



**Energy and Natural Resources Committee  
United States Senate**

**Hearing on**

S. 987 - the Biofuels for Energy Security and Transportation Act of 2007

**Testimony of**

**Bob Dinneen**

**President & CEO, Renewable Fuels Association**

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Good morning, Chairman Bingaman, Ranking Member Domenici, and Members of the Committee. My name is Bob Dinneen and I am president and CEO of the Renewable Fuels Association, the national trade association representing the U.S. ethanol industry.

This is an important and timely hearing, and I am pleased to be here to discuss the future of our nation's ethanol industry and how the bipartisan Biofuels for Energy Security and Transportation Act of 2007 (S. 987) can help our country achieve its energy security goals.

Due to the visionary and invaluable work of this Committee in the 109<sup>th</sup> Congress, the Energy Policy Act of 2005 (EPAct 2005) put our nation on a new path toward greater energy diversity and national security through the RFS. EPAct 2005 has stimulated unprecedented investment in the U.S. ethanol industry. Since January of 2006, when the RFS went into effect, no fewer than 15 new ethanol biorefineries have begun operation, representing some 1.2 billion gallons of new production capacity. These new gallons represent a direct investment of more than \$1.8 billion and the creation of more than 22,000 new jobs in small communities across rural America.

The RFS has done exactly what Congress intended. It provided our industry with the opportunity to grow with confidence. It convinced the petroleum industry that ethanol would be a significant part of future motor fuel markets and moved them toward incorporating renewable fuels into their future plans. It persuaded the financial community that biofuels companies are growth market opportunities, encouraging significant new investment from Wall Street and other institutional investors. If a farmer in Des Moines doesn't want to invest in the local co-op, he can choose to invest in a publicly traded ethanol company through the stock market. As can a

schoolteacher in Boston, or a receptionist in Seattle. Americans coast-to-coast have the opportunity to invest in our domestic energy industry, and not just in ethanol, but biodiesel and bio-products.

In addition to the RFS, many of the other programs authorized by EPLA 2005, such as the loan guarantee and grant programs, will accelerate the commercialization of cellulosic ethanol and make the new goals set forth in S. 987 absolutely achievable. Many of the provisions included in S. 987 build upon the programs designed by this Committee and included in EPLA 2005 to further expand the domestic renewable fuels industry. The Senate Energy and Natural Resources Committee will have an invaluable role to play in making sure our nation successfully moves toward increasing the use of domestic, renewable energy sources.

## **Background**

Today's ethanol industry consists of 115 biorefineries located in 19 different states with the capacity to process almost 2 billion bushels of grain into 5.7 billion gallons of high octane, clean burning motor fuel, and more than 12 million metric tons of livestock and poultry feed. It is a dynamic and growing industry that is revitalizing rural America, reducing emissions in our nation's cities, and lowering our dependence on imported petroleum.

Ethanol has become an essential component of the U.S. motor fuel market. Today, ethanol is blended in more than 46% of the nation's fuel, and is sold virtually from coast to coast and border to border. The almost 5 billion gallons of ethanol produced and sold in the U.S. last year contributed significantly to the nation's economic, environmental and energy security. According to an analysis completed for the RFA<sup>1</sup>, the approximately 5 billion gallons of ethanol produced in 2006 resulted in the following impacts:

- Added \$41.1 billion to gross output;
- Created 160,231 jobs in all sectors of the economy;
- Increased economic activity and new jobs from ethanol increased household income by \$6.7 billion, money that flows directly into consumers' pockets;
- Contributed \$2.7 billion of tax revenue for the Federal government and \$2.3 billion for State and Local governments; and,
- Reduced oil imports by 170 million barrels of oil, valued at \$11.2 billion.

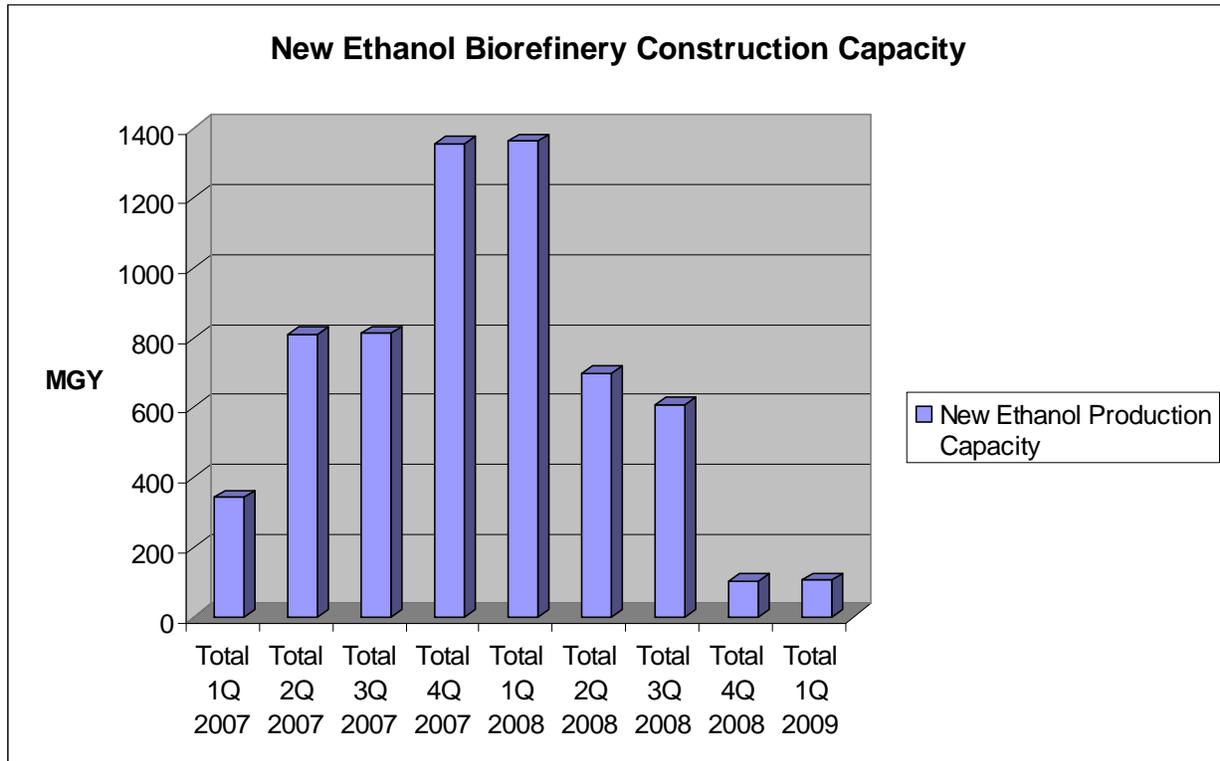
In addition to providing a growing and reliable domestic market for American farmers, the ethanol industry also provides the opportunity for farmers to enjoy some of the value added to their commodity by further processing. Farmer-owned ethanol plants account for 43 percent of the U.S. fuel ethanol plants and almost 34 percent of industry capacity.

There are currently 79 biorefineries under construction. With seven existing biorefineries expanding, the industry expects more than 6 billion gallons of new production capacity to be in operation by the end of 2009. The following is our best estimate of when this new production

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<sup>1</sup> *Contribution of the Ethanol Industry to the Economy of the United States*, Dr. John Urbanchuk, Director, LECG, LLC, December, 2006.

will come online.



### Feedstocks

To date, the U.S. ethanol industry has grown almost exclusively from grain processing. As a result of steadily increasing yields and improving technology, the National Corn Growers Association (NCGA) projects that by 2015, corn growers will produce 15 billion bushels of grain. According to the NCGA analysis, this will allow a portion of that crop to be processed into 15 billion gallons of ethanol without significantly disrupting other markets for corn. Ethanol also represents a growing market for other grains, such as grain sorghum. Ethanol production consumed approximately 26 percent of the nation's sorghum crop in 2006 (domestic use). Research is also underway on the use of sweet and forage sorghum for ethanol production. In fact, the National Sorghum Producers believe that as new generation ethanol processes are studied and improved, sorghum's role will continue to expand.

In the future, however, ethanol will be produced from other feedstocks, such as cellulose. Ethanol from cellulose will dramatically expand the types and amount of available material for ethanol production, and ultimately dramatically expand ethanol supplies. Many companies are working to commercialize cellulosic ethanol production. Indeed, there is not an ethanol biorefinery in production today that does not have a very aggressive cellulose ethanol research program. The reason for this is that today's ethanol producers all have cellulose already coming into the plant in the form of corn fiber. Producers are making good use of all parts of the corn kernel -- beyond just the starch. Several ethanol producers are working on technology to turn the fiber in a corn kernel into ethanol through fermentation. Since fiber represents 11 percent of the

kernel, this could lead to dramatic increases in ethanol production efficiency. If today's producers can process these cellulosic materials into ethanol, they will have a significant marketplace advantage. The RFA believes cellulose ethanol will be commercialized first by current producers who have these cellulosic feedstocks at their grain-based facilities. It is essential to the advancement of the ethanol industry that these "bridge technology" cellulosic feedstocks be included in the definition of advanced biofuels.

Further, biotechnology will play a significant role in meeting our nation's future ethanol needs. Average yield per acre is not static and will increase incrementally, especially with the introduction of new biotech hybrid varieties. According to NCGA, corn yields have consistently increased an average of about 3.5 bushels per year over the last decade. Based on the 10-year historical trend, corn yield per acre could reach 180 bushels by 2015. For comparison, the average yield in 1970 was about 72 bushels per acre. Agricultural companies like Monsanto believe we can achieve corn yields of up to 300 bushels per acre by 2030. It is not necessary to limit the potential of any feedstock – existing or prospective. Ultimately, the marketplace will determine which feedstocks are the most economically and environmentally feasible.

While there are indeed limits to what we will be able to produce from grain, cellulose ethanol production will augment, not replace, grain-based ethanol. The conversion of feedstocks like corn stover, corn fiber and corn cobs will be the "bridge technology" that leads the industry to the conversion of other cellulosic feedstocks and energy crops such as wheat straw, switchgrass, and fast-growing trees. Even the garbage, or municipal solid waste, Americans throw away today will be a future source of ethanol.

### **Research & Development, Deployment and Commercialization of New Technologies**

The ethanol industry today is on the cutting edge of technology, pursuing new processes, new energy sources and new feedstocks that will make tomorrow's ethanol industry unrecognizable from today's. Ethanol companies are already utilizing cold starch fermentation, corn fractionation, and corn oil extraction. Companies are pursuing more sustainable energy sources, including biomass gasification and methane digesters. And, as stated, there is not an ethanol company represented by the RFA that does not have a cellulose-to-ethanol research program. These cutting edge technologies are reducing energy consumption and production costs, increasing biorefinery efficiency, improving the protein content of feed co-products, utilizing new feedstocks such as cellulose, and reducing emissions by employing best available control technologies.

The technology exists to process ethanol from cellulose feedstocks; however, commercialization of cellulosic ethanol remains a question of economics. The capital investment necessary to build cellulosic ethanol facilities remain about five times that of grain-based facilities. Those costs will, of course, come down once the first handful of cellulosic facilities are built, the bugs in those "first mover" facilities are worked out, and the technology continues to advance. The enzymes involved in the cellulosic ethanol process remain a significant cost, as well. While there has been a tremendous amount of progress over the past few years to bring the cost of those enzymes down, it is still a significant cost relative to processing grain-based ethanol.

To continue this technological revolution, however, continued government support will be critically important. The biomass, bioresearch, and biorefinery development programs included in S. 987 will be essential to developing these new technologies and bringing them to commercialization. Competitively awarded grants and loan guarantees that build upon the existing programs authorized in EPCA 2005 and enhanced in S. 987 will allow technologically promising cellulosic ethanol projects move the industry forward become a reality.

## **Infrastructure**

Ethanol today is largely a blend component with gasoline, adding octane, displacing toxics and helping refiners meet Clean Air Act specifications. But the time when ethanol will saturate the blend market is on the horizon, and the industry is looking forward to new market opportunities. As rapidly as ethanol production is expanding, it is possible the industry will saturate the existing blend market before a meaningful E-85 market develops. In such a case, it would be most beneficial to allow refiners to blend ethanol in greater volumes, e.g., 15 or 20 percent. The ethanol industry today is engaged in testing on higher blend levels of ethanol, beyond E-10. There is evidence to suggest that today's vehicle fleet could use higher blends. An initial round of testing is underway, and more test programs will be needed. A study of increased blend levels of ethanol, included in S. 987, will be an essential and necessary step to moving to higher blend levels with our current vehicle fleet. Higher blend levels would have a significant positive impact on the U.S. ethanol market, without needing to install new fuel pumps and wait for a vehicle fleet to turn over in the next few decades. It would also allow for a smoother transition to E-85 by growing the infrastructure more steadily.

Enhancing incentives to gasoline marketers to install E-85 refueling pumps will continue to be essential. There are now more than 1,000 E-85 refueling stations across the country, more than doubling in number since the passage of EPCA 2005. The RFA also supports the concept of regional "corridors" that concentrate the E-85 markets first where the infrastructure already exists, which is reflected in S. 987 in the infrastructure pilot program for renewable fuels.

Over the past several years, the ethanol industry has worked to expand a "Virtual Pipeline" through aggressive use of the rail system, barge and truck traffic. As a result, we can move product quickly to those areas where it is needed. Many ethanol plants have the capability to load unit trains of ethanol for shipment to ethanol terminals in key markets. Unit trains are quickly becoming the norm, not the exception, which was not the case just a few years ago. Railroad companies are working with our industry to develop infrastructure to meet future demand for ethanol. We are also working closely with terminal operators and refiners to identify ethanol storage facilities and install blending equipment. We will continue to grow the necessary infrastructure to make sure that in any market we need to ship ethanol there is rail access at gasoline terminals, and that those terminals are able to take unit trains. Looking to the future, studying the feasibility of transporting ethanol by pipeline from the Midwest to the East and West coasts, as proposed in S. 987, will be critical.

As flexible fuel vehicle (FFV) production is ramped up, it is important to encourage the use of the most efficient technologies. Some FFVs today experience a reduction in mileage when ethanol is used because of the differences in BTU content compared to gasoline. But the debit

can be easily addressed through continued research and development. For example, General Motors has introduced a turbo-charged SAAB that experiences no reduction in fuel efficiency when E-85 is used. There is also technology being developed that utilizes “variable compression ratio engines” that would adjust the compression ratio depending on the fuel used. Thus, if the car’s computer system recognized E-85 was being used, it would adjust the compression ratio to take full advantage of ethanol’s properties. RFA supports the further study of how best to optimize technologies of alternative fueled vehicles to use E-85 fuel as included in S. 987. The study of new technologies could dramatically improve E-85 economics by eliminating or substantially reducing the mileage penalty associated with existing FFV technology.

## **Conclusion**

The continued commitment of the 110<sup>th</sup> Congress, this Committee, and the introduction of legislation such as S. 987 will all contribute to ensuring America’s future energy security. Chairman Bingaman and Ranking Member Domenici, you have made clear your commitment to the hardworking men and woman across America who are today’s newest energy producers.

There have been numerous bills introduced in the first few months of the 110<sup>th</sup> Congress to further expand the rapidly growing domestic biofuels industry that will soon eclipse the current RFS. Many of the sound provisions included in those bills to move the industry forward and create new market opportunities for biofuels are incorporated in S. 987. With minimal modifications, S. 987 strikes the right balance between incentivizing cellulosic ethanol technologies, developing the necessary infrastructure, moving beyond existing blend markets for ethanol, and capitalizing on the momentum created by EPAct 2005. The RFA looks forward to working with you to further develop this important legislation.

Thank you.