Statement of Jan Koninckx Global Business Director, Biofuels DuPont Applied BioSciences E.I. DuPont de Nemours and Company, Inc Regarding Domestic Renewable Fuels before the Committee on Environment and Public Works U.S. Senate April 13, 2011

Good morning Chairman Boxer, ranking member Inhofe and members of the committee. My name is Jan Koninckx and I am the Global Business Director for Biofuels for DuPont Applied Biosciences, which includes our biofuels and biomaterials businesses. I am pleased to be here today to discuss the bright future for renewable fuels in the US. In my testimony I will provide our views of the future of biofuels, and the role of the Renewable Fuels Standard in that future.

I have two key messages for you today. First, advanced biofuels are a technological and economic reality. They are about to become a commercial reality. Second, the single most important thing that Congress can do to ensure this reality is to provide a stable policy environment – keep the RFS and advanced biofuels tax policies as they are. We simply ask that you do no harm. With stable policy and access to the fuel pool we will succeed.

DuPont brings a uniquely broad perspective to bear on biofuels issues. We span the biofuels value chain. Our seed business Pioneer Hi-Bred is the world's largest seller of seed corn and the second largest seller of soybean seed to farmers. Our seeds have enabled steadily rising yields, or production per acre, with declining inputs such as pest control and fertilizer, for over 80 years. We sell over 250 corn varieties specifically for ethanol production, varieties that produce high levels of fermentable starch, yielding more gallons of ethanol per acre. As a company with a 208 year history of technical innovation and manufacturing expertise we are also a developer of advanced biofuels technologies. These are not interesting lab scale experiments – these are businesses. We are operating in the US, South America, the EU and Asia as demand for biofuels grows globally. We bring significant biotechnology, process engineering, plant operations and agricultural experience to this endeavor. Our world class partners bring significant expertise on enzymes and fuel markets. Several Congresses and Administrations have called on the private sector to step forward and advance biofuels technologies and production. We have responded with almost ten years of work, hundreds of millions of dollars of R&D and investment and some of our brightest minds. We are very confident of our capabilities to cost effectively produce advanced biofuels. Once we demonstrate production at commercial scale we will license these technologies to biofuels companies, providing expanded economic opportunities for current growers and producers and speeding the rate of advanced biofuels production.

We have already demonstrated our ability to succeed in turning biological feedstocks into value adding products. Our first venture in industrial biotechnology was the specialty chemical propanediol, or PDO, traditionally made from hydrocarbons. We developed a technology to produce bio-PDO through fermentation, for which we received the President's Green Chemistry award. We built a production plant in Louden, Tennessee, which we have subsequently expanded due to growing market demand. We are successfully selling bio-PDO into multiple end use markets, including our Sorona biobased polymer that is going into applications as varied as Mohawk Smartstrand® brand carpeting, sportswear and auto parts.

With our partner BP we have developed and extensively tested bio-butanol, a higher alcohol fuel produced by fermenting biomass. Biobutanol has excellent fuel properties, with higher energy density than ethanol and the ability to be distributed via the existing gasoline infrastructure, including pipelines. Biobutanol also improves ethanol-gasoline blends as a co-blending component. It reduces the volatility of the blend, allowing butanol-ethanol-gasoline blends to be used in the summer season where air quality concerns currently limit the use of ethanol-gasoline blends. Because butanol has less affinity for water and is a weaker solvent than ethanol it will be more compatible with existing equipment, including small engines. We are on track for commercial scale production of biobutanol in the US by 2013-2014. Our joint venture company DuPont Danisco Cellulosic Ethanol (DDCE) will shortly announce the construction of a commercial scale cellulosic ethanol facility based on corn stover, with production in 2013-2014. This demonstrated technology, operating today in Vonore, Tennessee, will quickly provide expanded ethanol production from the existing agricultural and biorefinery infrastructure employing non-food feedstocks such as corn stover and switchgrass.

The existing suite of biofuels policies, of which the RFS is a significant component, has been very successful in standing up a US biofuels industry that is making a meaningful contribution to US energy security and reducing the environmental footprint of transportation. We have to remember that we started down the road of alternative transportation fuels because of the variety of security, environmental and economic ramifications of our dependence on petroleum. Those challenges have only grown more acute. And we are making solid progress. Today, biofuels production in the US offsets over 10 billion gallons of petroleum demand each year. Ten billion gallons is a significant amount of very expensive petroleum we did not have to import. That alternative fuels supply has been built by the first generation grain ethanol industry. Future growth in biofuels supply will now come largely from non-food related feedstocks.

## The Role of Biofuels

We believe that biofuels can serve an expanded role in fueling transportation in the US and elsewhere while contributing to reducing the carbon intensity of transportation. We also believe this can be done in a very sustainable manner, without increasing the environmental footprint of the agricultural enterprise. Steadily increasing agricultural

productivity, which our seeds are helping to acheive, and the use of non-food feedstocks, such as cellulose, to produce biofuels are important to this future. Ensuring a viable biofuels market will be critical to the substantial private sector investments that are occurring to bring these second generation biofuels technologies to market. The RFS provides the policy framework that is needed. It is important that it remain stable.

Why are we bullish on biofuels? First, because we see agricultural productivity as an engine than can provide abundant food, feed, fuel and materials globally. And second, because we see the promise of next generation biofuels technologies to expand upon the solid foundation we have built on grain based ethanol. Our DuPont/BP joint venture Butamax will be producing biobutanol at commercial scale in 2013-14. The first generation of butanol production will come from modifying current grain ethanol facilities to produce this higher value fuel under technology licensing, which will not change corn supply demand dynamics. Future production will come from additional feedstocks including cellulose. Butanol is a proven high value fuel. We have already performed more than 1.5 million miles of detailed fleet testing and 80 million miles of on-road testing involving 250,000 tank fills across multiple automobile brands, model years and engine configurations, as well as extensive engine and infrastructure testing. In that testing we have evaluated engine performance and vehicle emissions and demonstrated that biobutanol is a clean, effective motor fuel. We are on track to soon bring to market a biofuel that is completely compatible with the existing petroleum infrastructure, has high energy density and thus good fuel mileage, and improves ethanolgasoline blends. This "drop-in" fuel is the first biofuels specifically developed for its fuel performance characteristics. This year our joint venture with Danisco, DDCE, will announce the location of its first full scale commercial plant to produce ethanol from corn stover, which is the cob, stalk and leaves of the corn plant, with commercial production in 2013-14. This fuel will have a carbon improvement over gasoline on the order of 80 to 90%.

Why corn stover? Because it capitalizes on the existing infrastructure to provide rapid expansion in ethanol production from non- food feedstocks. Existing farming equipment will harvest an appropriate amount of stover, leaving behind enough for soil conditioning and erosion control. The stover will be transported to a cellulosic conversion unit associated with an existing biorefinery where it will be fed to a parallel processing and fermentation unit integrated with the existing facility. The result will be a 20-25% increase in ethanol production from the existing acreage, providing expanded economic opportunity to current farmers and ethanol producers. The stover from fields that are currently producing corn for food and feed uses will be able to produce additional biofuels volumes, further expanding the ability of agriculture to produce food, feed <u>and</u> fuel. We are also demonstrating this technology on the energy crop switchgrass, providing the opportunity to produce biofuels well outside the Midwest.

An important element of advanced biofuels is securing a high quality, cost-effective feedstock supply for commercial biorefineries. We have been working closely with growers, harvest experts, and universities on two groundbreaking feedstock projects. In Tennessee, through a farm-to-fuel program jointly funded by the state and by our joint

venture DDCE, we have built an operating demonstration scale biorefinery to take advantage of nearly 6,000 acres of switchgrass cultivation created through the joint efforts of local farmers, the University of Tennessee and Genera Energy. Farmers are scaling up that acreage. In the Midwest we have been working closely with growers and with Iowa State University on a comprehensive program to cultivate, transport and store corn stover. Through this program we have developed a viable business model for stover to supply the commercial scale biorefinery we are planning to build in Iowa. It is a program that ensures our feedstock supply and creates additional economic opportunity for growers in those farming communities.

## The RFS

Now let me turn my attention to some of the specifics of the Renewable Fuels Standard. As the RFS was developed we encouraged Congress to emphasize policies that were feedstock, technology and fuel type neutral, and to focus on desired fuel attributes such as energy density, low carbon content and infrastructure compatibility. The RFS II provisions made positive steps in this direction, and are helping to motivate the right kinds of market transitions. There are multiple technology developers preparing to produce cellulosic ethanol in demonstration or commercial quantities from a range of feedstocks over the next 24 months. Both our joint venture Butamax and at least on competitor will produce commercial quantities of biobutanol in the same time frame, and multiple companies are working on other "drop-in" fuels. The economics and carbon performance of grain ethanol continues to improve as well, as does agricultural productivity and sustainability in the US. These trends suggest that while the RFS targets are aggressive, as they should be, they are not out of reach. Advanced biofuels are slightly delayed versus the annual RFS targets, but we are confident they are on track to meet the overall goals. EPA has all of the authority it needs to adjust annual targets on the way to meeting the overall goal. The RFS does not need to be, nor should it be, reopened to allow this market to develop properly. In fact, reopening the RFS would seriously undermine the market predictability that is allowing us to move forward with significant investments in these businesses. The integrated strategy of the U.S. is exemplified by the RFS and the related investment strategies of US DOE and USDA, which have supported a variety of alternative fuels technologies. As a result, numerous companies and institutions are now involved in biofuels work looking at a variety of different technologies, approaches, and feedstocks, and we can confidently look to USderived technology to make the seminal contributions to renewable fuels.

## The Role of Agricultural Productivity in Biofuels

Agricultural productivity plays a significant role in biofuels as well. The US has a long track record of continually expanding production from the existing agricultural acreage, and producing a wide variety of products for food, feed, fuel, and industrial uses. At the turn of the 20<sup>th</sup> century, 25% of all energy used in the US came from burning wood, and in 1915, some 90 million acres of US cropland were used to grow feed for horses and mules – our transportation at that time. A major innovation of the last century was to learn to use fossil fuel based sources for our transportation, energy, and material needs.

While hugely transformational for the world's economy, limitations of our dependency on fossil fuels are increasingly apparent. Concurrently with the huge transition to this fossil based economy, agricultural productivity also increased by leaps and bounds. When our Pioneer subsidiary began operations in 1926, corn yields were about 27 bushels per acre and petroleum was relatively cheap – you could buy 3.5 pounds of petroleum for the cost of one pound of corn. Today, corn yields in the US average about 165 bushels per acre and many farmers see over 200 bushels per acre – and yields continue to increase. Corn, at \$7/bushel, is some 3.5 times <u>cheaper</u> than petroleum, instead of being 3.5 times more expensive as it was in 1926 – a remarkable testament to agricultural productivity. And we have yet to fully apply this proven development process to cellulosic feedstocks such as switchgrass, where we anticipate similar progress.

Thank you for the opportunity to speak with you today on this important topic. As I have tried to illustrate in my remarks, biofuels technologies are demonstrated and implementable. We are poised to see commercial scale production from multiple companies producing various fuels – just as it should be in a competitive market. We are confident that several of these technologies will prove out at commercial scale. Congress has done an effective job of creating a policy framework that has allowed this to happen – especially the RFS. Your job now is simply to maintain that policy so that we have the predictability to move forward. Thank you, and I look forward to your questions.