a result of natural disasters, wars, and terrorist attacks. Price shocks resulting from a major supply loss can put the U.S. economy into recession.

Second, global oil reserves are becoming more limited as easy supply is depleted, global demand rapidly increases, and governments exert more control over reserves. This makes oil more expensive in the short term, and creates the prospect

that supplies may not be accessible in the future.

Third, some oil-rich nations are using energy as an overt weapon. Adversarial regimes from Venezuela, to Iran, to Russia are using energy supplies as leverage against their neighbors.

Fourth, hundreds of billions of dollars in oil export revenues flowing to authoritarian regimes increase corruption and hurt democratic reform. Some oil-rich nations are using this money to invest in terrorism, instability, or demagogic appeals to populism.

Fifth, the threat of global climate change has been made worse by inefficient and unclean use of non-renewable energy like oil. This could bring about drought, famine, disease, and mass migration.

And finally, dependence on oil increases instability and undermines development in much of the developing world. Rising energy costs can undermine our foreign assistance and hurt stability, development, disease eradication, and efforts to combat the root causes of terrorism.

Acknowledging these risks is only the latest step in a long process of reducing the nation's oil use. The governors' efforts to persuade Congress and the President to enact the Renewable Fuels Standard and to expand ethanol research and production incentives are producing results more rapidly than anticipated. This success and the risks identified by Senator Lugar should encourage Congress and the President to take the necessary steps now to achieve America's biofuels future, as many governors are doing in their own states.

Governors' 2007 Policy Recommendations

The Governors' Ethanol Coalition, determined to foster the continued expansion of ethanol production and use, assembled a group of experts to aid in developing a set of far-reaching policy recommendations. The Coalition believes that a national commitment to adopting and implementing the governors' recommendations will result in ethanol's replacing 25 percent or more of the petroleum used in the nation's transportation fuel system by 2025. According to a study commissioned by the Governors' Ethanol Coalition, adoption of a goal of providing only 20 percent of the nation's gasoline supply from biofuels would deliver extraordinary benefits to the nation, including:

- Approximately 60 billion gallons of annual ethanol production, an amount equal to about 25 percent of projected future gasoline demand in 2030;
- \$52 billion a year in avoided oil imports, creating lasting reductions in our trade deficit; and
- \$110 billion of direct economic activity each year with the total impact to the nation's economy of \$368 billion a year; and
- 2.4 million new jobs.

The governors believe that ethanol produced from a wide range of feedstocks (e.g., wood wastes, grasses, barley, agricultural residues, as well as corn and grain sorghum) in all regions of the nation and used in more efficient vehicles is the cheapest and best solution to the oil-related challenges we face. The governors' policy recommendations continue the successful, multi-pronged combination of policies from past recommendations: supporting a robust Renewable Fuels Standard (RFS), meeting the infrastructure challenges of sufficient renewable fuel stations, ensuring greater sales of flexible fuel capable vehicles, supporting additional technological developments, and encouraging vigorous private sector investment.

The governors' 2007 recommendations follow:



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The Coalition recommends immediately expanding the RFS to include a short-term target of 12 billion gallons a year of ethanol and biodiesel utilization by 2010, and to establish longer-term BTU-based targets of 15 percent of total motor fuels consumption by 2015 and 25 percent by 2025, with equal incremental steps provided for each year in between.



1. Expanded Renewable Fuels Standard

The passage of the RFS in 2005, along with the phase out of MTBE, is driving a surge of ethanol production expansion that means the nation's RFS goal of using 7.5 billion gallons of ethanol a year by 2012 will be surpassed in 2008. We now have more than 5.0 billion gallons of annual production and an additional 3.5 billion gallons of production under construction will come online over the next 18 months. This rapid progress means the nation can achieve far greater reductions in oil imports than envisioned in the *Energy Policy Act of 2005*.

In order to assess the potential for adopting such an expansion, the Coalition commissioned the University of Tennessee to conduct a study of the economic, environmental, and agricultural impacts of increasing levels of ethanol production and use. The results of the study show that further expansion of production — 10 billion gallons in 2010, 30 billion gallons in 2020, and 60 billion gallons in 2030 — is well within the capability of the industry and farmers under conservative grain yield improvement assumptions and market entry of modest amounts of cellulosic derived ethanol production by 2012.

The Coalition recommends immediately expanding the RFS to include a short-term target of 12 billion gallons a year of ethanol and biodiesel utilization by 2010, and to establish longer-term BTU-based targets of 15 percent of total motor fuels consumption by 2015 and 25 percent by 2025, with equal incremental steps provided for each year in between. This goal includes 500 million gallons a year from cellulosic ethanol by 2012. The accelerated expansion of cellulosic ethanol will only be effective when linked to the governors' recommended infrastructure expansion policies and the related incentive measures envisioned in the *Energy Policy Act of 2005*. One such measure is the monetization of the cellulosic ethanol trading credit contained in the current RFS.

2. Provide a Financial Value to the RFS Trading Credit for Cellulosic Ethanol

In order to stimulate demand for cellulosic ethanol, Congress included a 2.5:1 "trading credit" for cellulosic ethanol when it approved the RFS. This enhanced trading credit means that each gallon of cellulosic ethanol would count as 2.5 gallons for purposes of meeting the RFS requirements. Because the expansion of conventional ethanol production has far exceeded expectations, there is no financial incentive for ethanol blenders to pay more for cellulosic ethanol, and therefore there is no incentive for producers to invest in cellulosic production. Monetizing this credit by giving it a financial value is one of the principles envisioned by Congress and the President in passage of the RFS, but not realized because of the volume of ethanol produced today.



Because the expansion of conventional ethanol production has far exceeded expectations, there is no financial incentive for ethanol blenders to pay more for cellulosic ethanol, and therefore there is no incentive for producers to invest in cellulosic production.

This goal can be achieved, however, with a simple policy modification. **The Coalition recommends that Congress assign a value to the trading credit by converting the \$0.51 Volumetric Ethanol Excise Tax Credit (VEETC) to a ten year Cellulosic Ethanol Production Tax Credit (CETOH PTC).** With the CETOH PTC, cellulosic ethanol would be worth an additional \$0.765 a gallon compared to conventional ethanol, or \$0.765 plus the value of the regular ethanol VEETC at that time (nominally \$0.51, as discussed below). This approach differs from the current credit for conventional ethanol in that it would be available to producers — the current VEETC for conventional ethanol accrues primarily to the petroleum blender — based on the draft U.S. Environmental Protection Agency regulations implementing the RFS. Properly structured, these measures incentivize a range of new ethanol production technologies that reduce fossil fuel inputs and increase the competitiveness of domestically produced ethanol.

3. Meeting the Vehicle and Infrastructure Challenge — A Regional E85 Market Strategy

The ethanol infrastructure-vehicle stalemate has long been defined as which comes first — adequate E85 pumps and infrastructure or sufficient numbers of flexible fuel vehicles to use the fuel. Congress must break down this barrier in order to enable real competition among fuels. There is no evidence that the current entrenched fuel system will afford a timely transition to a more dynamic and resilient system that includes higher blend renewable fuels. Federal, state and private actions are needed to open the door for new market entrants and create a more vibrant domestic biofuels industry.

The governors recommend a regional approach to solve the infrastructure challenge — an E85 regional marketing strategy. This strategic distribution of E85 in several major metropolitan markets leading to region-wide availability, combined with greater number of flexible fuel vehicles is a relatively rapid and cost-effective means of building sustained consumer support for biofuel producers. **The Coalition recommends that Congress adopt performance standards for major gas station owners and branders (e.g., owners of 100 or more fueling stations, high-volume stations) that would provide at least one E85 pump at 95 percent of their stations in at least one region over five years.** For example, the Midwest has a motor fuel pool of 39 billion gallons.² If E85 met 40 percent of consumption, this region alone would use about 15 billion gallons of ethanol annually. Other regions present similar opportunities and offer an excellent means to support new ethanol production. States would be encouraged to provide additional E85 incentives, such as those now employed by Iowa, which provides \$.025 a gallon credit to retailers for

selling E85, and Illinois, which provides a complete state sales tax exemption for E85, providing a savings of \$0.1875 a gallon when gasoline is \$3.00 a gallon.

The petroleum industry would be given flexibility to introduce E85 in regions by, for example, initiating efforts in several metropolitan markets offering the greatest potential (e.g., those with supply or flex-fuel vehicle availability advantages, state and local incentives). This approach offers flexible implementation, a timetable for results, and impacts primarily major oil companies and large fuel marketers. In addition, incentives for pump installation and E85 sales should be designed to drive more rapid implementation in areas that present the greater market opportunity and the ability to concentrate marketing, sales, and logistics in ways that maximize value to both retailers and consumers.

Further, the Coalition recommends that within 10 years, major gas station owners and branders have E85 pumps at not less than 10 percent of all of their stations nationwide. Consideration should also be given to providing owners of a smaller number of stations with incentives and assistance in making the transition to E85. As a comparison, Sweden has mandated that 60 percent of its gasoline stations offer E85 by 2009. In the context of tremendous oil profits and a desire for market-based solutions to our oil problem, asking major companies to invest in America's future at their own retail facilities in the Midwest is a reasonable step.

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Flex-Fuel Vehicles

Following a meeting with President Bush in November 2006, leaders of the Big Three automakers indicated an ability to produce 50 percent of all light duty vehicles as flex-fuel capable within five years, provided that progress is made on expanding the E85 infrastructure. In Brazil, 80 percent of new vehicles sold are flex-fuel capable and are produced by the world's automakers at virtually no price differential to conventional vehicles. Moreover, automakers such as General Motors are making great strides in the production of flexible-fuel vehicles as production lines turn over.

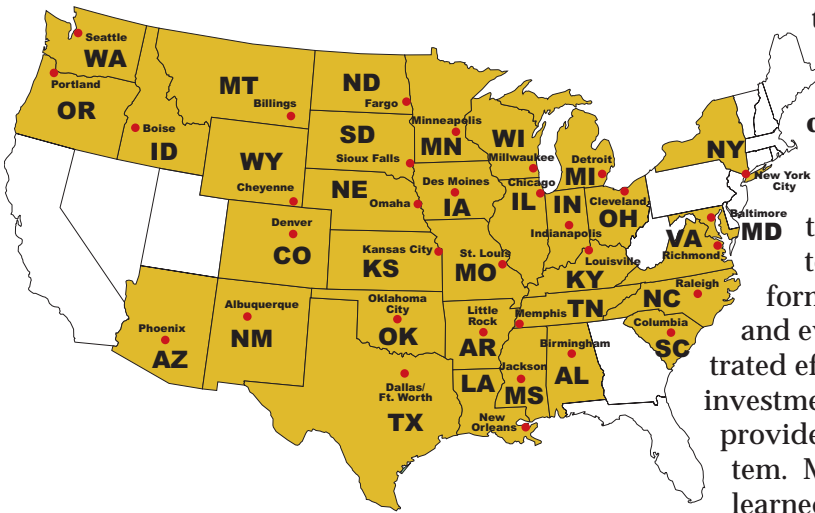
Given this progress, the governors recommend adopting a timetable for the transition to uniform flexible-fuel vehicle standards that not less than 70 percent of new light duty vehicles sold in the United States be fuel flexible within 10 years. Modest incentives (e.g., \$100 for each vehicle) should be provided to aid auto manufacturers in the cost of



this transition. Disincentives could also be explored, such as changes in the linkage between meeting CAFE requirements and the production of flex-fuel capable vehicles, for automakers not attaining the standard. This timetable complements the called for infrastructure expansion and offers limited impact on vehicle costs due to the phased approach.

Leveraging State and Local Efforts

To accelerate this transition, the governors recommend that the U.S. Department of Energy's (DOE) Biomass Program be provided with \$10 million in new funding to offer a high profile competition providing funds to three metropolitan areas in the Midwest region. Collaborative teams would compete for the one-time, cost-shared awards with such selection criteria as the potential for long-term market transformation, economic sustainability, market impact, and evidence of a local commitment. This concentrated effort would maximize private, state, and local investments in marketing and infrastructure and would provide evidence of the potential of a flexible-fuel system. Moreover, the approach would offer "lessons learned" that allow state and private efforts of a similar nature to occur in other areas of the nation.



The Coalition recommends \$8 million in new funds for E85 infrastructure expansion and education efforts conducted by the DOE Biomass Program. The Coalition also recommends that \$1 million in new funds be provided to DOE to aid in addressing biofuels infrastructure analyses and research efforts.

Preparing for the Transition

The link between a flexible-fuel vehicle timetable and a complementary E85 infrastructure timetable is a reasonable means of breaking the stalemate that has existed in the conventional fuel and auto markets for many years. To aid an orderly transition and to best prepare for the future transportation fuel system, the Coalition recommends a significant expansion of federal support for E85 infrastructure development through the transition period of the next five years.

National E85 infrastructure support efforts at DOE must be expanded, and would benefit by being overseen by DOE's Biomass Program. The limited federal funds made available to stakeholders to date have, when combined with state contributions, produced impressive results at minimal costs. However, a more comprehensive national effort is required. **The Coalition recommends \$8 million in new funds for E85 infrastructure expansion and education efforts conducted by the DOE Biomass Program.** The Coalition also recommends that \$1 million in new funds be provided to DOE to aid in addressing biofuels infrastructure analyses and research efforts. As major oil companies and petroleum marketers, the ethanol industry, and others work to dramatically expand the biofuels infrastructure, many complex issues are arising such as examining fuel storage, logistics, and safety issues. These funds are needed to aid in addressing transition challenges.

In particular, research is needed to consider the best approaches and implication of utilizing various wood waste streams and certain wood energy crops.



4. Research, Demonstration and Incentives

Technological breakthroughs and incremental process improvements are the bedrock of expanding production of ethanol and in particular delivering the promise of cellulosic ethanol. Without sustained investments in the well-planned research and incentive authorizations of the *Energy Policy Act of 2005*, America will not lead the biofuels technology of the future.

The Coalition continues its call for expanded federal resources for ethanol research, demonstration, and incentives for key programs authorized under the *Energy Policy Act of 2005*, including the DOE's Biomass Program, U.S. Department of Agriculture's Biomass Research and Development Program, U.S. Environmental Protection Agency's ongoing implementation of the RFS, and the *Section 942* Reverse Auction Cellulosic Production Incentive. The recommended funding levels for each are described below.

The Coalition recommends providing \$213 million for the DOE Biomass Program's research and demonstration activities in 2007. This program is already delivering results and should be provided a consistent level of funding to achieve the research goals and objectives established by Congress. Congress should also work to dramatically reduce the level of Congressional earmarks under this program to ensure ongoing and planned research and demonstration activities can be carried out over the next five years.

The Coalition strongly recommend that USDA's Biomass Research and Development Program be funded in 2007 at not less than the authorized level of \$200 million. This program's complementary focus on feedstock collection and other agricultural issues is essential. Substantially greater resources are needed so that USDA's unique expertise in the areas of plant biology, soil quality, and biomass collection can be used. In addition, USDA should be provided with funds to support research and demonstration that aid in establishing environmentally sustainable cellulosic ethanol production in the forestry sector. In particular, research is needed to consider the best approaches and implication of utilizing various wood waste streams and certain wood energy crops. The unique capabilities of USDA in these areas complement the energy-focused work of DOE and should be supported and expanded.

Another key USDA action that could aid private sector investors and project developers in moving cutting edge ethanol production from demonstration projects to commercial scale facilities is USDA's loan guarantee program. Guarantees provided under the *Energy Policy Act of 2005* to be carried out by DOE continue to be explored and lack necessary funding. Thus, the Coalition recommends that the USDA's loan guar-



The Coalition recommends that the USDA's loan guarantee program be modified to include a small pilot portfolio of commercialization — or higher risk — cellulosic ethanol and advanced biofuel projects. This successful program is delivered through offices in every state may offer an additional and expedient means to deliver loan guarantees for cutting edge ethanol production facilities.

antee program be modified to include a small pilot portfolio of commercialization — or higher risk — cellulosic ethanol and advanced biofuels projects. This successful program is already delivered through offices in every state may offer an additional and expedient means to deliver loan guarantees for cutting edge ethanol production facilities.

The Coalition also recommends robust funding for ongoing implementation of the Renewable Fuels Standard (RFS) and related analytical and decision support activities. The power of the RFS to reduce the nation's dependency on imported oil will be diminished unless adequate resources are provided to operate the program. The governors recommend providing not less than \$11.4 million for the U.S. Environmental Protection Agency's Federal Vehicle and Fuel Standards Certification activities and ongoing implementation of the RFS.

Finally, experiences in the governors' states with production incentives have shown tremendous value. **The governors recommend \$250 million — a one-time appropriation disbursed over five years — for the Section 942 reverse auction production incentive authorized in the *Energy Policy Act of 2005*.** Funding this incentive for cellulosic ethanol will provide needed market-pull to bring innovative production processes to both existing ethanol facilities and new facilities in other regions of the nation using an array of locally available feedstocks.

The resources for the above activities comprise the bulk of our nation's cellulosic ethanol research, demonstration, and incentive program and will make near-term contributions to our energy security by aiding the industry in utilizing the cellulose associated with the kernel of corn and corn stover, and allowing other producers to add new biomass feedstocks, such as wood chips, forest waste, and wood associated with the manufacture of paper, as well as additional grain crops such as barley, resulting in ethanol production in all regions of the nation.

Our discussions with energy, agricultural, research, and environmental organizations have reinforced our belief in the need to provide policy makers at the state and federal levels with a greater understanding of energy and bioenergy issues.



Conclusion

The Coalition's concern for the nation's energy, economic, and environmental security — our national security — led to the development of these recommendations. To meet the nation's growing transportation fuel needs and reduce our dependence on foreign oil we must set an aggressive course to further expand ethanol use and production.

Our discussions with energy, agricultural, research, and environmental organizations have reinforced our belief in the need to provide policy makers at the state and federal levels with a greater understanding of energy and bioenergy issues. In particular, we believe it is vital to communicate the potential of ethanol produced from both agricultural and non-agricultural sources, and to aid in developing sound public policy.

As a next step in our efforts, we intend to work with a broad range of organizations to provide additional depth and detail to the governors' recommendations. We will also coordinate with these organizations in the development of communications and outreach efforts to better inform the public and Congress about the benefits of renewable, domestically produced biofuels such as ethanol. Through collaboration and pragmatic, cost-effective actions, we can achieve a biofuels future for America.

Endnotes

- 1 De La Torre Ugarte, Daniel G., Burton English C. 2006. *Economic and Agricultural Impacts of Ethanol and Biodiesel Expansion*, page 3.
- 2 The region consists of the states of North Dakota, South Dakota, Iowa, Nebraska, Kansas, Oklahoma, Minnesota, Missouri, Wisconsin, Illinois, Michigan, Ohio, Kentucky, and Tennessee. The region also corresponds to the PADD2 or the Petroleum Administration for Defense District.

Acknowledgements

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