



BioEnergy
International, LLC

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US House of Representatives**

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Mr. Chairman, Members of the Committee -- thank you for inviting me to testify here today. I applaud your leadership in recognizing the urgent need to change our energy paradigm. To the Chairman in particular, your leadership inspired me over the last 15 years. When I would come to DC in the early 1990's, I was occasionally referred to as the village idiot, however the Chairman was one of the few Members who listened, and drove me to make a difference. I profoundly thank you.

Since then, I have had the privilege of serving on Presidential Committees (The Biomass Technical Advisory Board under President Bill Clinton and George W. Bush), as well as Congressional Committees helping to craft the Energy Policy Act and in particular the cellulosic components. As the Chairman knows, I came to the ethanol industry in the late 80s somewhat circuitously. Some believed we were going to face a crisis with mounting pressures on landfills and a need to find a home for our ever expanding waste streams, so my cousin, an avid environmentalist took me to New Hampshire for a meeting on composting municipal solid waste. As fate would have it, I was introduced to a technology from the University of Florida which just received Patent # 5,000,000 which was a little organism that likes to eat sugars from all types of cellulose and make ethanol.

I figured it had to be more profitable to convert waste into booze rather than dirt and launched what was one of the first cellulosic ethanol company's in the country.

BC International, which later became Celunol, and now Verenium proved the technology was viable after developing and operating 3 successful pilot plants. We arranged financing for what would have been first commercial cellulosic demo, a 23 million gallons per year facility based on sugar cane bagasse, rice hulls. 9-11, a change in administration and priorities, the deal fell apart, the industry set back a decade. Set back not because of a failure in technology, but the lack of incentives and moreover, a will and vision of what was to come. Gasoline at the time was still less than \$1.30 per gallon.

With a barrel of oil pushing \$90, the tragic loss of lives in the Middle East, and hydrocarbons fueling a climate crisis, we cannot afford another decade of delay.

Mr. Chairman, my message is simple yet urgent – the ethanol industry is at a tipping point. We are on the brink of the next bio-industrial revolution, on the verge of transforming our economy from a carbon based society to a carbohydrate based program with next generation biorefineries. The Earth's ability to produce sugar from biomass is virtually unlimited and sustainable.

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However, I would suggest, this is the year we either commit ourselves to an all out offensive to reduce our dependency on foreign oil, to stop the funding of radical countries that continue to do us harm, and to reduce our insatiable use of fossil fuels to stem our climate crises.

Or, this is the year we will point to with dismay, and ask why. Why we failed when the technology was here, and a workable blueprint in the Senate-passed bill, with phased expansion of the Renewable Fuel Standard (RFS) and incentives which drive us toward cellulose as the future.

I don't want to tell my grand children we failed because of a lack of will.

We need bold leadership to replace foreign oil with homegrown fuel first from corn, then cellulosic feedstock's such as agricultural wastes and municipal waste. This effort is no different than the challenge issued in the 1960's. President John F. Kennedy wanted to put a man on the moon. We did not attempt to land on the moon the first time. We had a program, sparked by vision, propelled by leadership, but grounded in phased, yet ambitious, milestones. First we shot a rocket in the air. Then we circled the earth. Then we flew around the moon. Finally, we landed on the moon. It changed history forever. We need that kind of vision and commitment from you all today.

Let there be no doubt, the energy bill this year is the fight of our generation.

Clearly, with all the discussion of a glut, the biofuels industry has met the call to action, and surpassed the federal mark for all the right reasons -- energy independence, global climate change, jobs and American prosperity, and regaining our morale leadership among world of nations.

The Question, and opportunity, is "What do we need to do to provide America with a self sustaining program that has an evolution with beginning, middle and end. We have an extraordinary opportunity to change how we derive our fuels based economy. Home grown fuels initially from corn, then bio-based waste such as switchgrass, wood chips and even municipal landfill waste from every region of the country.

The story sounds too good to be true – but it is real, and has already been an economic boom to the country as other sectors such as housing lag. The Governor's Ethanol Coalition in December 2006 suggested that the goal of providing only 20% of the nation's gasoline supply from biofuels would deliver extraordinary economic and security benefits to the nation, including:

- Approximately 60 billion gallons of annual ethanol production, an amount equal to about 25 % of projected future gasoline demand in 2030;
- \$52 billion a year in avoided oil imports, creating lasting reductions in our trade deficit;

- \$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.

In addition to the enormous economic benefits of the US leading the emerging global biofuels industry, ethanol from corn today is contributing significantly to reducing harmful greenhouse gas emissions. The benefits of ethanol fuel alone are staggering according to the Natural Resource Defense Council, which predicts the following environmental benefits from increasing the use of cleaner burning fuels, made from plant materials, to power our cars:

- **Biofuels can slash global warming pollution.** By 2050, biofuels -- especially those known as cellulosic biofuels -- could reduce our greenhouse gas emissions by 1.7 billion tons per year. That's equal to more than 80 percent of current transportation-related emissions.
- **Biofuels can be cost competitive with gasoline and diesel.** By 2015, we could produce biofuels at costs equal to between \$0.59 and \$0.91 per gallon of gasoline, and \$0.86 per gallon of diesel. These prices are competitive with average wholesale prices over the last four years -- \$0.91 per gallon for gasoline and \$0.85 per gallon for diesel.
- **Biofuels will provide a major new source of revenue for farmers.** At \$40 per dry ton, farmers growing 200 million tons of biomass in 2025 would make a profit of \$5.1 billion per year. And that's just the beginning. Experts believe that farmers could produce six times that amount by 2050.
- **Biofuels can provide major air quality benefits.** Biofuels contain no sulfur and produce low carbon monoxide, particulate and toxic emissions. Using biofuels should make it easier to reach air pollution reduction targets than using petroleum-based fuels.
- **Biofuels offer major land-use benefits.** Switchgrass, a promising source of cellulosic biofuel, is a native, perennial prairie grass that has low nitrogen runoff, very low erosion, and increased soil carbon, and also provides good wildlife habitat.

Today, we not only have the *responsibility* to transform our economy away from fossil fuels – but with ethanol -- we have the *ability* to do so. Let us not allow a well funded campaign by Oil to stop us from the critical progression toward next generation biorefineries.

Toward this end, I serve as Chairman and CEO of BioEnergy International, LLC. BioEnergy is a science and technology leader in the development of biorefineries that produce both biofuels and bio-based specialty chemicals from renewable resources. We just launched a first-of-its-kind research facility in Woburn after spending the better half of the last two years assembling a world renowned team and developing a strategic vision that is rooted in the integration of three specific initiatives – our 3 legged stool:

(1) is the creation of a secure cash flow stream through conventional ethanol facilities – one in Pennsylvania and the other in Louisiana – we must look at these as cheap sugar platforms but very similar to the early oil refineries;

(2) is the diversification of our product portfolio through the introduction of BioEnergy's novel biocatalysts for the manufacture of green chemicals and biopolymers; and

(3) the optimization and commercialization of cellulose technology for retrofitting into existing and future plants to drive down costs and move away from food based raw materials.

These three steps we believe will ensure financial success and continue to drive investment and interest in the biorefinery sector.

I believe we are close to the day when a pound of sugar can replace a barrel of crude in the manufacture of everything from the fuel we put in our cars to the plastics and fabrics we use in our everyday lives. I am especially proud of the ethanol industry, and its extraordinary progress in the fight to reduce our nation's dependency on imported oil – from phasing out MTBE to surpassing current RFS. A feat that many in the oil patch said could never happen.

But, there is much work to be done and we must recognize corn has limitations.

It's not perfect, but the status quo of oil, especially foreign oil driving down environmental standards while driving up costs is unacceptable and unsustainable. Today, ethanol is as much as \$1.00/gallon cheaper than gasoline yet the market refuses to use the product where it can, which could consume another 4-5 billion gallons.

Let's be clear, if it is not ethanol today, it is oil and if we fail to create a robust market for the product then all attempts to move to the next generation of cellulosic ethanol will fail. As my good friend Bob Dineen from the Renewable Fuels Association has said many times; "If not now, when, if not this, what".

It is poetic justice that we are launching our INDEPENDENCE ethanol project in north central PA, near Titusville, where Edwin Drake ushered in the US petroleum industry with the first successful commercial oil well that has led to today's modern multi-cut petro-refineries. At BioEnergy, we aim to commercialize cellulose with an integrated

plan to usher in the first *commercial cellulosic* biorefineries – first mimicking and then replacing petrochemical based refineries.

As a low cost renewable sugar platform, traditional corn-based ethanol is the low hanging fruit to get biofuels into the consumer market, strengthen existing systems, generating new jobs and revenues for economic patriotism. In Pennsylvania, we are developing one of the first integrated corn/cellulose biorefineries with the help and extraordinary leadership of Governor Rendell and his Penn Secured Fuels Initiative – an initiative to manufacture one billion gallons of in-state production.

With an expanded RFS, we achieve energy independence and combat global warming with distributed biomass plants that provide American jobs in communities throughout the country – not just in the farm belt. This in turn will lead to the expansion of more advanced fuels and bio-based chemicals that would provide optionality and a range of new environmentally friendly products. The Bottom line is corn has and cellulosic technology will change the game forever and spur \$2-3 trillion in new value.

According to the 2003 *White Biotechnology Refinery* report by McKinsey, biorefineries could generate \$2-3 trillion in new value worldwide. Rapid advances in drug development, cancer research, and gene therapy are creating the genetic tools required for innovative “Industrial Bioprocessing” techniques that compete with traditional production technologies. This has spurred improved industrial applications of newly discovered enzymes that have additive benefits to tolerate extreme hot, saline, acidic or alkaline conditions. I highlight this data as a testament that going green for the environment translates into green dollars for profitability. The US can lead this new environmentally friendly global industry.

The Department of Energy (DOE) states in a 2003 report, *Industrial Bioproducts: Today & Tomorrow*, that fully integrated facilities will process grain or biomass crops into a full range of products that will represent 20% of production, yet account for 80% of profits. By operating with a highly flexible and profitable product output, the biorefinery will be able to get the most value from a bushel of biomass, while optimizing overall profitability. In 2004, the DOE further identifies twelve building block chemicals that can be produced from sugars via biological or chemical conversions in the National Renewable Energy Laboratory (NREL), *Top Value Added Chemicals From Biomass*. These twelve can then be converted to high-value bio-based chemicals or materials with tremendous opportunity for the US according to the following excerpt:

America is fortunate to possess abundant and diverse agricultural and forest resources, unused cropland and favorable climates. Together with a remarkable talent to develop new technologies, we have a tremendous opportunity to use domestic, sustainable resources from plants and plant-derived resources to augment our domestic energy supply.

The Biomass Program, in the Energy Efficiency and Renewable Energy Office in the Department of Energy directly supports the goals of The President's National Energy Policy, the Biomass R&D Act of 2000 and the Farm Security and Rural Investment Act of 2002. To accomplish these goals, the Program supports the integrated biorefinery, a processing facility that extracts carbohydrates, oils, lignin and other materials from biomass, converts them into multiple products including fuels and high value chemicals and materials.. Already today, corn wet and dry mills, and pulp and paper mills are examples of biorefinery facilities that produce some combination of food, feed, power and industrial and consumer products.

This report, the first of several envisioned to examine value-added products from all biomass components, identifies a group of promising sugar-derived chemicals and materials that could serve as an economic driver for a biorefinery. By integrating the production of higher value bioproducts in the biorefinery's fuel and power output, the overall profitability and productivity of all energy related products will be improved. Increased profitability makes it more attractive for new biobased companies to contribute to our domestic fuel and power supply by reinvesting in new biorefineries. Increased productivity and efficiency can also be achieved through operations that lower the overall energy intensity of the biorefinery's unit operations, maximize the use of all feedstock components, by products and waste streams, and use economies of scale, common processing operations, materials, and adequate equipment to drive down all production costs.

With speeding this vision to market, BioEnergy is excited to launch our Woburn research center to advance and optimize our IP to convert current and future ethanol plants to biorefineries. This will improve efficiencies on the front end – allowing for low cost waste feedstocks – and on the back end -- to diversify product portfolio through novel biocatalysts such as higher value products like biobutanol, lactic acid, and succinic acid to increase profitability per pound of sugar. Our lab will build on our exclusive worldwide rights to non-ethanol technology developed at the University of Florida by Dr. Lonnie Ingram that covers all bacteria and yeast modified by this process to ferment every sugar in biomass including the previously unfermentable C5 sugar into biopolymers, as well as the process of integrating genes into chromosome of host organisms. With a core competency from our sponsored research in the development of new compounds, we intend to extend our technological lead in biomass refinery process technologies by pursuing IP that would lower the cost of sugar from cellulose using enzymes, for strains capable of producing beneficial enzymes.

This will achieve rapid deployment with minimal capex by taking excess capacity first, and affords a twenty-five percent growth within trillion-dollar markets. For biopolymers, BioEnergy has already received two milestone payments from licensing lactic acid technology to Purac, the world's largest lactic acid producer, and is advancing successful strain development for L-Lactic, Succinic, Malic, Alanine, Xylitol, and Pyruvate. In essence, BioEnergy's novel IP "software" will convert today's "hardware" (conventional ethanol platforms) into tomorrow's Biorefineries.

In closing, I offer these comments to present a compelling story that American's corn-based ethanol plants of today, provide the bridge to tomorrow's next generation cellulosic biorefineries that will use domestic waste and renewable resources. It is imperative that we expand the RFS this year to support ongoing robust growth of the US domestic ethanol industry to combat global climate change, fuel energy independence and power a new economy. Gene shuffling and metabolic engineering have given way to dramatic technological advances that soon will allow us to use a broad array of waste feed stocks that will drive down costs and transition us from corn plants to more efficient biorefineries of the future.

The immediate challenge before us all is not to get bogged down in the incidental issues of first generation corn plants but to focus on the real challenge to this committee and all of us – to wean ourselves from the perils of Oil as quickly as we can.

Toward this shared commitment, I urge the committee to support the biofuels provisions included in HR 6 as passed by the Senate, specifically the framework to expand the RFS and provide for cellulosic incentives.

Thank you .
Stephen J. Gatto