S. HRG. 113–561

GROW IT HERE, MAKE IT HERE: CREATING JOBS THROUGH BIO BASED MANUFACTURING

HEARING

BEFORE THE

COMMITTEE ON AGRICULTURE, NUTRITION AND FORESTRY

UNITED STATES SENATE

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Tuesday, June 17, 2014

UNITED STATES SENATE,
COMMITTEE ON AGRICULTURE, NUTRITION AND FORESTRY
Washington, DC

The Committee met, pursuant to notice, at 10:06 a.m., in room 328A, Russell Senate Office Building, Hon. Debbie Stabenow, Chairwoman of the Committee, presiding.

Present: Senators Stabenow, Donnelly, Heitkamp, Boozman, Grassley, and Thune.

STATEMENT OF HON. DEBBIE STABENOW, U.S. SENATOR FROM THE STATE OF MICHIGAN, CHAIRWOMAN, COMMITTEE ON AGRICULTURE, NUTRITION AND FORESTRY

Chairwoman STABENOW. Well, good morning. Call to order the Committee on Agriculture, Nutrition and Forestry. We have members that are coming, but in the interest of time, because there are votes that are going to start about 11:00 this morning, we will proceed at this point.

I look forward to so much not only to hearing from all of you today, but to the bio-based manufacturing showcase that we have next door, and the opportunity to really lift up an exciting part of our economy and innovation, and to do this in a way that is going to bring some more attention to all of the wonderful work that you are doing and the 35 companies, I believe, that we have next door that are all showing us what they are doing today.

Thank you for being here to take a look at one of the most promising opportunities we have to grow jobs and strengthen the economy, bio-based manufacturing. Over the past couple of years, this Committee worked together to write a new Farm Bill that focuses on both feeding the world and strengthening the economy.

Earlier this year, we saw the work that began at this table make its way to the President's desk. The Farm Bill generated significant support from our colleagues in both the House and the Senate because members on both sides of the aisle recognized how critical it is to growing the economy.

They recognized that the Farm Bill really is a jobs bill. One of the biggest ways the Farm Bill is helping to create jobs is found in the energy titles, Bio-Based Initiatives. We created new opportunities to support bio-based manufacturing so innovators in both

rural and urban America can continue growing their businesses and creating manufacturing jobs.

We recognize the connection between manufacturing and agriculture and understood early on its potential for growing the economy. Now, I have to say, as a Michigander and Chairwoman of the Agriculture Committee, I certainly see the importance of connecting agriculture and manufacturing.

As I always say, we in Michigan both grow things and make things. I do not think we have an economy as a country unless we grow things and make things. And, in fact, I think that is the foundation of the middle class of our country.

For years, manufacturers have been looking toward agriculture to find bio-based alternatives to petroleum products. I have seen it firsthand from our auto makers in Michigan. Agricultural products are being used in nearly every part of automotive production from seats to interior panels, arm rests to sunshades, soy wire coatings, carpets, and structural foam. I am very pleased that one of our witnesses today from Lear Corporation will tell us more about that work.

Bio-based manufacturing goes beyond the auto industry as well. More than 3,000 companies in the United States either manufacture or distribute bio-based products. What does, quote, bio-based mean? It means instead of using petroleum-based chemicals to manufacture products, companies are creating new products from American-grown agricultural crops, like soybeans and corn, just as examples.

This shift toward using biodegradable and renewable materials displaces the need for foreign-based petroleum and helps to create American-grown jobs. Outside of this hearing room today, as I indicated earlier, just around the corner in the Kennedy Caucus Room, many of these products will be seen on display following today's hearing and we would urge everyone to have the opportunity to go over and take a look.

You will be able to see bio-based innovation firsthand, and I certainly hope that you will take the time to do so. The products on display will include household items like cleaning products and soaps as well as installation in plastics, foam products, and fabrics.

Innovation in the bio-based industry is creating high-value products from traditional agricultural goods. I just have to stress, creating jobs. This innovation is helping us move away from petroleum-based products.

As we heard from another panel of witnesses in April about the importance of growing the production of advanced bio-fuels, the technology and commercialization of bio-based alternatives to petroleum are no longer just around the corner. They are here. Advanced bio-fuels are creating jobs while also helping the United States become more energy independent, which in turn is creating new opportunities for bio-based manufacturing.

All of these perspectives have helped shape our thinking as we develop the energy title of the Farm Bill. For the first time we created new opportunities for bio-based manufacturing and renewable chemical production, officially recognizing and supporting these areas like they have never been before.

We also increased USDA's resources to manage the bio-preferred labeling and procurement program, which promotes bio-based products. The opportunities we created in the Farm Bill here at this very table will go a long way in supporting more entrepreneurs and innovators to develop and manufacture products and to fuel economic growth and jobs.

So again, welcome to each of you. I am going to introduce each of our witnesses and then ask you to give us five minutes of opening testimony and then certainly we want to have the opportunity for anything that you would like to give us in writing as well and any products you want us to take a look at as well. I will be turning then to questions not for myself, but for colleagues as they arrive.

So our first witness on the panel today is Mr. Scott Vitters, General Manager of the Coca-Cola Company's PlantBottle Innovation Platform. Mr. Vitters has been with Coca-Cola since 1997, holding a number of positions of increasing responsibility. He also serves as an advisor to Michigan State University's Center for Packing Innovation and Sustainability.

I should have meant my alma mater, so I am glad to see that connection. He is also on the Governing Board of the Bio-Technology Industry Organization Industrial and Environmental Section and was recognized in 2011 by Fortune Magazine as a green star within the most admired companies. That is terrific.

Our second witness today is Mr. Ashford Galbreath, who was named Director of Advanced Materials and Comfort Engineering—I love that term, comfort engineering—for Lear Corporation's Seating Division in 2004. He is responsible for engineering, design, and technology advancements, including seating system materials innovations.

He holds over 20 patents and has been instrumental in the commercial success of Lear's SoyFoam renewable foam and several other lightweight material breakthrough technologies.

Good morning, Senator Heitkamp. Wonderful to have you. Well, thank you. Thank you very much. I am so glad you are here.

Senator HEITKAMP. We have to say that to each other.

Chairwoman STABENOW. That is right. I strongly advocated for Senator Heitkamp on the Committee because we do not have enough redheads either on the Committee or in the Senate.

So you have 100 percent of the redhead caucus here today of the United States Senate.

[Laughter.]

Chairwoman STABENOW. I know that Senator Klobuchar wanted very much to be here to introduce Mr. Kurtis Miller, and I know once she arrives, we will give her an opportunity to bring greetings as well. But let me—I know she is on her way, so let me go ahead though and say, our third witness is Mr. Kurtis Miller, who is President and Business Unit Leader for the Cargill Industrial Specialties Business Unit.

He is responsible for the manufacturing, research and development, and sales and marketing for all of Cargill's Ag-based industrial products. Mr. Miller has over 25 years of experience in specialty industrial chemical industries, ranging from paints and coat-

ings to plastics, transformers, foams, and asphalt. That is a wide range.

Our fourth witness is Mr. Adam Monroe, the Regional President of the Americas, Novozymes, a world leader in bio innovation and a leading manufacturer of enzymes, microorganisms, and bio-pharmaceutical ingredients. Mr. Monroe has over 20 years of experience in the industrial biotechnology industry, is a leading voice on sustainability, bio-energy, and a bio-based economy. Welcome.

Our fifth and certainly last but not least witness is Mr. J.D. Hankins. Mr. Hankins is the co-owner and Vice President of Hankins Forest Products, a land and timber company based in Ripley, Mississippi. Mr. Hankins has worked in the industry for over 50 years, starting as an eight-year-old in his grandfather's sawmill.

Next month Mr. Hankins will begin serving as Chairman of the Executive Board for the Southeastern Lumber Manufacturer's Association and his expertise in the industry makes him a sought after voice regarding how Federal trade practices affect independent mill owners.

So we are so pleased to have such a packed powerhouse group of witnesses with such wonderful expertise with us this morning.

Good morning, Senator Boozman. Welcome.

Mr. Vitters, we will let you proceed at this time with your testimony.

STATEMENT OF SCOTT VITTERS, GENERAL MANAGER, PLANT BOTTLE INNOVATION PLATFORM, THE COCA–COLA COMPANY, ATLANTA, GEORGIA

Mr. VITTERS. Well, thank you and good morning, Chairwoman Stabenow and members of the Committee and staff. On behalf of the Coca-Cola Company and our 130,000 employees and more than 700,000 system associates, it certainly is a pleasure to be here today and have the opportunity to discuss our commitment and investment in helping to advance the renewable chemicals and bio-based manufacturing sectors here in the United States and abroad.

Inside every bottle of Coke is a story of creating new value through increasing efficiency and advancing innovation. We have a long-term vision to help realize a world in which creating and using products wastes nothing. To achieve this zero waste vision, we are designing more resource efficient packaging, supporting community-recycling systems, and increasing our use of renewable materials through breakthrough innovations like our PlantBottle package, the first ever fully recyclable PET plastic bottle made with plants.

Coca-Cola introduced the world to PlantBottle in 2009. The technology uses natural sugars found in plants to make ingredients identical to the fossil-based ones traditionally used in polyester fiber and resins. PlantBottle packaging looks, functions and importantly recycles just like traditional polyester, or PET plastic, but with a lower dependence on fossil fuels and a lighter environmental footprint on the planet.

Thomas Edison is quoted as saying that the value of an idea is in the using of it. Our measure of success with PlantBottle is in advancing commercial solutions that go beyond pilot tests or niche green product uses. Our expectation is to realize the technology's

full potential and deliver meaningful, positive change everywhere we do business.

Our first generation PlantBottle technology has already been launched in 31 countries across more than 25 billion bottles. It has helped to reduce our dependence on fossil-based materials and remove over 190,000 metric tons of CO2 emissions, or the equivalent of more than 400,000 barrels of oil.

In just four years, Coca-Cola has become the world's largest bioplastic end user through our PlantBottle and we are committed to going even further with our goal to have all new PET plastic that we use contain PlantBottle technology by 2020.

Commercializing bio-based materials, and specifically our PlantBottle technology, are a material part of the company's 2020 Vision and Roadmap for Winning. At the heart of this vision and plan is a commitment to double our business in this decade. We see a world of opportunity and growth in areas like a rising middle class. We also see a world of challenge and need in areas like population, poverty, and the growing stress on finite resources.

Put those together, and it is obvious that the only way we can hope to double our business is to double it sustainable. Packaging has a huge impact on those aspirations. Every one of the 3,500 different beverage offerings we produce, for every consumer, in every market requires some form of package.

Over half of the global volume delivered today is through PET plastic beverage bottles for Coca-Cola. Behind this demand is a desire for lightweight, shatter-resistant, resealable, cost effective, and highly recyclable packaging. To continue meeting these beverage needs in the years ahead, while maintaining public trust and sustaining growth, requires moving beyond traditional fossil-based materials to renewable and recyclable bio-based sources.

Coca-Cola today is partnering with companies to build manufacturing capacity for PlantBottle technology in local markets around the world. Until this supply chain is optimized locally, in most markets we pay an added cost to use PlantBottle. We view this premium as an investment, an investment both in our future competitiveness of our business and the health of the local communities that we serve.

As a result, we have not increased the price of our products in PlantBottle. Instead we have challenged ourselves to get the supply chain built out under the timeline we have set, or even better, do it faster.

To help accelerate investment in the PlantBottle supply chain and further expand the positive sustainability impact of the technology, Coca-Cola is rethinking traditional approaches to innovation. For example, instead of just holding the technology to ourselves, we are actually enabling other early adaptors to join with us on our PlantBottle journey.

In fact, we even envision a future in which our competitors also have ready access to the technology as well. In 2011, Coca-Cola formed a strategic partnership with H.J. Heinz to produce ketchup bottles made with PlantBottle technology. In 2013, we joined forces with the Ford Motor Company to showcase a Ford Fusion plug-in hybrid with its interior fabric made from PlantBottle polyester. Just this year, we have partnered with SeaWorld Parks and Enter-

tainment to debut the first ever refillable plastic souvenir cup made from PlantBottle technology.

I want to pause and thank leaders from both the Senate and House Agriculture Committees for the tireless work on reauthorizing the Farm Bill. Specifically, we applaud the extension of eligibility to renewable chemical technologies under the Biorefinery Assistance Program and Bio-Research and Development Program, and the support for new purpose grown energy crops. These efforts are truly helping open doors to new bio-based manufacturing opportunities and jobs here in the United States.

For some the growing emergence of renewable chemicals and bio-based products may raise questions regarding the sustainability of using harvested agricultural biomass. As one of the largest buyers of sugars and starches in the world, I can assure that any trend with the potential of negatively impacting food and feed supplies would be of significant concern to our company.

Through transparency and credible third party partnerships we can advance breakthrough bio-based manufacturing opportunities that deliver better environmental and social performance without negatively impacting local food security. Working with the World Wildlife Fund last year we launched the BioPlastics Feedstock Alliance, a new collaboration with several other leading consumer brand companies focused on guiding the evaluation and sustainable development of plant-based feedstocks specifically for plastics.

Last year our efforts focused on advancing the use of agricultural residues for PlantBottle was selected as an official eco-partnership within the U.S.-China Strategic and Economic Dialogue.

Ensuring the sustainability of the agricultural ingredients we source for our products is a critical area of focus for our business. Through collaborative programs like Field to Market we are working across the entire agricultural supply chain to measure and improve the environmental and social performance. These measures are helping to inform and guide the responsible use of biomass for industrial materials.

Investing in the bio-economy is good for business, for our business, the communities that we serve, and our shared environment. Today our first generation PlantBottle technology replaces one of the two ingredients that make PET plastic. Our long-term goal is to realize a 100 percent renewable, fully recyclable plastic bottle.

To realize this goal, Coca-Cola is investing millions in local technology companies, companies like Virent in Madison, Wisconsin; Gevo in Englewood, Colorado; and Avantium in Amsterdam, the Netherlands. We have already demonstrated the potential for producing such bottles and are now focused on advancing commercial pathways for successfully scaling the technology.

These are truly exciting times. Thank you again for allowing me to share Coca-Cola's progress here today and for your continued commitment to helping realize the transformative potential of the renewable chemical and manufacturing sector. Thank you.

[The prepared statement of Mr. Vitters can be found on page 47 in the appendix.]

Chairwoman STABENOW. Thank you very much. It is exciting to hear what you are doing. Mr. Galbreath and I started together, I think in 2011, carrying around your soy-based foam seat, doing

press conferences about what bio-based manufacturing was all about in Michigan. It is great to have you here today.

STATEMENT OF ASHFORD A. GALBREATH, DIRECTOR, ADVANCED MATERIALS AND COMFORT ENGINEERING, RESEARCH AND DEVELOPMENT, LEAR CORPORATION, SOUTHFIELD, MICHIGAN

Mr. GALBREATH. Thank you. Well, first of all, I would like to thank you, Chairman Stabenow and the Ranking Member Cochran and members of the Committee for the invitation to speak today about Lear Corporation's bio-derived products.

My name is Ashford Galbreath and I am here representing the Lear Corporation team, from Chairman Stabenow's home state of Michigan, which develops bio-based products and launched Soyfoam in 2007 on the 2008 Ford Mustang. Environmental stewardship and sustainability are key dimensions of Lear Corporation's mission statement.

In 2004, Ford Motor Company approached Lear about partnering to develop soy-based automotive foams. We formed a team, including the United Soybean Board Checkoff, Renosol, Bayer and a soy polyol supplier, and set a new standard of environmentally friendly foam performance with the first-to-market launch of SoyFoam.

SoyFoam is soybean oil-derived automotive polyurethane for use in seating, head restraint, armrest, and console foam padding. For SoyFoam we substitute petroleum-based polyol with soybean oil-based polyol and adjust the formula to meet strict automotive specifications. We successfully replaced 5 percent petroleum polyol by weight in a low density seating cushion and back foam and replaced 16 percent petroleum oil content by weight in a high density head restraint and typical European seat cushion foam.

Today Lear sells SoyFoam seating on multiple Ford, General Motors, Hyundai and other customer vehicles molded in the United States and Mexico. We have approvals for 10 percent level Soyfoam we are preparing to launch, and research shows promise for at least double that amount.

Soy polyol provides significant environmental improvements as measured by the National Institute of Standards BEES Study. Giving all environmental impacts equal weighting, soy polyol showed a 75 percent improvement compared to petroleum polyol.

Global warming improvements from a net reduction of 5.5 kilograms of carbon dioxide for each kilogram used. Two kilograms of carbon dioxide is captured from the atmosphere when grown, plus you avoid the 3.5 kilograms of carbon dioxide release from petroleum.

We consider SoyFoam to be very significant to Lear Corporation in that it serves as a firm representation of our commitment to the environment, product cost control and meeting both our customers' and our consumers' needs. Most of our global OEM customers have environmentally proactive initiatives in response to demanding regulatory hurdles such as the European Commission's requirement to lower carbon use levels.

Success with SoyFoam helped establish Lear's environmental leadership position in automotive seating. Environmental innovation continued at Lear with launches of DECS, Evolution seating

systems that combine weight reduction with bio-based and recycled innovations. Recently we added an EcoPadding product, which is a trim laminate made with 40 percent nanocrystalline cellulosic fibers and 24 percent recycled polyester that can replace polyurethane foam trim laminates.

We are also close to incorporating other bio-based foam ingredients such as soy oil. At Lear there are multiple business-related drivers for bio-based product innovation. One is economic consideration of controlling product cost increases from rising oil price.

Petroleum-related price increases are costly to Lear's customers and consumers. Although currently somewhat stable, historically oil price is much more volatile than the price of soybeans. As use increases, new volume should improve supply economics in affiliated industries. North American use of soy polyol and other critical raw materials should continue to grow at a good pace as the product proliferates and content per pad grows.

Lear's internal foam molding business is growing globally and SoyFoam is expected to be a key component of that growth. Bio-based products are one of our key areas of innovation focus.

Lear faces a variety of what we would consider sustainability pressures, and response-related initiatives are multi-dimensionally important to us; compliance with local and national regulations, conflict minerals and voluntary protocols; market pressures from customers needing to reduce supplier impacts; consumers with a growing environmental awareness; business benefits from innovative products with increased market potential; and a sustainable workplace attracts new talent for Lear; and social concerns desiring to protect employees' welfare and build community relations.

Thank you again, Chairman Stabenow, Ranking Member Cochran, and members of the Committee for your time today. I look forward to answering any questions you may have and thank you for your support of bio-based product development.

[The prepared statement of Mr. Galbreath can be found on page 26 in the appendix.]

Chairwoman STABENOW. Thank you so much.

Mr. Miller, welcome.

STATEMENT OF KURTIS MILLER, PRESIDENT, BUSINESS UNIT, CARGILL INDUSTRIAL SPECIALTIES, CARGILL, INC., HOPKINS, MINNESOTA

Mr. MILLER. Good morning, Chairman Stabenow, Ranking Member Cochran, and distinguished members of the Senate Committee on Agriculture, Nutrition and Forestry. Thanks for the opportunity to testify before you today.

I am Kurtis Miller, President of Cargill Industrial Specialties. Our business unit within Cargill delivers customer-focused solutions in targeted industrial markets. We leverage our expertise in agricultural-based chemistries to create specific technologies that solve particular application needs in our customers' respective markets.

With more than 60 years of experience in the industrial sector, we are encouraged by the new growth and opportunity I bio-based technologies. I want to thank the Committee for its committed leadership, commitment and leadership to bio-based manufac-

turing. I hope my statement will provide insight to the current state of our bio-industrial sector and highlight economic and job creation potential.

I really have the best job at Cargill. Every day I go to work and I look to replace petroleum products with Ag-based solutions. We have a proven track record of delivering the solutions our customer want. I have included in my written testimony three winners of the EPA President's Green Chemistry Award, PLA, soy polyol, and FR3 transformer fluid, but there are hundreds of other Ag-based solutions being delivered to customers daily.

One example of innovation for our customers was with Owens Corning and their fiberglass insulation. Owens Corning wanted to replace phenolic resins with a more friendlier environmental chemistry, but they were struggling with a bio-based solution, and they went to Cargill and asked, Can we help? Well, we did not know anything about fiberglass insulation or the process and technology involved, but we sure know a heck of a lot about bio-based technology.

The combination of two teams got together and delivered Ecotouch bio-based binder solution, which was an incredible savings for Owens Corning. So it delivered a bio-based product, 99 percent, either renewable or bio-based—or recycled or bio-based—and it is the leading technology in the marketplace. So you will see it under the Ecotouch brand in your hardware stores.

So Cargill recommends that the Committee continue to support the entire adoption process from R&D through commercialization, really, in three key areas: R&D, innovation centers, and product differentiation. What we are doing is really hard stuff, and continuing to support classical R&D in this area is critical.

One of the biggest risks we face in pre-commercialization scale-up is, we need to have—our customers need large quantities to test their product—our product in their product, so it semi-works. It is a critical component and one of the most risky components of the development process.

One solution could be a private/public innovation center, which companies could rent out production space or scale-up prior to building a full scale manufacturing plant. We have two chemistries that fall under that characteristic right now where we would love to move forward, but do we spend the money, the high risk, to build a semi works plant?

Another way the community could support bio-based technologies is by recognizing product differentiation. For example, our FR3 bio-based soybean oil based transformer fluid is treated exactly like mineral oil when it comes to the EPA and spills. So there ought to be an opportunity for us to do something with bio-based renewable differentiation.

In closing, consumers continue to demand more environmentally-friendly products and our customers want to deliver products to meet those demands. As an industry, it is our responsibility to find ways to tap R&D opportunities, open commercialization avenues, and encourage adoption. In the end, only the marketplace will decide which innovation succeeds.

However, we are strong believers that bio-based technologies can compete and out-perform existing alternatives. I, again, want to

thank the Committee for the opportunity to share Cargill's views today as well as continue to commit to bio-based manufacturing. We urge you to continue investing in these promising technologies.

[The prepared statement of Mr. Miller can be found on page 34 in the appendix.]

Chairwoman STABENOW. Thank you very much.

Mr. Monroe, welcome.

STATEMENT OF ADAM MONROE, PRESIDENT, AMERICAS, NOVOZYMES NORTH AMERICA INC., FRANKLINTON, NORTH CAROLINA

Mr. MONROE. Thank you, Chairwoman. Chairwoman Stabenow and members of the Committee, my name is Adam Monroe and I am President of Novozymes for the Americas, and it is an honor to be here today to represent our company and its technology, but to also talk about the bridge that we see from the technologies we develop to a brand new American industry.

Let me start today by thanking Chairwoman Stabenow for her unique leadership in this space and the Committee's invitation to testify today, and for recognizing that the United States has an opportunity to innovate an entire new portfolio of products from renewable feedstocks.

If anyone is wondering about the nature of my accent, Senator Boozman would understand.

Like you, we have a vision for a new American industry rooted in agriculture. We see an America that is dotted with advanced manufacturing plants using the latest technologies from fermentation techniques to microbial development. These manufacturing plants are going to drive development in some of the most underserved economic areas of our country, and they will bring not only our businesses, but new businesses, restaurants and tax revenue to these communities.

Scientists and engineers would not only staff them, but they would be staffed by folks from the local community with high school degrees, technical degrees, and college degrees. We believe in that vision as a company and we are doing a number of things to help that take root.

So for those of who do not know, Novozymes is a $2 billion global technology and science company and we are in the business of bio-based manufacturing. It is what we do. We make enzymes and microorganisms, and some of these things come from very unique and interesting places. I wanted to give you an example of one today that I think is relevant.

Back in World War II, our troops were fighting the enemy in the South Pacific, but they were also fighting heat, humidity and insects, and also this very strong blue-green fungus that ate everything cotton, from their tents to their uniforms to sandbags to the canvases that were covering their most vital equipment.

The Army was smart enough to isolate this organism from a tent and take it back to a research center to understand what they could do to combat it. Now, funny enough, after decades of research, we understand that these enzymes are some of the most powerful in the world and can turn a tent into sugar. Sugar is an ideal platform for bio-based manufacturing.

You have heard about that today. You can turn renewable sugar into anything you can get from a barrel of oil, from plastics to absorbency in diapers, as an example. We, as a company, have developed a number of new enzymes from that same organism that do everything from treat denim to make your jeans look a certain way to soften the towels in your laundry to help make these alternative fuels for the nation.

We have also invested hundreds of millions of dollars in developing microorganisms for agriculture, which will allow farmers to more efficiently use their land and their fertilizer and the water that they need. We recently announced plans to create a new bio-ag research center in Raleigh, North Carolina, where I live, where we are going to invest more than $36 million and create another hundred new research jobs in this area.

Between farmers and timber growers and even trash collectors, we believe the U.S. is the most productive producer of renewable feedstocks anywhere in the world. This broader domestic portfolio of feedstocks is going to help the U.S. insulate itself from global volatility. It also will provide a new economic growth engine for the country.

We believe that market-driving policies that you find in the USDA's Biomass Programs, the Farm Bill and the Renewable Fuel Standard: these programs are critical to establish these new feedstock supply chains.

Let me take this opportunity now to thank this Committee for its strategic thinking reflected in the new Farm Bill. Two of these programs are helping two of our current partners, specifically the Biomass Crop Assistance Program and the Loan Guarantee Program.

Ten years ago, I would not have imagined that as a company we would have built a $200 million enzyme plant in Nebraska for just one industry, the renewable fuel industry in this case. But today, you can go to Blair and see 110 local Nebraskans and Iowans working in this facility, and I welcome all of you to come out and see it. It is a pretty amazing place.

With your support, we are confident that when we look back a generation from now, we are all going to be amazed by what we helped to create. So thank you for the opportunity to testify today and I am very happy to answer questions.

[The prepared statement of Mr. Monroe can be found on page 43 in the appendix.]

Chairwoman STABENOW. Well, thank you very much.

Mr. Hankins, we are happy to have you with us. I know that Senator Cochran was very excited about your being able to participate today and sends his greetings as well.

STATEMENT OF J.D. HANKINS II, VICE PRESIDENT, HANKINS, INC., RIPLEY, MISSISSIPPI

Mr. HANKINS. Thank you, Madam Chairwoman. I would like to thank the Committee for holding this hearing on bio-based manufacturing and for inviting me to discuss the importance of the bio-based programs to the forest products industry. I would also like to thank the Committee for all the hard work on the 2014 Farm

Bill and for the expansion of the bio-based program to more comprehensively include forest products.

Our industry also greatly appreciates this Committee's work on the Farm Bill on issues such as the forest roads provision, research, and conservation funding. We were very fortunate, as an industry, to have had so many strong advocates sitting around this table during the Farm Bill process.

My name is J.D. Hankins and I am Vice President and co-owner of Hankins, Inc. near Ripley, Mississippi. I also currently serve as Vice Chairman of the Southeastern Lumber Manufacturer's Association, or SLMA. Hankins, Inc. is a privately held family owned company that manufactures, dries, and planes Southern Yellow Pine lumber that is sold throughout the United States.

The Southeastern Lumber Manufacturer's Association is a trade association that represents independently owned sawmills, lumber traders and their suppliers in 17 states throughout the Southeast. Hankins, Inc. was founded in 1988 when my brothers, Harold, David, and I, decided to separate from our family's sawmill and purchase a small sawmill. We purchased a mill that was producing about 12.5 million board feet of green lumber per year.

Since that time, we have modernized the operation bringing total production to over 95 million board feet per year and bringing more than 90 good-paying jobs to rural Mississippi. The lumber industry has a long history of being green and we like to say that Southern Yellow Pine was the original green building product.

We are proud to be good stewards of natural resources, and are therefore very interested in using the bio-based label to tout our products. Unfortunately, the original rules developed around this program prohibited forest products from eligibility by defining the industry as a whole as a mature market that is not innovative.

The 2014 Farm Bill changed this dynamic and clarified the inclusion of forest products in the program. While it would be difficult for me to argue that a two-by-four from a generation ago is any different in function than a two-by-four today. The path that a two-by-four takes from a forest to your home or to your grandchild's swing set is a significantly different and improved path.

Innovation in the industry over the past two decades has been phenomenal and has allowed the industry to more fully utilize our country's natural resources. For this reason, we believe the forest products industry will be well-positioned to become a full entrant into the bio-based market.

Recognizing that most people have probably not had the opportunity to tour a modern mill and to see the strides that have been made by the original bio-based industry, I would like to share with you a few of the innovations we have adopted at our mill in Ripley, Mississippi.

At Hankins, Inc., we apply responsible stewardship principles to our manufacturing process from the start. We have received certification from the Sustainable Forest Initiative, which ensures the timber we source is from well-managed timber stands.

In the production line, we have installed high tech equipment for more efficient use of both energy and logs. We completely renovated the manufacturing equipment starting in 1993. These improvements include a gangsaw that is capable of sawing multiple

sizes of boards from the same log simultaneously and optimized trimming and edger system that maximize yield from logs.

Additionally, we have added more efficient planing systems and sorting systems. Since 2000, Hankins, Inc. has invested approximately $20 million to upgrade our optimization program, programmable logic controllers, motor-controlled devices, that have resulted in production efficiencies increases by 37 percent, and energy efficiencies by 25 percent.

One of the most energy dependent processes in the mill is the drying process. We have taken great lengths to improve the efficiency of this process by replacing dry kiln systems in our mill. One such change reduces the drying cycle by 14 percent, which reduces our energy footprint. Our kilns also burn residuals from the lumber-cutting process as a source of energy, thereby ensuring the waste in the lumber cutting process and energy use is minimized.

Also, we sell excess residuals from our mill to fuel pellet manufacturers to be utilized as a green energy source. While it is difficult to describe some of this technology we use in mills, I hope everyone will stop by the table and see the equipment during the bio-based expo this afternoon. Their display will provide video of how the state-of-the-art equipment works.

In conclusion, I look forward to the opportunity to use the bio-based label when the USDA rule is finalized. Thank you again for your time today and your commitment to the bio-based label. I look forward to answering any of your questions.

[The prepared statement of Mr. Hankins can be found on page 29 in the appendix.]

Chairwoman STABENOW. Well, thank you very much to each of you.

I would like to start by asking each of you if you could take a moment to discuss how important Federal policies and initiatives are to growing this very exciting industry, and any experience that you have with the bio-based product procurement system that the President has set up and USDA is promoting to try to really promote the industry. Mr. Vitters.

Mr. VITTERS. Happy to. On the first in terms of from a policy perspective, I have certainly been encouraged with the work that has been done to date. As I think was referenced earlier, one of the biggest challenges, and particularly as we look to our PlantBottle 2.0 of being able to go to this other ingredient that we are looking to replace, is you have got first-in-kind technologies that are moving from pilot or small scale trying to reach to commercial scale.

We were very excited in terms of the loan guarantee program offerings within USDA 9003. One encouragement in terms of what that meant for these companies is being able to raise capital and be able to make these programs work.

What has been raised by a couple partners as a potential concern is an interpretation that perhaps with some of them, that it is mandatory to have a bio-fuels component as part of that, versus it being able to be accessed separately for just a renewable chemicals company. So obviously, for a company like ours, ensuring that it was set for renewable chemical use would be important.

As for the purchasing side, in particular, the USDA BioPreferred Program, we have been very pleased with the work with USDA and

the support that we have gotten, and we think it is important in terms of raising awareness around bio-based products that exist, and certainly appreciate the leadership that has existed on that front.

Chairwoman STABENOW. Great. Mr. Galbreath.

Mr. GALBREATH. Yes. Most of our help, as I mentioned, for this technology to emerge came from funds the Chekhov Committee concept provided. Back in those days, there was some limitation on capital through that program. Not only did Lear benefit from research and development from that money, but so did our customers and our supply base.

So now that there is capital available through some other funding programs for our supply base that is where we could use some help. As we try to grow, it is very difficult at times for us to predict volumes because automotive sales can fluctuate.

So for, in particular, a Polyol supplier, they need to invest capital in some new plants and prototype facilities to try out new Polyols for our use. Automotive grade Polyols are a special grade for seating. They are not like furniture or insulation that is more common so sometimes it takes a little help to get us to the full volumes we need for automotive.

As I said, we are going to new larger volumes now and trying to globalize as well, so it is becoming even more important now that supply base be available for us to grow.

Chairwoman STABENOW. Great.

Mr. GALBREATH. Thank you.

Chairwoman STABENOW. Mr. Miller.

Mr. MILLER. Yes, thank you. I will talk a little bit about the BioPreferred Program. So when it initially was rolled out, there was a tremendous amount of interest, which is what we like, so if we can talk to people about bio-based technology and what we can do, then we can show them the benefit of the bio-based technology.

The challenge is that there is really no teeth to it, so although we have got a lot of products tested and approved, if there is absolutely no—if there is no cost savings or significant improvement in value for the Government, typically we do not move forward. So we definitely have sold a lot of chemistry into this market, but there is not a lot of teeth to it.

Chairwoman STABENOW. That is important for us to know. Mr. Monroe.

Mr. MONROE. Chairwoman, so a number of these—you asked about the Federal policies, and a number of these policies are really critical in a new industry like we are talking about today.

If you think about it from the perspective of a farmer or feedstock provider, some of these feedstocks are new and have farmers considering whether or not to invest in what it may take to get this new feedstock to market. Providers are also considering how long the consumption of this feedstock will go on.

So things like the Biomass Crop Assistance Program contained in the Farm Bill are very helpful to help these guys overcome the initial establishment of these supply chains.

The other side of that, of course, is we work with many partners across the country in new biorefinery projects, and the investor community is watching this as well and they are trying to under-

stand the technology. While we are confident, often investors do not understand it all.

Programs like the Biorefinery Assistance Program helped to offset, if you will, some of their uncertainties. So both of those, I think, are critical to help getting this new industry off the ground.

Chairwoman STABENOW. Thank you very much. Mr. Hankins.

Mr. HANKINS. Yes. Our main concern, of course, as I mentioned in the speech is on the labeling.

We are wanting to use this in sales to help promote our product, to continue to expand it here in the country and to the public.

The public is wanting to look at bio-friendly things and wanting to buy bio-friendly products, and that is where we are directing and trying to show that we are and have been a bio-product for all this time.

As far as any financing, of course, we are open to anything that develops out of it or anything that can be used in it somewhere.

Chairwoman STABENOW. Thank you very much. All right. Senator Boozman.

Senator BOOZMAN. Thank you, Madam Chair. Mr. Hankins, many Arkansas jobs depend on our renewable resources in the forest products industry, just like in your state. I am very pleased that the forest products are now, as you mentioned, eligible to more fully participate in USDA bio-based programs.

I am encouraged by that and it sounded like, from your testimony, that you are encouraged as well. What can you tell us, though as we see the implementation go forward? What should we keep an eye on with USDA?

Mr. HANKINS. Well, I think the first concern is in the rules and where lumber and forest products can be labeled. As I said, in our opinion, we are definitely a BioPreferred product. Right at the start on all lumber products, you put a grade stamp on it telling your mill, association and the grade, but you have also got an opportunity to put other things that you are involved with.

Currently we put on there that we are Sustainable Forest Initiative Certified. As soon as we got approval, we would be glad to add the BioBased label to where everybody buying those forest products would know these were bio-based products.

Senator BOOZMAN. Very good. It is good to have you here, Mr. Monroe, as one Razorback to another, and somebody that attended the University of Arkansas. Again, concerning the importance of this stuff, people ask us at home, what we are doing. The name of the game is jobs, jobs, jobs. That's what this is really all about.

As I meet with small business owners across Arkansas, almost all of them tell me about their hesitancy to hire new workers or grow their companies due to the climate of uncertainty that continues to hang over our economy. You also discuss this uncertainty in your testimony. However, I am very encouraged by your plans to create a new bio-agricultural research center, which would create 100 jobs.

Can you elaborate on the impact of this economic uncertainty, the effect it has had on your business decisions, and how you hope to mitigate those effects moving forward?

Mr. MONROE. Sure. So I mentioned earlier, when we are talking about a brand new industry like the one we are embarking on, de-

spite the research that we have been doing for a long time, as we all know in this economically uncertain time period, capital is hard to find. The more certainty we can provide in a number of ways, the more it helps.

So as an example, things like the Renewable Fuel Standard, and I know that is not the subject today, is a mechanism that helps us to provide certainty for a marketplace where we can continue to develop technologies, and our investor can look at and say, "Okay, there will be a market for your product."

The second part of that is the enormous potential of agriculture. This Committee is very important because it's helping to get the word out about the enormous potential that this country has for bio-based feedstock, it's what we are doing today. If we can get to that feedstock, that will provide a tremendous amount of economic growth and jobs.

These are jobs that are very hard to outsource. We are not going to collect feedstock in a 50-mile radius and then ship it somewhere else in the world to bring the product back. We are going to do that right here at home in local communities. So if we can get to that vision, and I think we are doing the right things to get there, we will have more certainty and we will have more jobs.

Senator BOOZMAN. Very good. Mr. Miller, you mentioned the challenge of gauging customer interest as an ongoing obstacle for bio-based manufacturers. What steps have you taken to market yourself to potential customers? What advice would you give to emerging companies?

Mr. MILLER. So originally when bio-based rolled out—I am dating a little bit, but 20 years ago, the challenge was the chemistry was not very good and we were trying to put chemistry where it should not be. The big difference today is we are focused on those markets and those applications and those technologies that really drive value.

Green is nice, but it does not sell. Right? You have to have the performance, it has to be there and you have to have the market knowledge. I would caution everybody is green is almost a table steak and you need to focus on driving the chemistry and the technology forward.

For instance, with our green transformer fluid, yep, it is green, made from soybean oil. But it also has a high flash point. Right? It is biodegradable. It also makes a transformer last longer. Not only do you get the environmental impact, but you also get safety and then you can save money for the utilities. So the key is, you have to have the value proposition.

Senator BOOZMAN. Right. Thank you, Madam Chair.

Chairwoman STABENOW. Thank you very much. Senator Heitkamp.

Senator HEITKAMP. Thank you, Madam Chairman. This is a topic for a state like North Dakota that is near and dear to our heart. We have gone, hopefully, with no offense intended to the fuels portion of this. I think we are looking at moving agricultural manufacturing beyond food, fiber, and fuels.

How do we do that? What I heard today is that, first off, the most critical part of this is getting the product right, product quality, because it has got to be competitive. If you went to 100 percent

bio-based, you might not have the integrity of the bottle. You might not have the integrity for the transformer. So it has got to be a quality product.

Then we have got to create a marketplace so that we can, in fact, engage the capital markets in investment. In my state, that investment typically came in the co-op movement, whether it was advanced manufacturing or what we would call value-added agriculture and pasta or food, you know. We were—strawboard was a big product, which did not perform well in the marketplace because it did not have the integrity that it needed in order to be a resilient building material.

I agree with you, it is product quality, it is capital, and then it is responding to the needs that the community has for labeling. It needs to be an appropriate standard for labeling.

So we are hearing all this, but my question for each one of you is, if you were sitting in our chair, as the Chairwoman of this Committee or one of the members who believes deeply that this advanced manufacturing is where agriculture needs to go for a future for our farmers and for production agriculture, what more would you be looking at? What more would you be doing, Mr. Vitters, and all the way down the line?

Mr. VITTERS. A couple things. One, I would not separate out fuels and chemicals. I think that is often a mistake that gets made by folks looking at the technologies. Many of our partners actually do fuels as well, and I think what they have come to realize is for getting started, the chemical space is a little smaller, a little easier to scale, perhaps has a little more value within it today for being able to get started and moving.

Senator HEITKAMP. So if we were looking at this as we fight the RFS or as we have that transition, to talk to people about the importance of that technology in the next generation of what you do?

Mr. VITTERS. Exactly. So chemicals as a vehicle toward also solving needs as it relates to fuels as well, for one thing. The second thing I mentioned in terms of ensuring within the loan guarantee, renewable chemicals have a place within that if they are not advancing bio-fuels. Maybe as a third thing, there have been a lot of comments around providing certainty or flexibility within the markets for companies that are getting started.

One thing that does impact the decisions around putting domestic manufacturing capabilities in place is around, when you are getting started, flexibility on feedstocks, looking at are there duties and taxes that are either prohibiting or creating challenges for being able to have an industry have the most amount of flexibility at the beginning.

Some looking at how you might reduce or eliminate incoming duties and taxes for the renewable chemicals market would be something we would be interested in terms of having it explored.

Mr. GALBREATH. Seven years ago we had a customer who had a marketing strategy to become green and that was Ford Motor Company. As Mr. Miller mentioned, I believe the value proposition has to catch up with the product. What is happening now is that value has caught up a little more for other customers because they are competing with Ford.

But in the interim there has been a lot of work done to clean up the material, make it more pure and more useful. So I think the research incentive is very important. As you heard Mr. Vitters mention, half of their product still has potential to be bio-based. The same is true for automotive seating foam.

We are only dealing with the Polyol portion, but the other side, the isocyanate also has potential. So we could theoretically get to 100 percent with the right level of research and dedication by our supply base.

The other one is incentives for use. We still have some holdout customers. It is entirely possible that use would grow faster if they had some incentives. I also previously mentioned capital investment. Some of that support was a little slower, in my world anyway, to catch up with our supply base and can, I think, also help expedite things in the future as well. Thank you.

Chairwoman STABENOW. I am going to ask each of you to be brief as well. We have votes starting here shortly. I want to make sure we hear from all our members. So please go ahead.

Mr. MILLER. Product differentiation with EPA. The other one is the challenge of switching costs. Any time you change from one chemistry to another, there is a lot of switching costs involved. So if our customers would get credit for switching costs, it would be interesting.

Mr. MONROE. For those of whom do not work in this town and run businesses, the debate over existing good policy like the new Farm Bill and the Renewable Fuel Standard creates uncertainty in our communities. We can live with whatever detailed works there may be when we have two good things like that we can rely on.

The mandatory section of the Farm Bill was a very nice add in this edition. So the less debate about what we have that we can work from, I think, in some ways the better. The mandatory side of the Farm Bill is a really good thing.

Mr. HANKINS. If it was me, I would be pushing for development in the residual products from wood products. I would be willing to push development in an area to use them, to generate energy, or to do whatever could be developed out of them. It is a cheap alternative, because it is a byproduct.

Europe has already taken advantage of it. Like I said, all our excess byproducts are going into making pellets to go to Europe to heat their homes and things. I mean, I think it is a wide-open industry if it is just pushed and capitalized.

Senator HEITKAMP. Thank you.

Chairwoman STABENOW. Great. Thank you very much. Senator Grassley.

Senator GRASSLEY. Thank you, gentlemen, for what you do to extend the products that we raise on our farms. First question I will ask you, and all of you do not need to respond, but I would like to get a consensus. Have consumers shown that they will pay a premium for bio-based products or do they see bio-based products as a unique option that needs to be priced competitively?

Mr. VITTERS. As a branded company up here, I will take the first shot at that. I think it was mentioned earlier in terms of our initial drivers for this program was looking at broader value. It is around long-term competitiveness for our business, around decoupling from

the volatility of fossil fuels, as well as looking at other considerations like increasing farmer value through the program as well.

That said, we always had a belief that there could be opportunity for connecting plant-based products with consumers. Traditionally, when you look across mainstream brands, if it is positioned on an environmental attribute, there often tends to be a challenge in terms of having that be a driver of purchase intent, so if you are looking carbon or recycling or whatever the environmental attribute.

However, we believe there are other ways to talk about bio-based products, talk about the connection to plants that are relevant to consumers. That may, in the future, be able to demonstrate. We have seen early signals that are encouraging on that fact, but we are not depending on that as the only driver of value for the program today.

Certainly, though, I will say that you have to have trust in order to build marketing love, and within key stakeholders having deeper conversations around the value of bio-based products in opinion elites and thought leaders. It is very important to have that foundation and that is helping to drive in terms of the product sales for it.

Mr. GALBREATH. Most of our sales are direct to automotive and that is primarily a price-driven situation. However, I will note that all of our global surveys show that consumers are all interested, no matter what their age or their demographic, in bio-based and environmental products, and they do state a willingness to pay more for them.

Also, when we launched Soyfoam, we saw a wave of customers coming into dealers, we heard, on the West Coast in particular, and saying, is this the place that sells Soyfoam in the Mustangs? We want one of those. It was to the point where we were asked for samples to send to the dealers of the seats, so they can reside at the dealers to help sales.

So I think they would be willing to pay a premium, personally, but that is just my opinion. We still struggle with being price-competitive unless we are adding value, and there are some ways that we are able to do that.

Mr. MILLER. Just quickly, there is always a small portion of the economy that will pay a premium, but in my opinion, over the years, it is very small. But the key is that when you come and talk to your customers, they listen. Right? If you give them the quality, they will buy it.

Mr. MONROE. What I would add to this is that while we may see trends today, for those of you who have kids—I have two teenage daughters—I have absolutely no doubt that as we go into the future, the younger generations will—they just expect this.

We can feel it, I know, in our company so we need to live up to this and pursue it. So I think basically over time, there will be a price premium for it, but it will also just be the expectation.

Mr. HANKINS. The main thing that we have seen is that yes, they will pay some more, but it is not a lot more. But their demand stands out a lot more. They demand that it be something and they will go to any product that is there and is competitive. As long as

you can give a competitive product and a quality product, they are willing to accept it.

But everybody is looking at their grandchildren or children and knowing that the future makes a difference. So they feel that way and they want to spend that way and they will if you give them the opportunity.

Senator GRASSLEY. I have got a question on research and development. How long does R&D on these new projects take to ensure their quality is on a par with what consumers expect? Does R&D on bio-based products cost any more than it would on non-bio-based products?

Mr. MILLER. I will jump in real quick. So it really depends on the challenge that you are trying to overcome. So if you have a Horizon Three, a tough challenge, or a Horizon Two challenge or One challenge. So I am not sure it takes any longer. It just depends really on the challenge that you are trying to overcome.

Mr. GALBREATH. To me the longest time was making the product pure. Lear was able to work around the chemistry to overcome that purity, to get it launched earlier, but it was time consuming and costly. I would say we are still working to develop soy now and make it work even more efficiently in our products.

The other one is the switching costs. There is a validation cost as we get approval to sell to automotive. We have to re-validate the product to make sure it is as safe and durable as the current product. That is an additional cost that we consider in R&D and does slow it down and can take up to a year.

We have been able to expedite that now because we have credibility of the product in the market. But without that, it was very difficult.

Mr. VITTERS. I would second a lot that has already been said. The only thing I would say differently is part of the reason we drove to drop-in chemicals, so at the end of the day, what we are producing is the exact same chemical as a fossil-based material except instead of coming from dinosaurs, it is coming from carbon that has been extracted out of the air.

By doing that approach, it has allowed us to drive toward cost competitiveness faster. It is less disruption within the value chain and then in terms of getting approvals and being able to advance the technology faster, which was an expectation for us, has been able to be done.

Senator GRASSLEY. If that is all, whatever you say, Madam Chairwoman.

Chairwoman STABENOW. Well, thank you very much. We do have votes that have just been called. We have many more questions. We will continue this discussion in the showcase right around the corner in the Kennedy Caucus Room. I do want to invite everyone to come between 11:30 and 1:30.

We have 35 companies representing 25 different states, so half the country is represented next door and you can see firsthand what is happening in what I think is one of the most exciting areas of growing the economy in terms of innovation. It really is bringing together making things and growing things and creating jobs.

So if anyone has any additional questions for the record, they should be submitted to the clerk five business days from today. That is 5:00 p.m. on Tuesday, June 24th. The meeting is adjourned.

[Whereupon, at 11:11 a.m., the hearing was adjourned.]

A P P E N D I X

JUNE 17, 2014

STATEMENT FOR THE RECORD
Senator Thad Cochran
Committee on Agriculture, Nutrition and Forestry
"Grow it Here, Make it Here: Creating Jobs through BioBased Manufacturing"
Full Committee Hearing
June 17, 2014

Madam Chairwoman, thank you for holding a hearing on biobased manufacturing. I am sorry I was unable to attend this important hearing, and that I did not have the pleasure of personally introducing Mr. J.D. Hankins from Ripley, Mississippi.

I think it is important that we hear from industry representatives and others who have been on the frontlines making the investments in biobased products and the manufacturing process, which can have a significant positive impact on our rural economies. We are fortunate to have a wide range of stakeholders, from small to large companies, as part of our witness panel today. It is my hope that the Committee will receive a firsthand account of which Federal policies have been successful and beneficial to this emerging market.

The 2002 Farm Bill contained the first energy title, and within it was a small program to help promote biobased products. Today, and with passage of the 2014 Farm Bill, this program has evolved into a larger Federal procurement and voluntary labeling initiative called the BioPreferred Program. Along with the growth and evolution of the BioPreferred Program and other Federal policies, we have also seen efforts within the industry to innovate and increase efficiency. Overall, we have witnessed the formation of unique public-private partnerships that continue in order to meet the increasing consumer demand for biobased products.

The 2014 Farm Bill included changes to the USDA Biobased Markets Program to promote greater inclusion of forest products in the Biopreferred labeling and procurement programs. I expect USDA to write effective rules to implement these provisions and allow the forestry industry in Mississippi and elsewhere to be a greater part of the emerging biobased manufacturing market. Over half of Mississippi's landscape is considered forested land, which encompasses approximately 17 million acres. Forestry and the forest product industry is an economic driver in Mississippi and employs over 50,000 in my home state. This region of the country has a significant advantage in the development of biomass resources. Not only are the resources readily available, but the Southeast also has the infrastructure and facilities in place that present a great opportunity to build upon this type of market.

J.D. Hankins is the Vice President and co-owner of Hankins Incorporated near Ripley, Mississippi, which manufactures, dries and dresses Southern Yellow Pine lumber that is sold throughout the United States. Mr. Hankins and his brothers founded Hankins Inc. in 1988 by purchasing a sawmill that produced 12.5 million board feet of green lumber per year. Since then, the company has been modernized and has substantially grown. Today, Hankins Inc. produces over 95 million board feet per year and is an important contributor to Mississippi's local economy.

J.D. Hankins is well qualified to highlight the advancements and efficiencies that the forest product industry as a whole has incorporated into the harvesting, processing, and manufacturing of forest products. He will share with the Committee the tremendous strides that have taken place within the industry in Mississippi and across the country and share how forest products fit within the biobased manufacturing sector. Mississippi and the Southeastern region of the country rely on forestry, and there are significant opportunities to develop biomass resources that can be used for finished biobased products. The production of biobased products, including the resources and processes used to manufacture them, involves a wide range of stakeholders. Federal programs and policies need to be effective and beneficial to agriculture, forestry, and other sectors, all of which are contributing to this emerging biobased market. It is important we get this right for everyone.

I want to thank the members of the panel for their testimony on this issue of great significance.

First I would like to thank you Chairwoman Stabenow, Ranking Member Cochran, and Members of the Committee for the invitation to speak today about Lear Corporation's bio-derived products. My name is Ashford Galbreath and I am Director of Advanced Materials and Comfort Engineering representing the Lear Corporation team from Chairwoman Stabenow's home state of Michigan that develops bio-based products and launched SoyFoam™ in 2007 on the '08 Ford Mustang.

Environmental stewardship and sustainability are key dimensions of Lear Corporation's mission statement. In 2004, Ford Motor Company approached Lear about partnering to develop Soy-based automotive foams. We formed a team including The United Soybean Board Checkoff, Renosol, Bayer and a soy polyol supplier and set a new standard of "green" foam performance with the first-to-market launch of SoyFoam™.

SoyFoam™ is soybean oil-derived automotive polyurethane for use in seating, head restraint, armrest, and console foam padding. For SoyFoam™ we substitute petroleum-based polyol with soybean oil-based polyol and adjust the formula to meet strict automotive specifications. We successfully replaced 5% petroleum polyol by weight in a low density seating cushion and back foam and replaced 16% petroleum oil content by weight in a high density head restraint & typical European seat cushion foam.

Today Lear sells SoyFoam™ seating on multiple Ford, General Motors, Hyundai and other customer vehicles molded in the United States and Mexico. We have approvals for ten percent level seating foam and research shows promise for at least double that amount.

Soy polyol provides significant environmental improvements as measured by a National Institute of Standards BEES (Building for Environmental and Economic Sustainability) Study. Giving all environmental impacts equal weighting, soy polyol showed a 75% improvement compared to petroleum polyol. Global Warming improvement from a net reduction of 5.5 Kg of CO_2 for each Kg used. 2 kg of CO_2 is captured from the atmosphere when grown plus you avoid 3.5 Kg of CO_2 release from petroleum.

We consider SoyFoam™ to be very significant to Lear Corporation in that it serves as a firm representation of our commitment to the environment, product cost control and meeting both our customer's and the consumer's needs. Most of our global OEM customers have environmentally proactive initiatives in response to demanding regulatory hurdles such as the European Commission's requirement to lower carbon use levels.

Success with SoyFoam™ helped establish Lear's environmental leadership position in automotive seating. Environmental innovation continued at Lear with launches of DECS ™ and Evolution™ seating systems that combine weight reduction with bio-based and recycled innovations. Recently we added an EcoPadding™ a trim laminate made with 40% nano-crystalline cellulosic fibers and 24% recycled polyester that can replace polyurethane foam trim laminates. We are also close to incorporating other bio-based foam ingredients such as soy-oil.

At Lear there are multiple *business-related drivers* for bio-based product innovation. One is economic consideration of controlling product cost increases from rising oil price.

Petroleum related price increases are costly to Lear's customers and consumers. Although currently somewhat stable, historically oil price is much more volatile than the price of soybeans.

As use increases, new volume should improve supply economics in affiliated industries. North American use of soy polyol and other critical raw materials should continue at a good pace as the product proliferates and content per pad grows. Lear's internal foam molding business is growing globally and SoyFoam™ is expected to be a key component of that growth.

Bio-based products are one of our key areas of innovation focus. Lear faces a variety of "sustainability pressures" and response related initiatives are multi-dimensionally important to us; *Compliance* with local and national regulations, conflict minerals and voluntary protocols; *Market pressures* from customers needing to reduce supplier impacts, consumers with a growing environmental awareness; *Business benefits* from innovative products with increased market potential, and a sustainable workplace attracts new talent; and *Social concerns* desiring to protect employees welfare and to build community relations.

Thank you again Chairwoman Stabenow, Ranking Member Cochran, and Members of the Committee for your time today. I look forward to answering any questions you may have and thank you for your support of bio-based product development.

Testimony for the Senate Committee on Agriculture, Nutrition and Forestry
Grow it Here, Make it Here: Making Jobs through Bio Based Manufacturing
JD Hankins Vice President and Co-Owner
Hankins Incorporated
June 17, 2014

I would like to thank the Committee for holding this hearing on BioBased manufacturing and for inviting me to talk specifically about the enthusiasm the forest products industry has for the BioBased labeling program. I would also like to thank the Committee for all of your hard work on the 2014 Farm Bill and the expansion of the BioBased program to more comprehensively include forest products. Our industry also greatly appreciates other work in the farm bill such as the forest roads provision, as well as research and conservation funding. We were very fortunate as an industry to have so many strong advocates sitting around this table during the farm bill process.

Company Background

My name is JD Hankins, and I am the Vice President and co-owner of Hankins Incorporated located in Northeast Mississippi near Ripley. I also currently serve as the Vice Chairman of the Southeastern Lumber Manufacturers Association (SLMA). Hankins Inc. is a privately held, family-owned company that manufactures, dries and planes Southern Yellow Pine lumber that is sold throughout the United States. The Southeastern Lumber Manufacturers Association is a trade association that represents independently-owned sawmills, lumber treaters, and their suppliers in 17 states throughout the Southeast. SLMA's members produce more than 2 billion board feet of solid sawn lumber annually, they employ over 12,000 people, and they responsibly manage over a million acres of forestland. These sawmills are often the largest job creators in their rural communities, having an economic impact that reaches well beyond people that are in their direct employment.

Hankins Inc. was founded in 1988 when my brothers, Harold and David, and I decided to separate from our family's sawmill in Grenada, MS and purchase our own small sawmill near Ripley, MS that was producing about 12.5 million board feet of green lumber per year. Since that time, we have modernized the operation with a state of the art sawmill, sorter, dry kiln, and planing operation. In 2000, we constructed a second dry kiln, bringing total production to over 95 million board feet per year and directly bringing more than 90 jobs to rural Mississippi.

Even after all of these changes and large investments over the last 25 years, we continue to make improvements to increase efficiency in our energy and fiber use.

The BioBased Label in the 2014 Farm Bill

The lumber industry has a long history of being "green" and we like to say that Southern Yellow Pine was the original green building product. We are proud to be good stewards of the land and our natural resources, and are therefore very interested in using the BioBased label to tout our products. This label not only highlights the sustainable qualities of forest products, but

qualifying for the BioBased label also makes a product eligible for the federal government's BioPreferred procurement program.

The BioBased and BioPreferred program was initially authorized in the 2002 Farm Bill to help with the broad scale marketing of biobased products. Unfortunately, the rules developed around this program largely prohibited forest products from eligibility by defining the industry as a whole as a "mature market" that was not innovative.

While it would be difficult for me to argue that a 2"X4" from a generation ago is any different in function than a 2"X4" today, the path that 2"X4" takes from a forest to your home or to your grandchild's swingset is a significantly different and improved path. Innovation in the industry over the past two decades has been phenomenal and has allowed the industry to more fully utilize our country's natural resources. For this reason, the forest products industries, including lumber, paper, and others, urged Congress to clarify the standards of the program in the 2014 Farm Bill.

With the strong support of this Committee, that goal was achieved. Section 9002 of the 2014 Farm Bill specifically notes that forest products are eligible for the BioBased label if they apply "an innovative approach to growing, harvesting, sourcing, procuring, processing, manufacturing, or application of biobased products regardless of the date of entry into the marketplace." The language goes on to note that biobased products include forest materials "notwithstanding the market share the product holds, the age of the product, or whether the market for the product is new or emerging." Report language that accompanied the bill further reinforced the eligibility of forest products in the program.

As an industry, the inclusion of this language is very exciting. I've seen this industry transform itself since I was a child growing up in my family's sawmill, and I believe the industry has a great deal to bring to the program. However, we are still anxiously awaiting completion of the BioBased program's final rule, which will translate this legislation into practice. We are hopeful that the dedicated employees at USDA will ensure the rule takes into consideration the many innovations throughout the forest products value chain.

Industry Innovation

Clearly there isn't much innovation to be seen in the mere appearance or shape of a 2"X4", but that hasn't stopped the industry from applying innovations at every step of the process that turns a tree into the frame of someone's home. The BioBased label will help consumers make a more educated decision when purchasing building materials by alerting them to the advancements and efficiencies involved in bringing wood products to market.

The products manufactured by the forest products industry all begin on timberland, and that is where our industry's commitment to sustainability and innovation begins. Certification programs are now available to ensure that the timber used to make forest products is from well-managed lands where trees are being grown in a sustainable manner. In North America, the most common forest certifications systems are Sustainable Forestry Initiative, American Tree Farm

System and Forestry Stewardship Council. Combined they certify over 120 million acres.[1] Starting in 2009, Hankins Inc. received certification from SFI for the chain of custody for the timber that we source so that our customers can be confident the products they are purchasing are from well-managed timber stands.

Another tool that is used by the wood products industry to demonstrate environmental responsibility is environmental product declarations, or EPDs. Currently available for softwood lumber, plywood, oriented strand board (OSB), and glue-laminated lumber, EPDs are standardized tools that provide information about the environmental footprint of the products they cover. Led by the American Wood Council and Canadian Wood Council, the North American wood products industry has taken its EPDs one step further by obtaining third-party verification from the Underwriters Laboratories Environment (ULE), an independent certifier of products and their sustainability. These EPDs are developed in compliance with the international standard, ISO 14025 *Environmental Labels and Declarations*, so they are trusted domestically and internationally.

An EPD includes information about everything from life-cycle environmental impacts of a product, the water and energy usage required to manufacture a product, and material content. All of this information is provided in a standardized format to make the EPD easier for consumers to read and use. An example of an EPD for lumber products is included as an attachment to this testimony.

In today's high-tech mills, automation is the norm. Computers are the brains of the system, and these computers guide the conveyors, scanners, lasers, digital cameras and bar coding systems that do the work. The employees are often skilled workers that man the computer systems and ensure the operation as a whole is running smoothly.

Most people have not had the opportunity to tour a sawmill and see just how modern our facilities are. Once a tree has been harvested and shipped to the sawmill, logs immediately come into contact with technologies that were not available just a few years ago. For example, many mills are now installing whole truck scanners that actually tell the operator the total number, sizes, and quality of logs before the logs ever leave the truck.

Before the logs enter the mill, they are immediately scanned by a metal detector for any objects that may be detrimental to the process and are debarked. Immediately upon entering the mill, a log is scanned by multiple lasers that are able to prescribe the sizes and number of pieces of lumber that are contained in the log. Communicating with the computer systems, the mill "knows" how to make the most profitable pieces of lumber while minimizing the amount of by-product manufactured. Once the computer has assigned the productive and efficient use of the log, it is transferred through a series of saws that are controlled by computers receiving data from thousands of cameras and lasers. This ongoing process ensures the logs are in the correct position while constantly checking for defects in the log not previously detected so that all parts of the log are put to best use. The parts of the log not used to make lumber are not wasted, but

[1] **Sources: www.sfiprogram.org, ATFS staff, http://us.fsc.org/facts-figures.219.htm**

are often sold to manufacturers of other products, such as paper mills. Alternately, many mills use these bi-products to produce heat that dries the lumber after completing the sawing process.

A fairly recent innovation that has revolutionized sawmilling for many lumber producers is the "curve gang saw." Imagine a large machine simultaneously operating multiple saw blades that actually moves with the curvature of the grain in the log. This tool has allowed producers of lumber to make higher quality and more lumber from the logs going through the mill, while reducing the amount of the log not becoming lumber.

Another major change in the sawmill industry is in the kilns used to dry the lumber after it has been sawed in the mill. Today's dry kilns are much more efficient than those used in years past and continue to be improved upon. For example, kilns are constantly monitored by various gauges connected to computers that maintain proper temperature, heat generated and drying times so the proper moisture content level is achieved in the lumber.

In the last few years, dry kilns have taken a major step forward with the invention of the "continuous" dry kiln. This kiln improves efficiency and drying time by allowing large loads (charges) of lumber to move through kilns on a continual basis. Previously, all kilns were considered "batch" kilns, which meant you put a single charge in, closed the door, heated it up, dried the lumber, then turned it off, removed the lumber, and repeated the process. Continuous kilns are open ended and keep lumber moving through constantly, so each charge of lumber is able to use the heat and steam coming off the charge that is finishing the process. Additionally, the continuous kilns do not dip in efficiency like batch kilns during the heating up and cooling down phases between charges.

Worker safety is another critical benefit from today's technology. Just a few decades ago a worker might have been standing next to a circular saw guiding a piece of timber along through the cutting process. With the new technology this same process can be done with the use of a joystick by a worker sitting behind protective shield. Beyond technology, the sawmill industry is constantly working to improve worker safety, from implementing programs that keep work areas clean to mandatory requirements for proper ear and eye safety equipment use. When a mill implements a number of these advancements and you accumulate the impact of all of these changes, the impact is real, and it is significant.

Recent Innovations at Hankins Inc.

At Hankins Inc. we have taken many of these innovations and applied them to our operation. When we purchased the sawmill in 1988 it was a very rudimentary operation. Since that time we've implemented a number of the innovations just described.

- A complete renovation of the manufacturing equipment transpired after 1993.
- In 1994, Hankins installed an optimized trimming system and a 42 bay bin sorting system.
- In 1995, a new modern sawmill was constructed, including an optimized double length canter line with four chipping canter heads, a two sided circular sawbox capable of producing 3 sideboards on either side of the cant.

  - A VDA (Vertical Double Arbor gangsaw) with a shifting sawbox for multiple sawcut patterns was placed in operation.
- An optimized edger was installed to complete the optimization of the sawing process to ensure maximum yield and recovery from the sawlogs.
- In 1997, Hankins Inc. installed an optimized bucking system on the tree length cut up deck to increase the yield of the log cut up system.
- In 1998, a modern planing and sorting system was installed to improve production throughput and efficiency.

Since 2000, Hankins Inc. has continued to upgrade their optimization programs, their programmable logic controllers and their motor control devices so that maximum efficiency could be achieved and maintained thus reducing energy cost per 1000 board feet by 25%. Additionally, our certification from the Sustainable Forestry Initiative ensures that our mill is using America's natural and renewable resources wisely, which is at the core of the purpose for the BioPreferred program. All told, Hankins Inc. has invested approximately $20 million since 1994 to improve production efficiency by 37% and energy efficiency by 25%.

Conclusion

In conclusion, the forest products industry is hopeful that businesses that continue to evolve and innovate will be able to utilize the BioBased label when the new rules for the program are finalized. The legislative language and report language of the 2014 Farm Bill make it clear that these types of processes should be considered when determining eligibility for the BioBased label, and for that we have this Committee to thank. The forest products industry has a great story to tell about how far we have come and the benefits today's improved technology provides. Thank you for your time and interest in this important issue.

Cargill

Testimony of

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"Grow it Here, Make it Here: Creating Jobs through Bio-Based Manufacturing"

Committee on Agriculture, Nutrition and Forestry
United States Senate

June 17, 2014

Chairwoman Stabenow, Ranking Member Cochran, and distinguished members of the Senate Committee on Agriculture, Nutrition and Forestry, thank you for the opportunity to testify before you today. I hope my statement will provide insight into the current state of our bio-industrial sector and highlight the economic and job creation opportunities associated with investment in these promising technologies.

My name is Kurtis Miller, President of Cargill Industrial Specialties, a business of Cargill, Inc. Cargill provides food, agriculture, financial and industrial products and services to the world. Together with farmers, customers, governments and communities, we help people thrive by applying our insights and nearly 150 years of experience. We have 142,000 employees in 67 countries who are committed to feeding the world in a responsible way, reducing environmental impact and improving the communities where we live and work.

The Cargill Industrial Specialties Business Unit seeks growth in renewable agriculture-based products by delivering customer solutions through a focused market and customer segmented

approach. Our focused innovations solve specific problems for our customers whether based on performance, cost or process. We leverage our expertise in bio-based chemistries to deliver the right solution for their particular need. Today, I am here to discuss our successes and struggles; what we have learned and what we hope to see in the future.

I am encouraged by the Chairwoman's commitment to promoting bio-based production through her "Grow it Here, Make it Here" initiative and by holding hearings like this one. I urge the Committee to continue, and to strengthen, its support for bio-based manufacturing. The focus on sustainability has progressed from an emerging trend to a consumer expectation as population continues to grow and oil prices continue to rise over the long run. As consumers demand more environmentally friendly products, bio-based materials are gaining in popularity for application in food and beverage packaging, plastics, lubricants, surfactants, and pharmaceuticals. Bio-based materials can help reduce dependence on foreign oil, limit pollution, mitigate climate change and reduce exposure to toxic chemicals. Bringing to market new bio-based materials with wholly new properties and performance can also fuel originally unforeseen innovation and opportunity. And of course, bio-based manufacturing also has the potential to create new high-paying "green" jobs.

At Cargill, we consider ourselves to be innovators in the bio-industrial space. We have developed and brought to market a number of bio-industrial chemistries, compounds and products, with quite a few more promising technologies in the pipeline. We invest in, and work very closely with, other pre-commercial bio-products companies such as Montana's Rivertop Renewables and Wisconsin's Virent, Inc., a partnership we share with fellow witness Coca-Cola. Three of our top-performing products have been honored as winners of the prestigious Presidential Green Chemistry Award.

Polylactide Bio-polymer (PLA)

In 1989, we began a research project looking for innovative uses of carbohydrates from plants as feedstock for more sustainable plastics. This was the start of NatureWorks LLC, now a 50-50 joint venture with Thailand's PTT Global Chemical. NatureWorks was the first company to

commercialize a broad family of low-carbon-footprint polymers derived from 100-percent renewable resources, which compete with oil-based plastics and fibers. NatureWorks engineered and built the first ever large scale bio-polymer plant, with the required economies of scale to compete head-to-head with traditional oil-based polymers. NatureWorks LLC produces the PLA bio-polymer on a Cargill site in Blair, Nebraska, which is then marketed globally under the Ingeo brand.

Fueling a healthy export market, and now used in countries around the globe, Ingeo is used in a variety of applications including rigid and flexible disposable packaging (packaging for meat, deli, fresh fruit and vegetables sold in retail grocery stores), compostable food service items, oil field services, non-wovens (baby wipes, diapers), 3D printing filament and in an ever increasing range of durable products (gift cards, mobile phones, computer and copier housings). Thanks to using renewable feedstocks, Ingeo materially lowers the carbon footprint of its targeted applications while requiring less energy for its production. The production of these materials typically uses 50 percent less fossil fuel and emits 60 percent fewer greenhouse gases in manufacture than conventional plastics.

NatureWorks is a typical representative of the broader bio-polymer and green chemical industry, and was proud to be a 2002 Presidential Green Chemistry Challenge Award recipient (as Cargill Dow LLC) in recognition of Ingeo providing a number of benefits, including its low carbon footprint, renewable composition and for being compostable and recyclable.

Vegetable Oil Polyols

One of the two chemical building blocks used to make polyurethane is a "polyol." Polyols are key ingredients in flexible polyurethane foams, which are used in furniture and bedding. Historically, polyurethane has been made from petrochemical polyols. The idea of replacing these polyols with bio-based polyols is not new, but the poor performance, color, quality, consistency, and odor of previous bio-based polyols restricted them to limited markets. Previous bio-based polyols also suffer from poor chemical reactivity, resulting in foam with inferior properties.

Cargill has successfully developed bio-based polyols for several polyurethane applications, including flexible foams, which are the most technically challenging. BiOH polyols provide excellent reactivity and high levels of incorporation. These foams set a new standard for consistent quality with low odor and color. Foams containing BiOH polyols retain their white color longer without ultraviolet stabilizers. They also are superior to foams containing only petroleum-based polyols in standard tests. In large slabstock foams, such as those used in furniture and bedding, BiOH 5000 polyol provides a wide processing window, improved comfort factor, and reduced variations in density and load-bearing capacity. In molded foams such as automotive seating and headrests, BiOH 2100 polyol can enhance load-bearing or hardness properties relative to conventional polyols.

Use of BiOH polyols reduces the environmental footprint relative to today's conventional polyols for polyurethane production. Each million pounds of BiOH polyols saves nearly 700,000 pounds of crude oil. In addition, Cargill's process reduces total energy use by 23 percent and carbon dioxide emissions by 36 percent.

BiOH polyols diversify the industry's supply options and help mitigate the effects of uncertainty and volatility of petroleum supply and pricing. Cargill is the first company to commercialize bio-based polyols on a large scale in the flexible foam market. Formulators can now use bio-based polyols in flexible foam without compromising product performance. Cargill was proud to be a 2007 Presidential Green Chemistry Challenge Award recipient in recognition of this accomplishment.

Vegetable Oil Transformer Fluid (FR3)

Let me now talk for a moment about transformer fluid from vegetable oil. High-voltage electric transformers must be filled with an insulating fluid that absorbs heat and prevents short-circuiting. For many years, most transformers were filled with polychlorinated biphenyls (PCBs) or, especially after PCBs were banned, petroleum-based mineral oil. While mineral oil is significantly less hazardous than PCBs, it is quite flammable and may be toxic to aquatic species.

Furthermore, mineral oil is very hydrophobic. At normal operating temperatures within a transformer, water is generated. In mineral-oil filled transformers, the ability for mineral oil to absorb the extra water generated is limited causing the overall insulation system (usually wood, paper or cardboard) to degrade faster. The service interval for transformers is largely dependent on the operational life of the solid cellulose insulators, so preventing the degradation of those insulators can significantly extend the service life of the transformer.

Cargill has developed Envirotemp FR3 natural ester dielectric fluid based on vegetable oil instead of petroleum. These bio-based oils can be used in replacement of mineral oil for retrofilling transformers. If used in newly designed transformers, the transformers can be made smaller owing to better thermal performance of Cargill's oils. The FR3 fluid is significantly less flammable than mineral oil, greatly reducing the risk of fire or explosion. Cargill's oils also increase the service life of the cellulose insulation by 5-8 times longer than mineral oil thus extending the insulation life as well as the transformer life.

A transformer using FR3 fluid has a lower carbon footprint across the entire life-cycle of a transformer, with the largest reductions occurring in the raw materials, manufacturing, and transportation phases. The total carbon foot print of an electric transformer is about 55-times lower when using FR3 fluid compared to mineral oil. This is all in addition to the low toxicity in soil and water, high biodegradability, and the fact that FR3 fluids are based on a renewable resource.

Furthermore, transformers filled with FR3 fluid offer improved fire safety for the community. There have been no known explosions or fires in the hundreds of thousands of transformers filled with FR3 fluid since the product launched.

FR3 fluid has achieved numerous industry validations including EPA's Environmental Technology Verification, the lowest environmental impact performance score in a BEES 4.0 lifecycle assessment, USDA Bio-based Product certification, and certification as a less flammable fluid by both Underwriters Laboratory (UL) and Factory Mutual Research

Corporation. We are currently working with EPA to finalize our DfE certification for FR3 fluid. Cargill was proud to add the 2013 Presidential Green Chemistry Challenge Award to this list of honors.

Lessons Learned

What we have learned over two decades of participation in the bio-industrial space is that this is hard stuff. Bio-manufacturing is a difficult and risky business with many moving parts. Due to their initial relatively smaller scale, chemicals from biomass are often more expensive at the start than petrochemicals except in periods of unpredictable price spikes. This leaves a very small window for growth for most technology-driven green initiatives to achieve competitive economies of scale and fulfill their promise as engines of economic development and job creation.

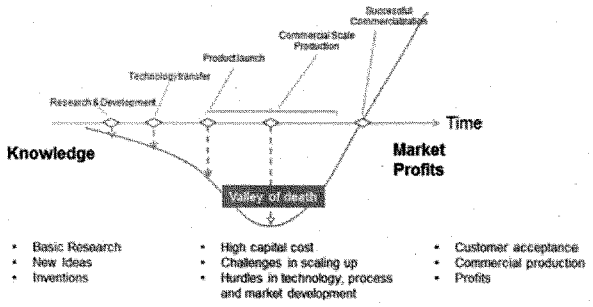
The most important lesson from our experience in NatureWorks, bio-based polyols, FR3 fluid and other industrial products is the need for a well-balanced approach to the commercialization process. Technology alone is not enough to succeed. Success in commercializing technology requires several other considerations including a competitive manufacturing/supply chain, distribution, sales and marketing personnel with customer knowledge, supply and demand understanding of raw materials and the end product.

Manufacturers must develop a solid understanding of their raw material and manufacturing supply chains. Fluctuations in the agriculture and petrochemical markets can make or break a company. Over the years, we have seen quite a few renewable fuel companies go under, or acquired by traditional refiners, because of a lack of understanding about their raw materials and what causes prices to rise and fall.

Large-scale commercialization of bio-based products is limited by constraints on physical assets, or access to capital for costly construction of demonstration-scale facilities. As referred to by the Chairwoman as the "valley of death," the inability to access capital and conversion capacity often prevents promising technologies from advancing to commercial scale production. As a

result, many bio-based companies are not able to surpass the early stages of development. Venture capital is rarely committed to large investments without full-scale proving trials.

Another problem currently facing the new product development field is providing customers with representative samples for testing and evaluation. Market development, and therefore justification for a full-scale installation, is hindered by the ongoing challenge of gauging customer interest. Semi-works facilities are needed that can supply sizable commercial quantities for testing and development at customer facilities. Given that bio-based products are often replacements for existing products, companies need this capability to validate the products performance and assess the need for larger quantities of the product.



Manufacturers must also have a clear value proposition that delivers distinctive value to the consumer. Emphasizing "greenness" alone is unlikely to be successful without a strong functional and/or price advantage. Companies must understand the industry they are attempting to provide bio-based alternatives for and their potential customers business model and priorities. They must define how the new technology can enhance current or future application opportunities and deliver true value. Our products must perform as well as, if not better than, existing alternatives.

The fixing of the value proposition itself requires not only a detailed understanding of customer needs but also of their "ecosystem," or the other players in their value chain and the environment

in which they operate, whether political, financial or legal. An understanding of the customers' ecosystem will allow a manufacturer to calibrate value from crop to packaging and even further. Industry must avoid the "build it and they will buy it" mentality.

Moving Forward

If the United States seeks to be the world leader in developing and promoting the emerging bio-economy, we must increase our investment in research and testing facilities that will position us globally as an innovative nation where companies will want to locate, create jobs, and be a part of the growth potential in biosciences and advanced bio-manufacturing.

The U.S. government can support innovation through competitively awarded research funds to reduce the cost of often expensive, time-consuming, R&D.

Federal agencies can revise regulations to differentiate between traditional industrial products and bio-based products with governmentally recognized environmental attributes such as low toxicity in soil and water, and high biodegradability. We believe this would further encourage, and enable faster adoption of, these commercially-viable, bio-based solutions.

In addition, the industry needs near-term manufacturing-scale support similar to that provided to other industries in their early stages such as those to petrochemical companies and other renewable technologies. Because this is risky business, with commercialization hurdles and staunch competition from petroleum-derived processes that have been established for decades, we need front-end encouragement to reduce the risk of failure, embolden companies to accept the challenge and develop a high-performing, green product that can survive in the marketplace. Otherwise, we are likely to continue to see companies exploring options in other geographies with more attractive government support and feedstock options.

Government can also reward consumer, as well as corporate, adoption of these products by creating, and educating these potential customers about, incentives that help them reduce the

physical and financial burden of conversion from traditional products, including tax credits and regulatory relief for adopting renewable, less toxic and energy efficient technologies.

In summary, I would like to thank this Committee for its commitment to bio-based manufacturing and urge you to continue investing in this promising technology. I thank the Committee for its leadership in creating and maintaining BioPreferred, which has sent a strong message to the marketplace, and urge continued support and strengthening of the program going forward.

In the end, only the marketplace will decide which innovations succeed. We are a strong believer that, with the right near-term support, bio-based manufacturing will provide commercial products that out-perform their existing alternatives. In addition, these "green" technologies will reduce dependence on foreign oil, limit pollution, mitigate climate change and reduce exposure to toxic chemicals. Success for the bio-industrial sector will result in an influx of high-paying jobs, opportunities for rural development and prosperity for our domestic agricultural industry and manufacturing base.

Thank you again for the opportunity to share Cargill's views with you today. I am willing to answer questions and respond to specific inquiries going forward.

Adam Monroe, Novozymes
Senate Committee on Agriculture, Nutrition and Forestry
"Grow It Here, Make It Here: Creating Jobs Through Biobased Manufacturing"
Tuesday, June 17

Chairmwoman Stabenow and Members of the Committee,

My name is Adam Monroe, Novozymes Regional President for the Americas. It is an honor to be here representing our company, technology and the bridge we see between biobased manufacturing and a new American industry.

Let me start today by thanking Chairwoman Stabenow for holding today's hearing – and the Committee for recognizing that the United States is on the doorstep of a new industry in biobased products made from domestic renewable feedstocks.

We are already seeing that industry at work: We are growing biomass and have built plants in rural communities, creating good-paying jobs for operators, technicians, scientists and engineers. We are seeing new products, like plastics made from plants and fuel made from trash, that reduce our need to purchase expensive fossil feedstock from other countries.

But I believe – and I know you do, Madame Chairwoman – these advances are part of a bigger story.

That story is a new American industry:

- New companies innovating an entire family of products for consumers.
- America dotted with advancing manufacturing plants to make these products using the latest technologies – from new fermentation techniques to microbial development.
- Construction workers welding, wiring and installing advanced equipment we need; and plants staffed by full-time workers with high school, technical and college degrees from the local community.

These manufacturing plants can drive development in some of our most economically underserved areas, bringing new businesses, restaurants and tax revenue to our communities. And because America's biomass availability is so big, the potential for biomanufacturing is equally as big.

I want to thank Senator Hagan for inviting me here today. Novozymes has a proud history in North Carolina: We were doing biotech before people called it "biotech" and built our first US manufacturing plant in 1977 in a soybean field.

That soybean field is now home to the largest multi-purpose enzyme manufacturing plant in the country. Our site has undergone multiple expansions, including the establishment of our global R&D center on biomass conversion. We recently announced a $36 million expansion of that site.

North Carolinians are there making enzymes, working in our labs – but also working in a number of roles including Human Resources and Accounting, showing how the biobased industry creates science and non-science jobs alike.

We recently announced plans to create a new BioAgriculture research center in the Research Triangle Area, investing more than $36 million and creating 100 jobs.

In the Mid-Atlantic, we have been working hard with Senator Hagan to establish North Carolina as a leader in the biotech space, including biotechnology for the Nation's agriculture, health and industrial needs.

Across the South, states like Senator Boozman's hold tremendous potential for biobased manufacturing.

And in the Midwest, our biobased technology is making an impact in Senator Thune's home state, too. Working together with POET, we are increasing the efficiency of the corn ethanol production process, helping them use less corn and energy to make biofuel, and turn crop waste into advanced renewable fuel.

As a businessman, I want to thank you for your ambition. The Agricultural Act of 2014 is a driver that can push the biobased products industry through the doorstep of commercialization. I would like to talk a bit more about how to take the ambition a step further.

We are in the biobased manufacturing business. We make enzymes and microorganisms, Nature's technology. They perform powerful and essential tasks for society – and some of them come from unique and interesting places.

Back in World War II, our troops in the South Pacific were fighting heat, humidity, insects – and a strange blue-green fungus that ate all things cotton. It destroyed their uniforms. It destroyed their tents. It even destroyed the sandbags, ropes and canvas used to protect their most vital equipment.

A sample of this strange fungus was taken from a degrading tent in camp and sent off to a little-known research group at the US Army QuarterMaster Research and Development Center at Natick, Massachusetts. After extensive study, it was revealed this organism could produce enzymes – ones powerful enough to turn a tent into sugar.

Forty years later and after a decade of Novozymes research, powerful new enzymes developed from this original fungus are being used to make fuels and products from sources we never imagined, including the waste in your trash can.

We believe that story is a powerful example of how these new technologies can put our vision into action.

The root of the biobased manufacturing industry – and our biobased technology – is unlocking the power of renewable sources of carbon, the key ingredient in biobased products. Please forgive the scientist in me for about a minute.

As many of you know, carbon is the foundation for many of the materials in our world – from plastics to clothing, to chemicals and fuel. We can source carbon two ways: Renewable from plants and fossil from sources like oil. There are some challenges for the ways we traditionally source our carbon:

1. Fossil sources are getting more expensive and difficult to extract. They are also exposed to volatility on the global markets;
2. We export American dollars to import foreign crude – and therefore support economies abroad instead of our own; And
3. While the technology to drill, frack and mine is developing, the safety and environmental risks are omnipresent.

While humans use drilling, fracking and mining, Nature has a much simpler, efficient way: Photosynthesis.

Photosynthesis captures renewable carbon from the atmosphere and stores it in feedstocks as diverse as seaweed, algae, grasses, plants and trees. We can then use those feedstocks to make everything from fuel to diapers and paint.

As the world's demand for products grows, developing these new renewable feedstock supply chains will provide unique economic opportunities for the United States: We can grow the feedstock, make the product and ship it – all from the same community.

Our site in Senator Johanns' state is our most sophisticated enzyme manufacturing plant. Funded by $200 million in private investment, the plant is a regional and global provider of enzymes to turn biomass into biofuels.

Today we have 110 men and women working at that plant, many coming from local high schools or community college training programs. Local Nebraskans and Iowans are receiving the raw materials, making our enzymes, working in our labs and moving our product.

Like that example, our company's ambition is to see biobased manufacturing grow. That ambition has led us to make more than $500 million worth of investment across the United States.

We have more than 1,000 employees across North America, with 6,000 across the globe. Our US footprint runs from coast to coast, including locations in California, Iowa, Nebraska, South Dakota, Texas, North Carolina, Virginia and Wisconsin. Our enzyme and microbe technologies are at work in 700 products in 130 countries.

Between farmers, timber growers and trash collectors, we believe the US is the most productive producer of renewable feedstocks in the world. We also believe market-making policies like the Renewable Fuel Standard are critical to establishing these new feedstock supply chains.

These key drivers were important in our decision to invest heavily in the US – and to choose Blair, Nebraska, over China for our advanced manufacturing plant location.

Peder Holk Nielsen, our President and CEO, reiterated the importance of these drivers while attending a White House meeting with President Obama, Valerie Jarrett, Jeff Zients and CEOs of international companies in May 2014. The Administration wanted to hear from business leaders on how it could encourage more investment in the United States. Peter indicated that if policy remains stable we would be willing to invest significantly more.

Consequently, the lack of long-term support for well-thought out strategic decisions reflected in key policies, like the Farm Bill and Renewable Fuel Standard, creates tremendous uncertainty in the investment community.

Here is an example of how the future could look with policy stability: Chemtex, our partner in North Carolina – a renewable fuel company working with the swine industry – is designing an advanced renewable fuel plant. Their plan is to grow energy crops on fields currently sprayed with hog waste and convert the feedstock into fuel using our enzymes. Programs at the United States Department of Agriculture and funded in the Farm Bill, like the Biomass Crop Assistance Program, are important in establishing these new feedstock supply chains.

Congress wisely made strategic policy decisions to give the Nation more options to meet its product needs from domestic, renewable sources. This broader portfolio helps insulate America from global price shocks. It helps improve the environment. It also provides a powerful new economic growth engine for the US.

In addition to the Farm Bill, I know you are working to provide more stability with a tax credit for renewable chemical producers, helping them to commercialize and build in the United States.

But as with any new industry, there will be important lessons learned, some failures and unforeseen obstacles. It is critical the industry remains backed by Congress and their strategic decisions despite setbacks.

I want to be clear: This is not picking winners and losers. This is about making strategic decisions for the good of the country.

Every day at Novozymes across the country – from our researches in California to our plant workers in North Carolina – we are discovering and developing the critical technology and products to drive this new American industry.

Ten years ago, we could not imagine converting trash from the trash truck into fuel in an economic way. Today, you can go to Lawrenceville, Virginia, and watch the process happen.

With your support, we are confident that when we look back ten years from now, we will be amazed by what we have helped to create.

Thank you for the opportunity to testify today. I am happy to answer any questions the Committee might have. # # #

Statement of Scott Vitters
General Manager, PlantBottle Innovation Platform
The Coca-Cola Company
United States Senate Committee on Agriculture Nutrition and Forestry
United States Senate
June 17, 2014

Good morning Chairman Stabenow, Ranking Member Cochran and Members of the Committee. My name is Scott Vitters and I am the General Manager of The Coca-Cola Company's Global PlantBottle Innovation Platform. On behalf of our company's 130,000 employees and more than 700,000 system associates, it is a pleasure to be here today and have the opportunity to discuss our commitment and investment in helping to advance the renewable chemicals and bio-based manufacturing sectors here in the United States and abroad.

Inside every bottle of Coke is a story of creating new value through increasing efficiency and advancing innovation. We have a long-term vision to help realize a world in which creating and using products wastes nothing. To achieve this zero waste vision, we are designing more resource efficient packaging, supporting community recycling systems and increasing our use of renewable materials through breakthrough innovations like our PlantBottle package – the first ever fully recyclable PET plastic bottle made with plants.

Coca-Cola introduced the world to PlantBottle in 2009. The technology uses natural sugars found in plants to make ingredients identical to the fossil based ones traditionally used in polyester fiber and resins. PlantBottle packaging looks, functions and importantly recycles just like traditional polyester (or PET) plastic, but with a lower dependence on fossil fuels and a lighter environmental footprint on the planet.

Thomas Edison is quoted as saying "that the value of an idea is in the using of it." Our measure of success with PlantBottle is in advancing commercial solutions that go beyond pilot tests or niche green product uses. Our expectation is to realize the technology's full potential and deliver meaningful positive change everywhere we do business.

Our first generation PlantBottle technology has already been launched in 31 countries across more than 25 billion bottles. It has helped to reduce our dependence on fossil-based materials and remove over 190,000 metric tons of CO2 emissions - or the equivalent of more than 400,000 barrels of oil. In just four years, Coca-Cola has become the world's largest bio-plastic end user through PlantBottle and we are committed to going even further with our goal to have all new PET plastic we use contain PlantBottle technology by 2020.

Commercializing bio-based materials, and specifically our PlantBottle technology, are a material part of our Company's 2020 Vision and Roadmap for Winning. At the heart of this vision and plan is a commitment to double our business in this decade. We see a world of opportunity and growth in areas like a rising middle class. We also see a world of challenge and need in areas like population, poverty, and the growing stress on finite resources. Put those together, and it's obvious that the only way we can hope to double our business is to double it sustainably.

Packaging has a huge impact on those aspirations. Every one of the 3,500 different beverage offerings we produce, for every consumer, in every market requires some form of package. Over half of our global volume today is delivered through PET plastic beverage bottles. Behind this demand is a desire for lightweight, shatter-resistant, resealable, cost-effective and highly recyclable packaging. To continue meeting these beverage needs in the years ahead - while maintaining public trust and sustaining growth - requires moving beyond traditional fossil based materials to renewable and recyclable bio-based sources.

Coca-Cola today is partnering with companies to build manufacturing capacity for PlantBottle technology in local markets around the world. Until this supply chain is optimized locally, in most markets we pay an added cost to use PlantBottle. We view this premium as an investment – an investment in both the future competitiveness of our business and the health of the local communities we serve. As a result, we have not increased the price of our products in PlantBottle. Instead we have challenged ourselves to get the supply chain built out under the timeline we have set – or even better do it faster.

To help accelerate investment in the PlantBottle supply chain and further expand the positive sustainability impact of the technology, Coca-Cola is

rethinking traditional approaches to innovation. For example, instead of holding the technology to ourselves we are actually enabling other early adaptors to join with us on our PlantBottle journey. In fact, we even envision a future where our competitors also have ready access to the technology.

In 2011, Coca-Cola formed a strategic partnership with H.J. Heinz to produce ketchup bottles made with PlantBottle technology. In 2013, we joined forces with the Ford Motor Company to showcase a Ford Fusion plug-in hybrid with its interior fabric made from PlantBottle polyester. And just this year, we have partnered with SeaWorld Parks and Entertainment to debut the first ever refillable plastic souvenir cup made from PlantBottle technology.

I want to pause and thank leaders from both the Senate and House Agriculture Committees for the tireless work on reauthorizing the Farm Bill. Specifically we applaud the extension of eligibility to renewable chemical technologies under the Biorefinery Assistance Program and Biomass Research and Development Program, and the support for new purpose grown energy crops. These efforts are truly helping open doors to new bio-based manufacturing opportunities and jobs here in the US.

For some the growing emergence of renewable chemicals and bio-based products may raise questions regarding the sustainability of using harvested agricultural biomass. As one of the largest buyers of sugars and starches in the world I can assure that any trend with the potential of negatively impacting food and feed supplies would be of significant concern to our company.

Through transparency and credible third party partnerships we can advance breakthrough bio-based manufacturing opportunities that deliver better environmental and social performance without negatively impacting local food security. Working with the World Wildlife Fund last year we launched the BioPlastics Feedstock Alliance, a new collaboration with several other leading consumer brand companies focused on guiding the evaluation and sustainable development of plant-based feedstocks for plastics. And last year our efforts focused on advancing the use of agricultural residues for PlantBottle was selected as an official eco-partnership within the US-China Strategic and Economic Dialogue.

Ensuring the sustainability of the agricultural ingredients we source for our products is a critical area of focus for our business. Through collaborative programs like Field to Market we are working across the entire agricultural supply chain to measure and improve environmental and social performance. These measures are also helping to inform and guide the responsible use of biomass for industrial materials.

Investing in the bioeconomy is good for our business, the communities we serve and our shared environment. Today our first generation PlantBottle technology replaces one of the two ingredients that make PET plastic. Our long-term target is to realize a 100% renewable, fully recyclable plastic bottle. To realize this goal, Coca-Cola is investing millions in local technology companies – companies like Virent in Madison, Wisconsin; Gevo in Englewood, Colorado and Avantium in Amsterdam, the Netherlands. We have already demonstrated the potential for producing such bottles and are now focused on advancing commercial pathways for successfully scaling the technology.

These are truly exciting times. Thank you for allowing me to share Coca-Cola's progress here today and for your continued commitment to helping realize the transformative potential of the renewable chemical and bio-based manufacturing sector.

DOCUMENTS SUBMITTED FOR THE RECORD

JUNE 17, 2014

Benefits of SoyFoam™- Environmental Performance

(BEES Building for Environmental and Economic Sustainability – National Institute of Standards)

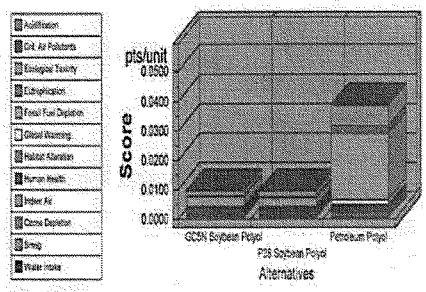
SoyFoam™ Renewable Comfort

Environmental performance of 2 soy polyols vs. petroleum polyol is shown at right.

Giving all environmental impacts equal weight, the observed environmental impact scores for the 2 soy polyols is 75% less than petroleum polyol.

Significant differences in impact were:

- Global warming - CO_2
- Smog formation (4x favorable)
- Eutrophication - PO_4, NH_4 (7x favorable)
- Ecological toxicity (4x favorable)
- Fossil fuel depletion



The difference in global warming potential is due to CO_2 being taken up (sequestered) during the soybean agriculture phase. Excerpts from the soy and petro polyol Life Cycle Inventory (LCI) show over 2 Kg of CO_2 taken out of the atmosphere per Kg of soy polyol produced vs. over 3.5 Kg of CO_2 added to the atmosphere per Kg of petro polyol produced.

SoyFoam™

Environmentally friendly seating foam with hydroxyl-functionalized soybean oil substituted for a petroleum-based ingredient. SoyFoam™ Seating meets all automotive performance requirements.

Consumer Benefits

- Environmentally Friendly
- Naturally Comfortable
- Economical: Reduced sensitivity to petroleum cost fluctuation
- Award winning technology

SoyFoam™ Renewable Comfort

Program Advantages

- Renewable Resource Derived: 5 – 15% of product weight are 100% renewable and available globally
- Reduces Carbon Use: Net reduction of 5.5 KG of CO2 for each Kg used
- Improved Material Cost Control: Base natural raw material, Soy oil, is more cost stable than petroleum
- 60% lower conversion energy is required to make the polyol
- Four times less smog formation compared to petroleum

DECS™ Dynamic Environmental Comfort System ™

Advanced Seat Comfort Using Layered/Eco-Friendly Materials

Layered design balancing consumer comfort, safety, environmental and economic needs with the best naturally engineered seating environment

Consumer Benefits

- Maximum Comfort: Designed using Lear's exclusive *ComforTec*™ process
- Economical: Reduces cost reliance on oil price fluctuation helping lower fuel cost
- Earth Friendly: Peace of mind reducing your environmental impact. Some of it is renewable and recyclable!
- Featuring SoyFoam™ *Renewable Comfort*

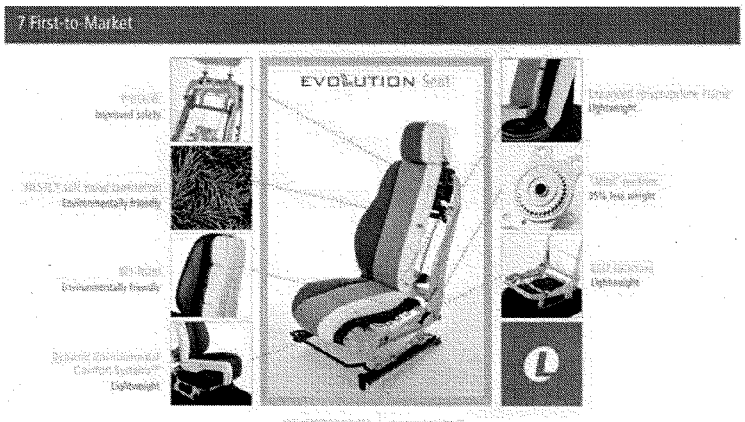
SoyFoam™

Program Advantages

- Mass Reduction: 5% to 85% lower weight compared to current comfort system designs
- Environmentally Friendly: Greener EPP life cycle vs. polyurethane foam
- End-of-Life Vehicle (ELV) compliant: Separable layers/recyclable content
- Uses SoyFoam™ 5 – 15% part mass renewable resource content
- Exclusive: Lear Corporation intellectual property profile

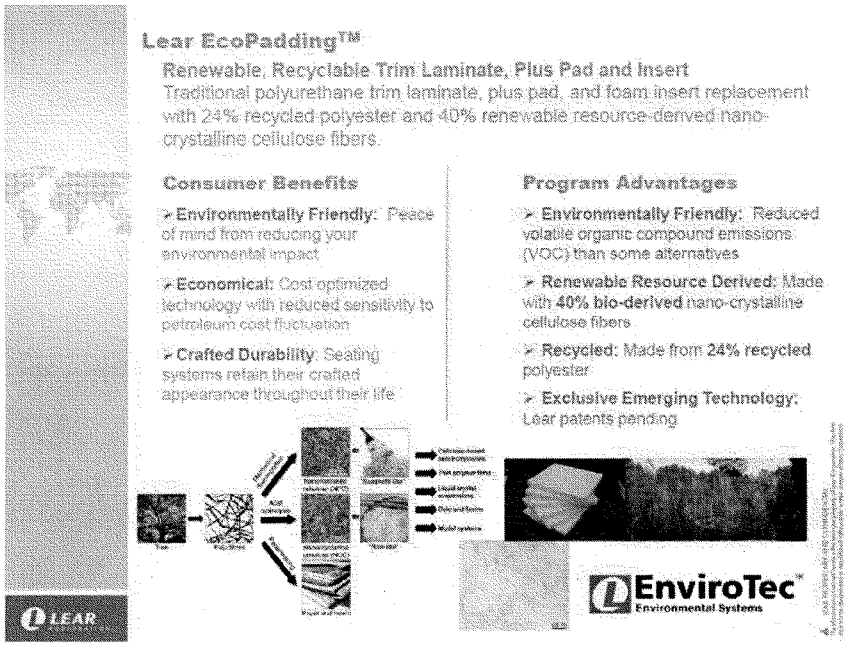
LEAR seating electrical

Lear Products Designed to Decrease Waste



Provides up to a 30% weight reduction, environmental benefits and cost savings

LEAR seating electrical

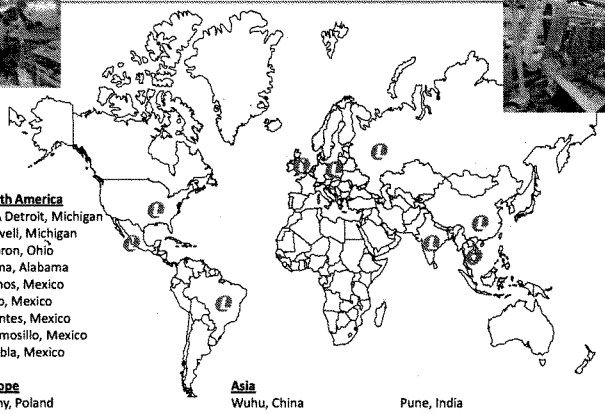


SoyFoam™/Eco-Foam™ Global Development Timeline

Year	*Soy Content by weight* TDI	TM	MDI	*Status*
2007	***5%***	-	-	**- First to market '08 Ford Mustang**
2008	5%	-	14%	**- 14% MDI for small parts (H/R, A/R) Ford, Chrysler, GM approved**
2010	5%	-	14%	**- 5% Hyundai seating and Ford Explorer/Fusion/Lincoln/Taurus**
2011	5%	-	***15%***	**- 15% MDI Head Restraints – Ford (Fusion/Lincoln) , GM**
2013	***10%***	-	15%	**- 10% TDI material approved NA Tier 1**
2014	20 %	5%	40%	**- SoyFoam™ & Eco-Foam™ global target**

Global Environmental Commitment

Lear Global Foam Plants



North America
IMA Detroit, Michigan
Farwell, Michigan
Hebron, Ohio
Selma, Alabama
Ramos, Mexico
Silao, Mexico
Fuentes, Mexico
Hermosillo, Mexico
Puebla, Mexico

Europe
Tychy, Poland
Sunderland, England
Kaluga, Russia

South America
Gravatai, Brazil
Cacapava, Brazil

Asia
Wuhu, China
Chongqing, China
Shenyang, China
Changchun, China
Beijing, China
Nanchang, China
Klang & Behrang, Malaysia
Pune, India
Nashik, India
Chennai, India

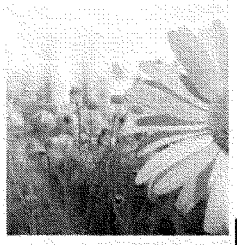
25 Facilities in 9 Countries

Global Diversified Customer Base

Lear Content on Over 300 Vehicle Models Worldwide

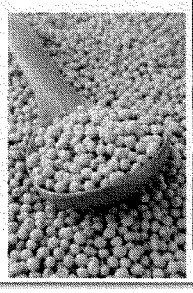
Product – Lear SoyFoam™

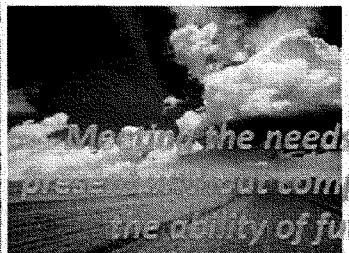
What Does Sustainability Mean at Lear?



Environmental Sustainability

Sustainability is widely defined as "meeting the needs of the present without compromising the ability of future generations to meet their own needs." At Lear, this means acknowledging that our decisions about what we consume, produce and waste has environmental and social impacts on today's society as well as on future generations. Lear Corporation's sustainability journey centers around finding better and smarter ways of doing things, with the objective of being stewards of the earth while ensuring the health and vitality of our communities.



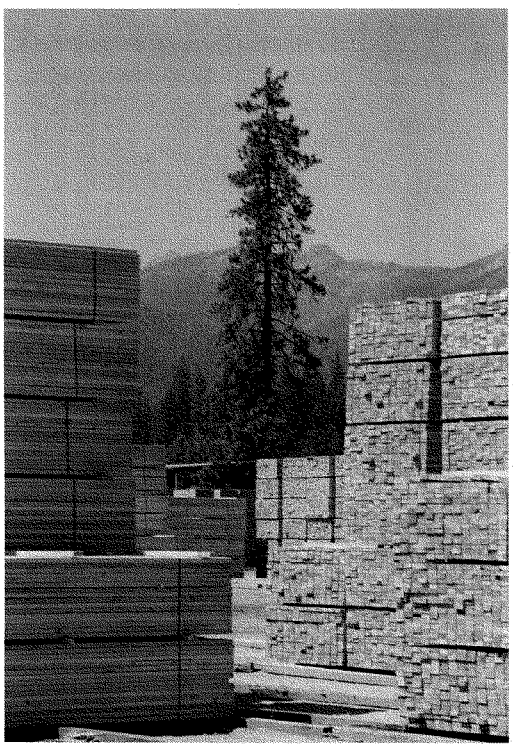


Meeting the needs of the present without compromising the ability of future generations to meet theirs.

ENVIRONMENTAL PRODUCT DECLARATION

NORTH AMERICAN SOFTWOOD LUMBER

AMERICAN WOOD COUNCIL
CANADIAN WOOD COUNCIL



The American Wood Council (AWC) and the Canadian Wood Council (CWC) are pleased to present this Environmental Product Declaration (EPD) for North American softwood lumber. This EPD was developed in compliance with ISO 14025 and ISO 21930 and has been verified under UL Environment's EPD program.

The EPD includes Life Cycle Assessment (LCA) results for all processes up to the point that planed and dry lumber is packaged and ready for shipment at the manufacturing gate; the cradle-to-gate product system includes forest management, logging, transportation of logs to lumber mills, sawing, kiln-drying, and planing.

The AWC and CWC represent wood product manufacturers across North America. Our organizations have undertaken numerous sustainability initiatives on behalf of our membership and we are pleased to present this document to show how we are doing. The publication of this EPD, which is based on rigorous LCA research, is our effort to back up with science what we know to be true – that wood products stand alone as a green building material.

Please follow our sustainability initiatives at:
www.awc.org and **www.cwc.ca**

CERTIFIED
ENVIRONMENTAL PRODUCT DECLARATION

AMERICAN WOOD COUNCIL | Canadian Wood Council | Conseil canadien du bois

North American Softwood Lumber
North American Structural and Architectural Wood Products

According to ISO 14025 and ISO 21930

This declaration is an environmental product declaration in accordance with ISO 14025 that describes environmental characteristics of the described product and provides transparency and disclosure of the impacts caused by the product life cycle. This EPD does not guarantee that any performance benchmarks, including environmental performance benchmarks, are met. EPDs are intended to compliment Type I environmental performance labels.

PROGRAM OPERATOR	UL Environment
DECLARATION HOLDER	American Wood Council and Canadian Wood Council
DECLARATION NUMBER	13CA24184.102.1
DECLARED PRODUCT	North American Softwood Lumber
REFERENCE PCR	FPInnovations: 2011. Product Category Rules (PCR) for preparing an Environmental Product Declaration for North American Structural and Architectural Wood Products, Version 1 (UN CPC 31, NAICS 321), November 8, 2011.

DATE OF ISSUE	April 16, 2013
PERIOD OF VALIDITY	5 years

CONTENTS OF THE DECLARATION	Product definition and information about building physics Information about basic material and the material's origin Description of the product's manufacture Indication of product processing Information about the in-use conditions Life cycle assessment results Testing results and verifications

The PCR review was conducted by:	FPInnovation
	PCR confirmed by PCR Review Panel
	570 Saint-Jean Blvd. Pointe-Claire, QC Canada H9R 3J9 T 514 630-4100 info@fpinnovations.ca
This declaration was independently verified by Underwriters Laboratories in accordance with ISO 14025 ☐ INTERNAL ☒ EXTERNAL	Loretta Tam, EPD Program Manager
This life cycle assessment was independently verified by in accordance with ISO 14044 and the reference PCR	Thomas P. Gloria, Ph. D., Industrial Ecology Consultants

AMERICAN WOOD COUNCIL Canadian Wood Council Conseil canadien du bois

North American Softwood Lumber
North American Structural and Architectural Wood Products

According to ISO 14025 and ISO 21930

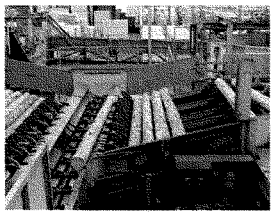
Description of Industry and Product

Description of North American Lumber Industry

The North American forest product industry is a major contributor to both the American and Canadian economies. Sawmills and wood preservation facilities directly employ more than 130,000 workers across North America and countless others in supporting industries. Many of these jobs are rurally located and are the primary driver of local economies.

The North American lumber industry has weathered unprecedented economic changes in recent years through innovation and expansion into new and emerging markets. Efficiency improvements, beyond simply ensuring competitiveness, continually improve the environmental footprint of wood products. Now, more than ever, we are ready to present this EPD that reflects years of research and demonstrates the hard work we've been doing.






AMERICAN WOOD COUNCIL | Canadian Wood Council | Conseil canadien du bois

North American Softwood Lumber
North American Structural and Architectural Wood Products

According to ISO 14025 and ISO 21930

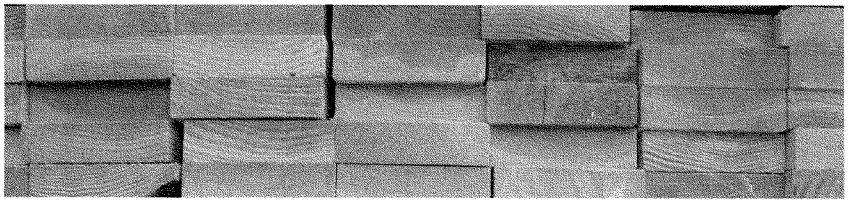
Description of Lumber Product

The product profile presented in this EPD is for a declared unit of 1 cubic meter (0.63 mbfm) of kiln-dried and planed dimension softwood lumber. Softwood lumber is available in a range of "nominal dimensions", the most common being 2 inches thick by 4 inches wide (2x4) and 2 inches thick by 6 inches wide (2x6), which account for roughly 75% of dimension lumber production in North America. The use of nominal dimensions for lumber is a long-held convention in the industry and describes the size of lumber prior to kiln-drying and planing. The actual dimensions of planed, dry lumber reflect the shrinkage of green lumber in kiln-drying and the material removed during planing, which means that a nominal dimension 2x4 is actually 1.5 inches thick by 3.5 inches wide. The range of nominal and actual dimensions for North American softwood lumber is shown Table 1. Each of these lumber sizes are available in a variety of lengths, the most common lumber product is used as framing studs between 8 and 12 feet.

This EPD is based on an LCA that considered the entire range of softwood lumber sizes and is weighted towards 2x4 and 2x6, which comprise the bulk of production. The results are presented for the metric unit of measure for lumber, 1 cubic meter. This corresponds to 630 board feet (0.63 mbfm), which is a common imperial unit of measure that is widely used in the industry.

Table 1. North American Kiln-dried, Planed Softwood Dimensional Lumber Sizes

Nominal (in)	Actual (in)	Actual (mm)
1 × 2	3/4 × 1 1/2	19 × 38
1 × 3	3/4 × 2 1/2	19 × 64
1 × 4	3/4 × 3 1/2	19 × 89
1 × 6	3/4 × 5 1/2	19 × 140
1 × 8	3/4 × 7 1/4	19 × 184
1 × 10	3/4 × 9 1/4	19 × 235
1 × 12	3/4 × 11 1/4	19 × 286
2 × 2	1 1/2 × 1 1/2	38 × 38
2 × 3	1 1/2 × 2 1/2	38 × 64
2 × 4	1 1/2 × 3 1/2	38 × 89
2 × 6	1 1/2 × 5 1/2	38 × 140
2 × 8	1 1/2 × 7 1/4	38 × 184
2 × 10	1 1/2 × 9 1/4	38 × 235
2 × 12	1 1/2 × 11 1/4	38 × 286
4 × 4	3 1/2 × 3 1/2	89 × 89
4 × 6	3 1/2 × 5 1/2	89 × 140
6 × 6	5 1/2 × 5 1/2	140 × 140
8 × 8	7 1/4 × 7 1/4	184 × 184



Cradle-to-Gate Life Cycle of Softwood Lumber

Business-to-Business EPD and Cradle-to-Gate LCA

Business-to-business EPD's are those that focus on the life cycle up to the point that the product has been manufactured and is ready for shipment, the portion of the life cycle referred to as cradle-to-gate. This EPD includes the cradle-to-gate processes as shown in Figure 1.

The delivery of the product to the customer, its use, and eventual end-of-life processing are excluded from the cradle-to-gate portion of the life cycle. This exclusion limits the accounting of carbon sequestration in the wood product because the benefit of sequestration is not realized at the point of manufacturing, but occurs over the life cycle of the product.

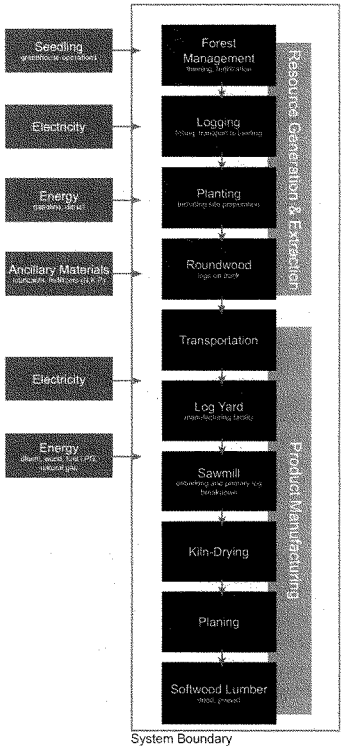
Forest Operations

The assessment of the life cycle impacts of a wood product begins with its origin in natural or managed forests and the energy use and emissions caused by its extraction. Forest management and the reforestation that occurs after extraction are also included. The PCR requires that the cradle-to-gate product system includes all forest management activities which may include site preparation, thinning, and fertilization. The forest operations portion of the resource extraction/generation phase also includes the production and planting of seedlings that occurs after logging.

Lumber Production

The lumber production phase begins with the transportation of logs to the sawmill and includes the unit processes of sawing, kiln-drying, and planing. These processes consume electricity drawn from regional grids, fossil fuel, and internally generated biomass (primarily for kiln-drying).

Figure 1: Cradle-to-gate product system for kiln-dried, planed softwood lumber



Methodology of Underlying LCA

Declared Unit

The declared unit in this EPD is 1 cubic meter (m^3) of planed, kiln-dried softwood lumber. This is equivalent to 630 board feet (0.63 mbfm). The average density of North American softwood lumber is 433.57 oven dry kg/m^3. Kiln-dry lumber produced in North America is understood to have some moisture in the product, while the oven dry unit of measure contains neither free moisture (moisture in cell cavities) nor bound moisture (moisture in cell walls).

System Boundaries

The system boundary begins with forest management and resource extraction and ends with planed dry lumber ready for shipment at the manufacturer. The forest resources system boundary includes planting the seedlings, site preparation, thinning, fertilization and final harvest. Lumber manufacturing includes the transportation of logs, rough milling, drying, and planing. Seedlings and the fertilizer and electricity it took to grow them were also considered in the system boundary.

Cut-off Rules

The cut-off criteria for flows to be considered within the system boundary are as follows:

- Mass – if a flow is less than 1% of the cumulative mass of the model flows it may be excluded, provided its environmental relevance is minor.
- Energy – if a flow is less than 1% of the cumulative energy of the system model it may be excluded, provided its environmental relevance is minor.
- Environmental relevance – if a flow meets the above two criteria, but is determined (via secondary data analysis) to contribute 2% or more to the selected impact categories of the products underlying the EPD, based on a sensitivity analysis, it is included within the system boundary.

Data Quality

Precision and Completeness

Primary data on raw materials, energy, and emissions were provided by logging operations and lumber milling facilities, based on input purchases, production output, and reported process emissions. All upstream and downstream secondary data was drawn from publicly available databases, primarily the United States Life Cycle Inventory (USLCI) database. The LCA practitioners performed quality control on all secondary data sources to ensure completeness.

All inventory flows were modeled and at no time were data excluded due to application of the studies' cut-off criteria.

Consistency and Reproducibility

To ensure consistency, only primary data as provided by the study participants were used to model gate-to-gate lumber manufacturing processes. All other secondary data (upstream and downstream) were consistently applied and adaptations to the databases were documented in the LCA reports.

Reproducibility by third parties is possible using the background LCIs documented in the CORRIM and Athena LCA reports.

Temporal Coverage

Primary data collected from the manufacturing facilities related to the product processes of interest are representative for the years 2004-2009. The underlying LCA models were updated in 2012 to reflect updates in underlying secondary data used to develop the LCI.

Geographical Coverage

The geographical coverage for this study is based on North American (NA) system boundaries for all processes and products.

Treatment of Biogenic Carbon

Biogenic carbon dioxide emissions were accounted as global warming neutral in accordance with the PCR. Under this approach, the carbon dioxide emissions from the combustion of internally generated wood fuels are considered equal to the carbon dioxide uptake in the forest during tree growth.

Crediting carbon sequestration against the global warming potential was excluded as the long term carbon storage is dependant on gate-to-grave processes not considered directly in this EPD. The expected carbon sequestration for average end-use and end-of-life treatment is provided in the section on "Additional Information".

Allocation

Allocation followed the requirements and guidance of ISO 14044:2006, clause 4.3.4, which gives preference to mass based allocation, and the following description of allocation from the PCR:

- Allocation of multi-output processes shall be based on mass. However, if economic value difference is at least ten times greater between products from a multi-output process, a suitable revenue based allocation principle shall be applied and these deviations shall be substantiated and readily available for review.

The lumber co-products fall within this 10 times value threshold and were thus allocated on a mass basis.

Aggregation of Regional Results

The LCA results that follow represent the weighted average of five different LCA studies; one for each of the American manufacturing regions and one Canadian average study. The five regions and their weighting relative to the aggregate profile are as follows:

- United States - Pacific Northwest: 17%
- United States - Southeast: 30%
- United States - Inland Northwest: 11%
- United States - Northeast/North Central: 3%
- Canada - National Average: 39%

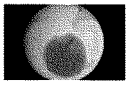
The weighting factors were developed from the relative annual production of the five manufacturing regions. The United States regional weights are based on the production totals for the years 2001-2009 which is representative of the data vintage that underlies those four studies. The Canadian weight is based on the 2010 production year to represent the more recent data that was used in that study. The selection of 2010 for the Canadian weighting is also conservative because North American lumber production was lower in that year than in the preceding years. This means that the potential Canadian impacts, which are generally lower than those of the American regions, is weighted less than if the same production years were selected for all weight derivations.

In addition to calculating weighted average impact assessment results, these weighting factors were also used to calculate the weighted average density of North American softwood lumber. All other values presented in this EPD also utilize this weighting.

Life Cycle Assessment Results

The life cycle impact assessment (LCIA) establishes links between the life cycle inventory results and potential environmental impacts. In the LCIA, results are calculated for impact category indicators such as global warming potential and smog potential. These impact category indicator results provide general, but quantifiable, indications of potential environmental impacts. The various impact category indicators and means of characterizing the impacts are summarized in the table below. Environmental impacts are determined using the TRACI 2 method. These five impact categories are reported consistently with the requirements of the PCR.

Table 2: Impact Assessment Categories

Impact Category Indicators	Characterization Model
Global Warming Potential 	Calculates global warming potential of all greenhouse gasses that are recognized by the IPCC. The characterization model scales substances that include methane and nitrous oxide to the common unit of kg CO_2 equivalents.
Ozone Depletion Potential 	Calculates potential impact of all substances that contribute to stratospheric ozone depletion. The characterization model scales substances that include CFC's, HCFC's, chlorine, and bromine to the common unit of kg CFC-11 equivalents.
Acidification Potential 	Calculates potential impacts of all substances that contribute to terrestrial acidification potential. The characterization model scales substances that include sulfur oxides, nitrogen oxides, and ammonia to the common unit of H^+ moles equivalents.
Smog Potential 	Calculates potential impacts of all substances that contribute to photochemical smog potential. The characterization model scales substances that include nitrogen oxides and volatile organic compounds to the common unit of kg O_3 equivalents.
Eutrophication Potential 	Calculates potential impacts of all substances that contribute to eutrophication potential. The characterization model scales substances that include nitrates and phosphates to the common unit of kg N equivalents.

Cradle-to-Gate Impact Assessment Results

The impact assessment results are shown in Table 3. This LCIA does not make value judgments about the impact indicators, meaning that no single indicator is given more or less value than any of the others. All are presented as equals. Additionally, each impact indicator value is stated in units that are not comparable to others. Some variations exist between the five underlying data sets and are a result of differences in regional energy mixes, particularly the sources of electricity, as well as differences in production practices and efficiencies.

The results presented indicate the potential impacts caused by the cradle-to-gate production of softwood lumber. Ozone depletion was below 10^{-5} kg CFC-11 eq. in all five of the LCA studies and is thus not reported in the results table. Water consumption was estimated for Canada as required by the PCR. However, the U.S. regional estimates include all water withdrawals without netting out non-consumptive use. As a result, the combined weighted average overstates total water consumption and is therefore conservative.

Table 3. Cradle-to-Gate Impact Assessment Results – The North American Softwood Lumber

Impact category indicator	**Unit**	**Total**	**Forestry operations**	**Lumber production**
Global warming potential	kg CO_2 eq.	72.64	10.56	62.09
Acidification potential	H+ moles eq.	42.25	5.43	36.82
Eutrophication potential	kg N eq.	0.0326	0.0123	0.0203
Ozone depletion potential	kg CFC-11 eq.	0.0000	0.0000	0.0000
Smog potential	kg O_3 eq.	14.51	2.84	11.67
Total primary energy consumption	**Unit**	**Total**	**Forestry operations**	**Lumber production**
Non-renewable fossil	MJ	1113.01	156.99	956.02
Non-renewable nuclear	MJ	114.48	1.60	112.88
Renewable, biomass	MJ	1578.86	0.00	1578.86
Renewable, other	MJ	60.60	0.27	60.33
Material resources consumption	**Unit**	**Total**	**Forestry operations**	**Lumber production**
Non-renewable materials	kg	0.11	0.00	0.11
Renewable materials	kg	468.11	0.00	468.11
Fresh water	L	90.02	8.61	81.41
Non-hazardous waste generated	**Unit**	**Total**	**Forestry operations**	**Lumber production**
Solid waste	kg	14.99	0.10	14.89

Impact Assessment Results By Life Stage

The two graphs below show that the lumber manufacturing itself is the primary driver of impacts in the cumulative cradle-to-gate product system. Lumber manufacturing consumes 86% of fossil fuels and 100% of biomass energy, which drive the impacts in every category.

Figure 2: Cradle-to-Gate Impact Assessment Results

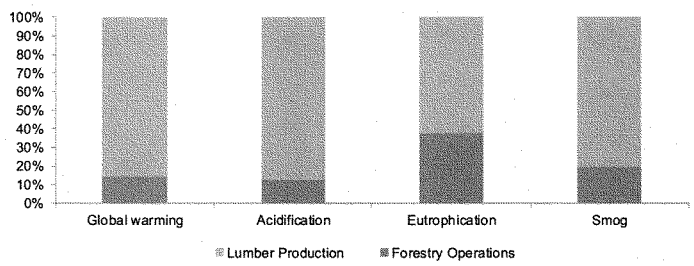


Figure 3: Cradle-to-Gate Primary Energy Consumption

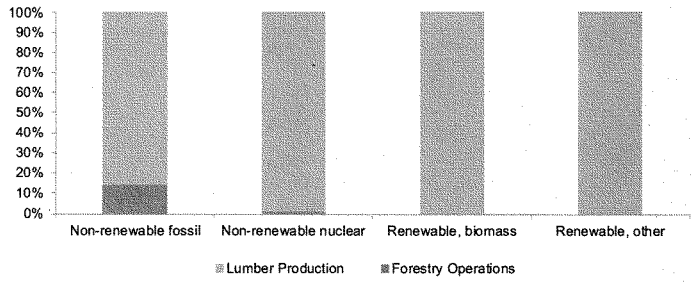


Figure 4: Cradle-to-Gate Energy Use

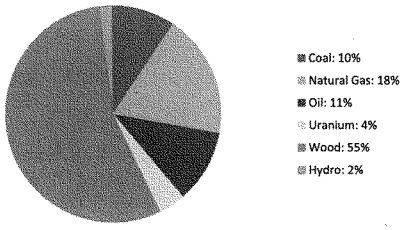


Figure 5: Forestry Operations Energy

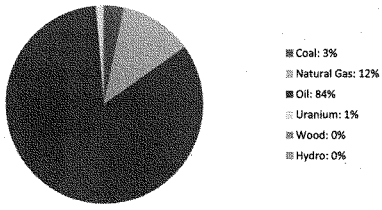
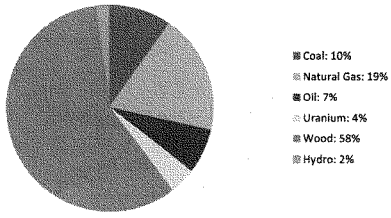


Figure 6: Lumber Production Energy Use



Primary Energy Consumption by Resource

The three pie charts show the consumption of various energy resources in the cradle-to-gate portion of the life cycle. The cradle-to-gate and lumber production charts show similar results as manufacturing consumes the bulk of cradle-to-gate energy.

The forest operations portion of the life cycle relies heavily on oil-based energy as consumed in the form of diesel by heavy machinery. Oil accounts for 84% of energy resources consumed in forestry operations.

More than half of the energy requirement in manufacturing is met by renewable energy sources, 58% from biomass and 2% from hydro power. This translates to 55% of cradle-to-gate energy use for biomass and 2% for hydro power. The biomass consumption is used exclusively in the kiln-drying process while the hydro energy use is due to electricity that is consumed throughout the cradle-to-gate product system. . Coal, natural gas, oil, and nuclear comprise the remaining energy use.

The prevalence of renewable energy use in the life cycle of softwood lumber means that only 39% of energy consumption is derived from fossil fuel sources. This means that lumber has a particularly low carbon footprint relative to the energy required for lumber manufacturing.

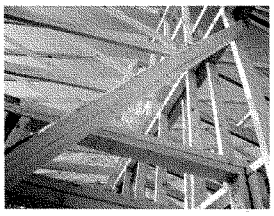
Additional Information

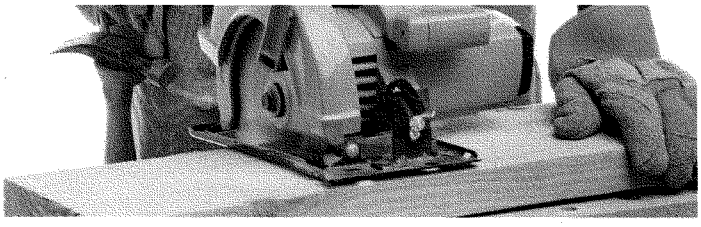
Range of Applications

Softwood lumber is a versatile product that is used in a variety of applications. Lumber is most commonly associated with the construction and renovation of single family homes. It is no surprise that commercial and residential construction consumes the greatest share of softwood lumber relative to other uses.

The following lists the breakdown of lumber end uses in North America:

- New single family residential construction: 33%
- Residential upkeep and improvement: 25%
- New non-residential construction: 8%
- Manufacturing furniture and other products: 34%



Carbon Sequestration

The PCR requires that carbon sequestration may only be credited to the product if the end-of-life fate of that carbon is considered in the LCA study. FPInnovations has recently published a carbon sequestration calculation tool that estimates the emissions from typical end-of-life treatment of wood products that includes recycling, combustion, and landfilling. The carbon sequestered in the product at the manufacturing gate serves as the basis for such an analysis and is as follows (all conversion factors and assumptions are documented in carbon tool):

$1m^3$ Softwood Lumber = 433.57 oven dry kg = 216.78 kg Carbon = 794.88 kg CO_2 eq.

This initial carbon sequestration may then be considered against its emission as the lumber product reaches the end of its service life in various applications. The FPI carbon tool is used to estimate the biogenic carbon balance at year 100, including service life estimations for various applications and the average landfill decay rate. The carbon tool gives the following results:

Carbon sequestered in product at manufacturing gate:
794.88 kg CO_2 eq. = -794.88 kg CO_2 eq. emission

Methane emitted from fugitive landfill gas:
3.22 kg CH_4 = 80.44 kg CO_2 eq. emission

Carbon dioxide emitted from fugitive landfill gas and the combustion of waste and captured landfill gas:
231.39 kg CO_2 eq. emission

Carbon sequestration at year 100, net of biogenic carbon emissions:
483.05 kg CO_2 eq. = -483.05 kg CO_2 eq. emission

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Athena Institute: 2012. A Cradle-to-Gate Life Cycle Assessment of Canadian Softwood Lumber

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CORRIM:2012. Cradle to Gate Life Cycle Assessment of Softwood Lumber Production from the Southeast

CORRIM:2012. Cradle to Gate Life Cycle Assessment of Softwood Lumber Production from the Inland Northwest

CORRIM:2012. Cradle to Gate Life Cycle Assessment of Softwood Lumber Production from the Northeast/North Central

FPInnovations: 2011. Product Category Rules (PCR) for preparing an Environmental Product Declaration (EPD) for North American Structural and Architectural Wood Products, Version 1 (UN CPC 31, NAICS 321), November 8, 2011. http://www.forintek.ca/public/pdf/Public_Information/EPD%20Program/PCR%20November%208%20 2011%20Final.pdf

FPInnovations and Athena Institute: 2013. Business-to-Business (B2B) Carbon Sequestration Tool for Wood EPD's as per PCR for North American Structural and Architectural Wood Products, Version 1.

ISO 14025:2006. Environmental Labels and Declarations – Type III Environmental Declarations – Principles and Procedures.

ISO 14040:2006. Environmental Management – Life Cycle Assessment – Principles and Framework.

ISO 14044:2006. Environmental Management – Life Cycle Assessment – Requirements and guidelines.

ISO 21930:2007 – Building and Construction Assets – Sustainability in building construction – Environmental declaration of building products.

TRACI: Tool for the Reduction and Assessment of Chemical and other environmental Impacts: http://www.epa.gov/ORD/NRMRL/std/sab/traci/

USLCI Database: http://www.nrel.gov/lci

QUESTIONS AND ANSWERS

JUNE 17, 2014

Senate Committee on Agriculture, Nutrition & Forestry
Grow it Here, Make it Here: Creating Jobs through Bio Based Manufacturing
Tuesday, June 17, 2014
Questions for the record
Mr. Ashford A. Galbreath

Chairwoman Debbie Stabenow

1. **Mr. Galbreath, when we first met a few years back, you spoke about how Lear was expanding into multiple North American Ford and other customer vehicles, with increasing levels of soy-based foam. How has Lear's SoyFoam market grown since then?**

Since the 2007 Ford Mustang launch Lear Corporation's use of SoyFoam grew from one vehicle line to fourteen and our volume use of soybean oil-derived polyol has increased more than 1,200 %. We are also now launching higher percentage SoyFoam and have authorization to convert 100% of the programs for another major NA customer this year.

Describe some of the barriers Lear has faced in expanding to more vehicles and applications.

As we expanded the use of SoyFoam beyond the initial launch of the Mustang Lear faced resistance to change from other customers. Early on we were challenged by the residual belief that Soy-derived product couldn't meet the strict automotive requirements and had excessive odor or poor cure. In the automotive supply industry we employ field use representative testing to prove new product meets strict performance requirements for flammability, staining, odor, fogging, volatile organic emissions, durability and other key criteria. We also use design and process control plans to ensure these acceptance requirements are repeatable and maintained over the life of the product. Customer compliance and reliability concerns were resolved by participating with our new potential customers in a validation process including multi-sample testing to their specific requirements with their unique test methodology identifying specifically how the product differed and what controls we had in place to prevent any deviation.

Aided by this confirmation data and the positive field performance history of the Ford Mustang SoyFoam we acquired additional material approvals. Our commercial teams also worked to ensure the material supply would be reliable and cost competitive. Although availability of the specific grade of soy polyol we needed was limited we were able to overcome concerns by showing our product could be made with more than one of the commercially available soy-derived raw materials. Three companies had a soy-derived polyol they were selling to furniture and construction foams and had new grades targeting our specific seating foam application. Having multiple sources of the raw material available was critical to further approvals. The potential for negative impact on the food supply also concerned some of our potential customers, especially the Asian transplants since soybean oil was a diet staple. We campaigned with the help of the United Soybean Board Checkoff to educate our customers as to the prolific global availability of the bio-derived oil since protein is extracted as the most valuable soy feedstock with oil a large volume byproduct.

Once key North American customers such as Ford and Hyundai ramped up their advertisement of their use of bio-based seating foam we began to see these objections disappear as the value of conversion now included matching competitive desirable environmentally friendly features. This shift in the value of bio-derived automotive interior content coincided with a growth in global consumer environmentalism, customer demand for green product to help meet new government

regulations, promise of better cost stability than petroleum-derived raw materials and the need to compete with companies that already had a green head start.

Have you had difficulties expanding the technology to auto-markets outside of North America?

Yes. Various issues challenged our growth of Soyfoam use in Europe and Asian Markets. Outside of North America limited locally available soy-polyol constrained our growth. Shipping soy-polyol or soy oil for conversion to polyol was considered but concerns of cost, consistent availability and genetically modified soybeans as a derivative of the product intervened. European Commission REACH new chemical compound approval requirements led to other cost and timing hurdles and in Asian countries the food vs. fuel (or in this case "bio-derived chemicals vs. food") was communicated as a customer concern. They feared consumer reprisals for limiting supply causing cooking oil price increases.

Today as we begin our marketing effort in Europe we have suppliers with REACH approval, a lessening of GMO-derived objections and customers with global programs wanting to match SoyFoam content from their North American competitors. The European Commission added End-of-Life Vehicle Directive 2000/53/EC and carbon use reduction regulation that is favorable to the use of bio-based product adding more favorable momentum to conversion. We now see increased interest by our European customers in bio-derived automotive seating and have accelerated our related formula development. One of our key suppliers attained REACH authorization and we are now working to predict sales volumes so they can invest appropriately in manufacturing facilities or partnerships in Europe to provide us soy-polyol.

2. **Some people have questioned the safety of replacing traditional petroleum-based foams or plastics with biobased products, yet often biobased products are found to be equivalent or even better performing than the traditional petroleum-based products. What have you seen in your tests at Lear in this regard?**

Lear's experience has shown no evidence of any safety concerns and that we can readily achieve functional equivalence in our finished product using soy-polyol as proven by production-scale trials and testing for performance in key product compliance areas including flammability, odor, volatile emission levels, compression-set resistance, durability and manufacturability. Our plant operators expressed easier mold removal and a better "hand feel" or softness compared to other petroleum polyol-based foams. Unique vibration control characteristics have led us to explore other unique automotive applications previously not considered.

Senator Tom Harkin

1) **In recent years, the Administration has created four manufacturing innovation centers as part of its National Network for Manufacturing Innovation. These centers, which are public private partnerships, will help to accelerate the development and adoption of cutting-edge manufacturing technologies. Given the application of biomanufacturing, I believe that it makes tremendous sense to establish a manufacturing innovation hub focused on biomanufacturing. The administration's FY2015 USDA budget in fact proposes the creation of such a center. What I'd like to know is whether or not the companies at this table believe that there would be value in a biomanufacturing innovation hub?**

Yes we believe there would be value in such a facility to support the development and scale up of these materials and their manufacturing processes. This additional funding and technical

support should speed up the growth and availability of bio-derived materials to Lear frequently limited by the requirement for private funding despite unproven growth.

Would your companies want to participate in a center like this?

Lear is interested in evaluating the specific centers and in understanding their potential to support our various research and development initiatives. We can participate where it makes sense to help us improve the level of technical input and potential for commercial success. The collaborative environment we have seen described at these centers is a proven means of success for innovation at Lear and we look forward to this opportunity.

2) **Each of your companies are doing incredibly innovative things with the creation of new bio-based products. Where do you see the bio-manufacturing industry heading in the coming years and what are the major challenges facing the industry that you think the federal government can help overcome?**

We see the trend of increased use of bio-derived chemicals in automotive interior parts continuing compelled by the potential cost control, consumer positive marketing impact, regulatory compliance support and industry wide sustainability focus. Major challenges will continue in the effort to attain adequate private and financial institution funding for research & development, scale-up pilots, manufacturing and logistics corporate investment. I believe growth potential is better with availability of additional federal government funding. Any consumer use incentives may also assist in expediting growth in this area of technology. Globalizing the end use and conversion of products grown in the United States for sales in Europe and Asian markets by shipping finished product or asking companies in those regions to process US agricultural products to meet our needs may face locally grown agricultural competition that can be offset with appropriate federal government support.

Senate Committee on Agriculture, Nutrition & Forestry
Grow it Here, Make it Here: Creating Jobs through Bio Based Manufacturing
Tuesday, June 17, 2014
Questions for the record
Mr. J.D. Hankins II

Chairwoman Debbie Stabenow

1. Mr. Hankins, you have overseen the expansion of your company over the years not only in terms of production, but also in terms of the technologies you are using to process timber. Companies like yours play a crucial role in supplying the raw materials that will help grow the biobased economy, but it is important that this is done in a way that helps conserve our natural resources for future generations. Hankins has recently received certification from the Sustainable Forestry Initiative, which ensures that your timber is coming from well-managed lands.

    a. How do you see a growing biobased manufacturing sector impacting supply-side companies like Hankins as far as creating jobs and growing local economies? Have you seen any impacts tied to this already at Hankins?

    What we've seen in the marketplace is that consumers want more information about the products they're purchasing. This consumer desire for more information is part of the reason we work with the Sustainable Forestry Initiative so we have an actual label that assures our customers of the responsible sourcing we use for our raw materials. Without this label, consumers could choose to source elsewhere.

    We believe the same dynamic exists with the BioBased label. Not having this label in the future could be seen as a negative in the eyes of the consumer, and they could turn to other sources for their lumber and building products. Changes in demand for our product could certainly lead to changes in the number of employees our business could sustain. In rural communities with very few employment opportunities, a decrease or increase in our ability to support employees can have a significant impact on the local economy.

    We are committed to growing our business and continuing to support our local, rural economy. The BioBased label is one more way for Hankins Inc. and the rest of the forest products industry to ensure that happens.

    b. Could you address your recent Sustainable Forestry Initiative certification and how we can ensure that we have sustainable supplies of timber and other feedstocks for future generations?

The lumber industry has a long history of being "green" and we like to say that Southern Yellow Pine was the original green building product. If our forest stands are managed correctly, Southern Yellow Pine is a truly renewable resource that will be available to our children, grandchildren and great-grandchildren. Our products will be available for generations to come.

The Sustainable Forestry Initiative (SFI) is an independent, nonprofit organization dedicated to promoting sustainable forest management. The group brings together local communities, conservation groups, landowners and others to the table in their certification process. A multitude of factors are considered in the SFI standard, including water protection, biodiversity, and wildlife habitat. Less than 10 percent of the world's forests are currently certified, which makes certification in our part of the world even more important.

Our family business depends on a reliable source of Southern Yellow Pine and those of us in rural Mississippi depend on forestland for hunting, camping and our overall quality of life. Being a part of the SFI program is a responsible way to let our customers know what is important to us at Hankins Inc.

2. In your testimony, you describe how your company has been dedicated to innovation and adopting new technologies. What, if any, plans do you have for implementing additional innovations and technologies in your operation in the future? What impact do you think these new technologies will have on your business?

   One of our next projects will be to replace one of our dry kiln burners that is already 25 years old. This new burner will be controlled by a central computer system, which will further streamline our current system.

   One of the key benefits of the new dry kiln burner will be a cleaner and more efficient burning of our sawdust byproduct. This upgrade will make us more energy efficient and environmentally friendly. The new system will also increase our drying capacity by approximately 6%, which will lead to more hours and wages for our current employees. While improvements to our mill temporarily provide construction jobs, we do not expect an increase or decrease in total employment numbers for our mill.

<u>Senator Tom Harkin</u>

1) In recent years, the Administration has created four manufacturing innovation centers as part of its National Network for Manufacturing Innovation. These centers, which are public private partnerships, will help to accelerate the development and adoption of cutting-edge manufacturing technologies. Given the application of biomanufacturing, I believe that it makes tremendous sense to establish a manufacturing innovation hub focused on

biomanufacturing. The administration's FY2015 USDA budget in fact proposes the creation of such a center.

What I'd like to know is whether or not the companies at this table believe that there would be value in a biomanufacturing innovation hub? Would your companies want to participate in a center like this?

We certainly believe there is room for innovation in our industry, and we've seen academic institutions such as Mississippi State University and the University of Georgia do tremendous work to further the forest products industry. If others would like to come to the table to assist with these innovations, the industry could make additional strides beyond those described in my written testimony.

However, I would be remiss if I did not mention my concern that this type of endeavor would not likely benefit the forest products industry. As an industry, we have had to fight simply for the ability to be labeled as a BioBased product – despite the renewable nature of our products and the transformation the industry has undergone to incorporate technologies to reduce waste and energy usage. Looking at the current plans for the National Network for Manufacturing Innovation, there is no mention of the forest products industry, and when the term "bio" is used, it is associated with pharmaceuticals and chemicals.

Again, we welcome opportunities for innovation in our industry, but it is not yet clear how the National Network for Manufacturing Innovation would fit into ongoing forest products efforts, or if its mission would encompass our industry.

2) Each of your companies are doing incredibly innovative things with the creation of new bio-based products. Where do you see the bio-manufacturing industry heading in the coming years and what are the major challenges facing the industry that you think the federal government can help overcome?

As mentioned in my previous answer, one of the biggest obstacles we have faced is simple recognition that forest products can, in fact, be a BioBased product and should be allowed to be labeled as such under the BioBased label. Thanks to the tireless work of the Agriculture Committee during the 2014 Farm Bill, we are hopeful this oversight will soon be rectified.

Some of the other challenges we face include various EPA and OSHA regulations. In addition, we're concerned about the treatment of timber tax provisions as well as the small business provisions in the context of tax reform.

Senator Amy Klobuchar

1) Minnesota has a strong forest products industry and I am pleased that the 2014 Farm Bill made it clear that forest products are eligible to fully participate in the bio-based programs.

- How is USDA moving to implement the changes needed to ensure that forest products can participate in these programs? What can USDA do to ensure that forest products can be fully eligible for bio-based programs?

  First, we appreciate your strong support of the forest products industry during the 2014 Farm Bill process. We were extremely pleased to have forest products so clearly made eligible for the BioBased program, and we look forward to the rule being finalized so we can apply for the label.

  There are a couple of things that we are watching carefully during the rule-making process. Of course, we want the process to move forward as quickly as possible. Secretary Vilsack mentioned in the spring that he thought the rule would move forward by the end of the year, and the industry is hopeful this will be the case. It has taken the forest products industry a long time to achieve eligibility, and the sooner we can utilize the label the sooner the industry - and the rural jobs supported by the industry - will benefit.

  We will also be watching the rulemaking process carefully to ensure that innovations throughout the manufacturing process are taken into account in the eligibility criteria for the program. As I mentioned during my testimony, a 2"X4" today is essentially the same as a 2"X4" from a generation ago, but the path that 2"X4" takes from the forest to your home or to your grandchild's swingset is significantly different. Innovations in the process ensure the timber is coming from renewable, well-managed stands. Innovations in the process also ensure that energy use is minimized and that forest products residuals are put to good use.

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Tuesday, June 17, 2014
Questions for the record
Mr. Kurtis Miller

Chairwoman Debbie Stabenow

1. Cargill provides food, agriculture, financial, and industrial products and services in more than 60 countries worldwide. From your perspective, how does the United States compare globally in terms of providing incentives for job growth in this industry?

In our opinion, the United States is on par from a global perspective, albeit might be different types of jobs versus other regions of the globe. Many countries have incentives to drive specific crops (e.g. ethanol in the US, coconut oil in Malaysia) and supply chain/logistics execution that creates particular types of jobs.

An example of some strong incentives for bio-technology can be found in SE Asia (Thailand, Malaysia, and Singapore) where a combination of tax credits and loan guarantees are available for bio-investments. Whereas the U.S has established solid incentive programs for some specific initiatives (see ethanol and cellulosic ethanol ITC/PTC, loan guarantees), it only recently has opened up the loan guarantee program for bio-based products in the most recent farm bill.

An opportunity for the United States is to further tap into the engineering and chemistry expertise that drives the innovation and application adoption into various industries. As we compete on a global scale, we use our expertise to develop other solutions across regions or businesses. The continued investment and cross-pollination of potential solutions on a global scale not only creates a vibrant innovation pipeline for bio-based technologies as a whole but also has a local impact – it drives job growth and healthy, economically-strong communities.

As I suggested in my initial testimony, providing incentives for pre-commercial scale manufacturing (semi-works) facilities is critical as this stage often requires significant investments to go from R&D to commercialization. Providing manufacturing incentives could be a strong motivator for both supplier and buyer to invest further in promising technologies. Potentially different skill sets and jobs are required at this stage than compared to R&D or commercialization phases which add to the job diversity and growth opportunities.

2. From your perspective, how can USDA's BioPreferred Program be improved?

The USDA BioPreferred program is a good program. It opens doors and puts bio-based technology on the consideration list. However, there are a few specific areas that could be evaluated and potentially integrated into the BioPreferred Program.

First, oftentimes in the procurement process initial cost versus total cost drives the decision. Therefore, bio-based products need to perform as well as the existing solution and be at cost parity. Little consideration or incentive is given to consideration of total cost value. If only evaluated on initial cost, the supplier could be

forced to give away many added value benefits for free. So, could there be incentives either geared toward demonstrating total value or pricing considerations to address cost parity?

Second, there are always switching costs whether financial, emotional, learning curve, or process/procedure modification. One suggestion would be to provide incentives for a validation phase which could reduce the perceived risk of switching. This validation phase could enable a testing ground to address and evaluate those switching costs. This could provide the organization with the often required "proof" that the change was worth the switching cost resulting in greater organizational confidence and support for a more successful full-scale adoption.

Third, we would suggest evaluating the requirements, management and expected outcomes of the program to truly drive more mainstream adoption of bio-preferred products. For example, goals are set to achieve a certain percentage of BioPreferred products purchased annually. Evaluation is based on a self-reported annual scorecard.

Some considerations:

- *What happens if the goals are missed? Without any consideration of consequences for missing the goal, a "check-the-box" mentality could inadvertently be created.*
- *What reward incentives are in place for organizations not only reaching their goal percentage, but leveraging bio-based products to achieve greater operational efficiencies?*
- *Is the same value placed across the board on all products? Could some products drive more organizational or operational efficiencies than others and therefore have incentives assigned accordingly which could drive greater, broader adoption?*
- *What types of products are being purchased and in what volume? Organizations could achieve their percentage goal but the volume of that purchase is so low, it really doesn't drive the industry in an economically-meaningful way.*

Fourth, we suggest differentiation between bio-based products and traditional industrial products be considered if clear benefits can be achieved through the differentiation. As an example, our Envirotemp FR3 natural ester dielectric fluid is made from renewable vegetable oils and is ultimately biodegradable. If spilled, it will biodegrade within 28 days and is non-toxic and non-hazardous in soil and water. Mineral oil does not biodegrade and is toxic and hazardous to wildlife and water. Yet, there is no differentiation in the SPCC thus requiring the electrical utility industry to treat all spills the same. If there were differentiation, the opportunity exists to provide cost and resource efficiencies to the industry while still helping protect the environment.

Cargill supports the BioPreferred program. There have been incredible strides made and we recognize the outstanding work to date. We appreciate the opportunity to share our thoughts and for the committee's continued investment in the program.

Senator Tom Harkin

1) In recent years, the Administration has created four manufacturing innovation centers as part of its National Network for Manufacturing Innovation. These centers, which are public private partnerships, will help to accelerate the development and adoption of cutting-edge manufacturing technologies. Given the application of biomanufacturing, I believe that it makes tremendous sense to establish a manufacturing innovation hub focused on biomanufacturing. The administration's FY2015 USDA budget in fact proposes the creation of such a center.

   What I'd like to know is whether or not the companies at this table believe that there would be value in a biomanufacturing innovation hub? Would your companies want to participate in a center like this?

Cargill fully supports efforts to spur innovations in bio-manufacturing with an established bio-manufacturing innovation hub. These investments will provide the tools and resources to help rural communities thrive by providing new job-creating economic opportunities.

We believe that a bio-manufacturing innovation hub could be a significant step forward in the investment necessary to rejuvenate an "industrial commons" in the United States that fosters and sustains innovation that in turn contributes to the vitality of the industrial sector, the agricultural sector, and the health of the U.S. economy. This concept of providing shared infrastructure, technology, methods, and intellectual property (IP) helps to de-risk investments in the bio-economy and enable subject matter experts to innovate, thereby restoring the ability of enterprises to develop and manufacture high-technology products in the United States.

Cargill is very much in favor of discussions between the Committee, the Administration and companies like Cargill around the value of a bio-manufacturing innovation hub. These types of public-private partnerships focusing on emerging markets and opportunities in the areas of bio-manufacturing and bio-products development are critical to stimulating innovations and achieving economic development.

Project Geode is a perfect illustration of this concept and a potential "arm" of this innovation hub. Project Geode is Cargill's internal name for a public-private partnership formed to pursue a pre-commercial scale manufacturing (semi-works) facility in Fort Dodge, Iowa. This facility will help bio-based innovations scale their process and technology to supply their customers with product samples for product development. Without this shared infrastructure, start-up companies struggle to secure the capital for such facilities. In other words, they utilize all their available capital before developing a commercial revenue stream. This facility leverages Cargill's expertise in fermentation while serving customers and providing academic and employment opportunities for Iowa students. We are currently forging the public-private partnerships necessary to make this project work and stand ready to be the premier bio-based innovation center with the United States Government as our partner. The education and training component of this project is extremely important to ensure that we develop a capable workforce to implement and sustain the innovations.

Cargill supports the potential of new bio-based products, production methods and discoveries to ensure that future investments in infrastructure and economic development are strategic, jobs are created and long-term economic benefits to the region as well as the country as whole are achieved.

2) Each of your companies are doing incredibly innovative things with the creation of new bio-based products. Where do you see the bio-manufacturing industry heading in the coming years and what are the major challenges facing the industry that you think the federal government can help overcome?

For bio-based products to really take off, we must look to the needs beyond the early adopters and to what mainstream buyers require. Their needs are different. Mainstream buyers require a secure supply, predictable cost and reliability in the products they purchase. They are more risk averse due to the volumes purchased and potential business implications of those decisions.

Uncertainty in regulations and incentives make it difficult to plan long-term whether that's R&D, semi-works or commercialization. If those regulations or incentives change often or are in a state of flux, it requires a re-work of assumptions and calculation of anticipated returns. In the end, the uncertainty causes a reluctance to move forward with many projects or go beyond initial R&D to semi-works as the risk is not worth the unknown, true cost. This is exactly the opposite of what we as an industry are trying to accomplish – it stunts innovation, job growth and adoption of new, better technologies.

Furthermore, we must avoid conflicting policies whereby on one hand investments are stimulated and on the other hand they get penalized (e.g. other costs associated with processing, recycling or composting).

As stated earlier and in my testimony, another challenge for our industry is its capital intensity (large plants are required to obtain competitive economies-of-scale), combined with inherent uncertainty around pace-of-market penetration.

Senator Amy Klobuchar

1) Minnesota's agriculture sector provides more than 340,000 jobs for the state and creates $75 billion in economic activity. Minnesota's prosperity depends on protecting and strengthening our farms and rural communities throughout the state.
   - How do you see the bio-based products industry as a new market that gives farmers and rural communities opportunity to add value for the products they grow?

Where there is more opportunity to sell your products, the inherent value increases. For example, in order to keep raw material costs down, we typically place plants close to the source. Our plants in Eddyville, KY and Cedar Rapids, IA are examples of this strategy. These plants create a whole job growth ecosystem ranging from job diversity (finance, supply chain, manufacturing), to skill level diversity (technical, engineering, chemistry) as well as fuels supporting industries related to servicing that plant.

The bio-based products industry provides a significant new market opportunity for farmers and their communities. Bio-based products are a growing market and there is potential for far greater market penetration in the future. As the global population grows, traditional petroleum industrial feedstocks are becoming unreliable and expensive, and sectors of society place increasing importance on the sustainability and environmental and health impacts of the products they use. Increased industrial utilization of agricultural feedstocks offers the potential opportunity to capture a higher value for both crops and feedstocks.

Soybean oil provides a good example. Soybeans are 80% meal and 20% oil. The meal, as a source of protein and feed for livestock drives the value and production of soybeans. Soybean oil is a co-product that has traditionally been in surplus and acted as a drag on overall soybean prices. The ability to utilize soybean oil for chemicals, plastics, cleaners, and other industrial and consumer bio-based products provides an alternative outlet for soybean farmers enabling them to maintain or add value to the products they grow.

Senate Committee on Agriculture, Nutrition & Forestry
Grow it Here, Make it Here: Creating Jobs through Bio Based Manufacturing
Tuesday, June 17, 2014
Questions for the record
Mr. Adam Monroe

Chairwoman Debbie Stabenow

1. Mr. Monroe, Novozymes does some fascinating work engineering enzymes, and it seems from your testimony that this technology has so many everyday applications from biopharmaceuticals to biobased chemicals. Novozymes is a fairly unique company, could you explain some of the barriers or challenges you have faced in getting these technologies into the marketplace in everyday applications?

   Novozymes envisions a future bio-based economy where many of the products we make today from petroleum can be made from plant-based sugars. Biorefineries will serve as the core of this economy, separating the energy components of plants and waste to use them in the most efficient way. These new facilities will be capable of simultaneously making bio-based products including food, feed, fuel, chemicals and materials. Biorefinery raw materials including agricultural and waste products will be sourced and refined locally, leveraging rural and urban communities' strengths and resources alike. Novozymes' biosolutions will provide continued improvement in yields and reduction of environmental impact from industrial processes throughout the entire value chain.

   The bio-based economy has the potential to replace oil, improve the environment, strengthen security of food and energy supplies, create jobs, increase family incomes and improve economic growth. We are making great strides toward achieving this vision but we face several significant challenges:

   - **Market access - Bringing disruptive technological change to market threatens incumbents, leaving them fighting hard to protect market share.**
   - **Policy Uncertainty – Wavering policy details and short-term legislation makes it difficult for businesses to plan and operate for long-term success. Business must have confidence in government policies and their administration to utilize their benefits.**
   - **Inconsistent regulation – regulations not based on sound scientific data leads to lack of public trust and difficulties managing federal requirements.**
   - **Lack of understanding of biotechnology - can lead to irrational fear and safety concerns and potential creation of unnecessary or burdensome regulations.**

   With the removal or easing of some of the challenges above, the US stands to gain from this industry's development today.

2. Novozymes, North America is located in Franklinton, North Carolina, which is a rural community. Do you face any particular challenges being located in a rural community? What more could the Federal Government be doing to support job creation in rural communities like Franklinton?

A majority of Novozymes' manufacturing operations are based in rural communities with good reason. Rural areas offer our business the space we need to operate as well as the ability to easily expand and grow. They offer a conducive environment for the commercial traffic necessary to support our plants and they provide educational institutions which are generally supportive of our workforce needs. However, these towns are generally challenged with small budgets and lean staffs to manage and support our growing needs.

We believe the federal government could assist in driving rural job creation in the following ways:

- **Transportation – Provide supportive funding for expanding or improving roads and bridges so that our operations and future growth do not impact rural communities in negative way.**
- **Education – Provide incentives for technical education programs at local community and technical colleges, where a business-school partnership drives the curriculum to better align with today's workforce needs.**
- **Education - Expose middle and early high school students to manufacturing as a desirable career choice. Hold a White House manufacturing fair for students during National Manufacturing Week to promote manufacturing in select communities around the nation to raise awareness.**
- **Research & Development - Continue to invest in and support agricultural technologies and related field trial programs that improve environmental protection while continuing to feed and fuel the world.**

3. One of my priorities during the Farm Bill process was to add to USDA's toolkit in terms of how the Federal Government could support the biobased economy. Biorefineries can integrate a number of processes at one location and produce a wide range of products. For example, a biorefinery making advanced biofuels could also produce renewable chemicals that have multiple purposes or polymers that could be used in bioplastics. This is why in the Farm Bill we expanded the Biorefinery Assistance Program to include eligibility for projects that support renewable chemical production and biobased manufacturing. This is not a new idea, but can you discuss the potential here to create additional manufacturing opportunities where there are already biofuel production facilities?

Thank you for your ongoing support of biorefinery development and particularly for widening the scope of eligibility for these facilities. While we work with many partners who are building and operating biorefineries, Novozymes currently does not operate such a facility ourselves. I would prefer to leave the answering of this question to those more closely associated with biorefinery operations. However, the growth of the biobased society is positive for Novozymes' business. At Novozymes, we envision America dotted with advancing manufacturing plants to make these products using the latest technologies – from new fermentation techniques to microbial development.

Senator Tom Harkin

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What I'd like to know is whether or not the companies at this table believe that there would be value in a biomanufacturing innovation hub? Would your companies want to participate in a center like this?

The National Network for Manufacturing Innovation and its innovation centers sound like good resources for the US to charge ahead in many areas and we are supportive of these types of initiatives. At Novozymes, most of our manufacturing technology is mature and commercially available. However, a Biomanufacturing Innovation Center could be of interest for new businesses or applications that are outside of our traditional enzyme and microorganism businesses, working collaboratively to develop a more generally applicable commercially viable platform. The commercially viable platform then could be shared by others in the Center for their applications. For example, NCSU has a Textile Innovation center that uses a similar model, at smaller scale.

2) Each of your companies are doing incredibly innovative things with the creation of new bio-based products. Where do you see the bio-manufacturing industry heading in the coming years and what are the major challenges facing the industry that you think the federal government can help overcome?

Novozymes envisions a future bio-based economy where all the products we make today from petroleum can be made from plant-based sugars. Biorefineries will serve as the core of this economy, separating the energy components of plants and waste to use them in the most efficient way. These new facilities will be capable of simultaneously making bio-based products including food, feed, fuel, chemicals and materials. Biorefinery raw materials including agricultural and waste products will be sourced and refined locally, leveraging rural and urban communities' strengths and resources alike. Novozymes' biosolutions will provide continued improvement in yields and reduction of environmental impact from industrial processes throughout the entire value chain.

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- **Market access - Bringing disruptive technological change to market threatens incumbents, leaving them fighting hard to protect market share.**
- **Policy Uncertainty – Wavering policy details and short-term legislation makes it difficult for businesses to plan and operate for long-term success. Business must have confidence in government policies and their administration to utilize their benefits.**
- **Inconsistent regulation – regulations not based on sound scientific data leads to lack of public trust and difficulties managing federal requirements.**
- **Lack of understanding of biotechnology - can lead to irrational fear and safety concerns and potential creation of unnecessary or burdensome regulations.**

With the removal or easing of some of the challenges above, the US stands to gain from this industry's development sooner, rather than later.

Senator Amy Klobuchar

1) You allude to the EPA's proposed rule rolling back the Renewable Fuel Standard biofuels targets in your testimony, and the tremendous amount of uncertainty this causes for the business community. This action, although not yet finalized, has already had an adverse effect on the farm economy by causing corn prices to plummet.
   - Could you please describe the long-term effect this proposed rule would have on your business, if it was adopted as proposed at the lower levels?

The current EPA RFS RVO proposal for 2014 has put our shared economic growth and energy security goals at risk and has created a tremendous amount of uncertainty for our business.

Unless EPA returns to their historical administration and legislative intent of the policy, the US will send a signal that we should look to more stable markets

- **Companies like ours will look for more stable investments in other markets.**
- **If there is lack of investment appetite for our producer partners, there is no draw for companies like theirs and ours to continue to commercialize advanced fuel technologies in this country.**

In terms of additional impacts, if the rule as proposed were adopted, it could:

- **Immediately increase greenhouse gas emissions in the United States as fossil fuels are substituted back in to our transportation fuel supply.**
- **Contributing to a greater dependence on foreign oil and reducing US energy security.**
- **Increase unemployment as renewable fuel producers cut back production.**
- **Halt investments in cellulosic and advanced renewable fuels. Rolling back the RFS will, potentially strand billions of dollars of private capital.**
- **Undermine the deployment of renewable fuels infrastructure throughout the country and solidify an oil-based transportation sector.**
- **Cap the US renewable transportation fuel supply to 10 percent or less of consumption.**

We want to continue to partner domestically. We want to continue to invest domestically. We are proud to do it. But uncertainty is bad for business.

At its inception, a guiding principle of the RFS was that obligated parties would be required to blend into our fuel supply renewable fuel produced, up to the statutory volumes. Novozymes believes this principle has been turned on its head in this proposed rulemaking. Neither the written law nor the interpretations and administrations of the EPA have ever led us to believe that alternative fuel infrastructure would be a consideration. If this principle is not maintained:

- **Companies like ours will be unable to evaluate future US projects due to market uncertainty.**
- **The passionate workers who answered the call of the RFS by developing technology, building manufacturing facilities and producing renewable fuels will face an oversupplied, capped domestic market with a very uncertain future.**
- **Commercialization of cellulosic and other advanced biofuel technology will be at risk.**
- **Low-cost, domestic, clean renewable fuel capacity could be idled, replaced by increasingly carbon-intensive petroleum fuels.**
- **Pollution, greenhouse gas emissions, and price vulnerability at the pump will increase.**

Like many companies, we were inspired by the RFS:

- **We optimized the conventional ethanol process to increase efficiency and get more fuel and oil from less corn, an area we continue to innovate in today.**
- **And we embarked upon an industry-leading research and development push over the last decade to break down non-food based cellulosic biomass economically.**

Novozymes has a rich history and dedication to continued research and development. Fourteen percent of our revenue is returned to R&D efforts.

We put 150 scientists and researchers to work designing enzymes for the biofuel industry – the single-largest R&D effort in our company's history. These enzymes are developed and manufactured at our facilities in Davis, CA; Blair, NE; and Franklinton, NC. We have 250 granted patents and 189 patents pending in the biofuel segment.

Over a five-year period, we brought down the cost of enzymes for conversion of cellulosic biomass into biofuel by 90 percent.

We have also partnered with leading US academic and government institutions to improve biomass conversion for more than a decade, including DOE for more than $50 million worth of joint work.

If EPA installs a blend wall by finalizing this proposal, the research and development Novozymes, the US Government and others have done to commercialize cellulosic ethanol will be irrelevant.

Since 2010, we have invested more than $60 million in our Franklinton, NC manufacturing plant, allowing us to expand our R&D and improve enzyme production. Established in 1979, our Franklinton site is the largest multi-purpose enzyme manufacturing plant in the United States. It employs more than 500 people and is our regional headquarters for North America.

In May 2012, we opened our newest advanced manufacturing plant in Blair, NE, dedicated to making enzymes for renewable fuels. With more than 100 employees and $200 million in private investment, our Nebraska plant is the largest and most sophisticated of its kind in the country. We chose Blair and the United States over countries like China. A big reason for that choice was the RFS. We built this plant to manufacture enzymes for the advanced biofuel volumes prescribed in the policy.

Until now, the market access provided by the RFS was a clear signal of investment stability and has encouraged our company and others to develop new products and build manufacturing plants.

Private industry has invested more than $5.7 billion in capital in the United States to build the advanced and cellulosic biofuels industry[1]. This investment has been matched with $2.2 billion in federal or state grants and loans. As a result, 28 out of 50 states have at least one or more existing or planned biorefinery for 77 facilities in total. This includes the five cellulosic biofuel facilities EPA projects to produce commercial gallons of cellulosic biofuels in 2014. The projects currently employ or promise to employ more than 7,900 people on a full time, ongoing basis. Further, construction of these facilities has created or will create an additional 8,600.

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[1] *The Renewable Fuel Standard, Timeline of a Successful Policy,* Biotechnology Industry Organization, Jun. 29, 2012, available at: http://www.bio.org/articles/renewable-fuel-standard-timeline-successful-policy

However, in joint comments filed in response to the EPA proposal cellulosic producers Abengoa Bioenergy, DuPont, and POET-DSM Advanced Biofuels stated - "It is our experience that investment interest by obligated parties in cellulosic capacity is in suspension because obligated parties believe that, as a result of EPA reduction of total renewable fuel volumes, they may never have to blend cellulosic ethanol. Our collective view is that other sources of financing for cellulosic plants, whether they be private equity or first generation plants and their bankers, want to be assured about the predictability of the RFS volumes to allow estimation of a rate of return that would justify investment."

The RFS was designed as a two-part strategy: It was our industry's charge to bring breakthrough renewable fuel technology to market, which we have done. It was the oil industry's charge to blend those renewable fuels into the nation's fuel mix.

With the removal of the latter obligation, EPA's proposal puts control of market entry for alternative fuels back in the hands of obligated parties and renewable fuel competitors.

EPA's proposal rewards obligated parties for failing to comply and indicates that future compliance will not be required. This would leave Novozymes and our partners in the advanced biofuels industry with a capped, saturated and shrinking domestic market and an expectation that future alternative fuels seeking to break into the market will be equally capped or blocked.

This is not the intent of the RFS.

Senate Committee on Agriculture, Nutrition & Forestry
Grow it Here, Make it Here: Creating Jobs through Bio Based Manufacturing
Tuesday, June 17, 2014
Questions for the record
Mr. Scott Vitters

Chairwoman Debbie Stabenow

1. Mr. Vitters, the work Coca-Cola is doing with its PlantBottles is so important, not just in terms of being a leader in the biobased economy, but in terms of reducing pollution and waste from plastics. As you mentioned, Coca-Cola is on track to use its PlantBottle technology in all plastic bottles by 2020. Besides reducing our reliance on petroleum-based products, what are some of the benefits as far as reducing pollution?

   PlantBottle PET plastic has a lower carbon impact over traditional fossil-based polyester plastic. Since initially launching PlantBottle, use of the technology has eliminated over 190,000 metric tons of potential CO2 emissions from entering the atmosphere. PlantBottle also is chemically identical to fossil-based PET and, therefore, fully compatible with existing recycling programs that are helping to ensure PET plastic bottles are used again and again. A core pillar of Coca-Cola's sustainable packaging strategy remains the use of recycled plastic bottles back in to our packages and into new consumer products. One example is our EKOCYCLE™ program which produces consumer goods made partially with recycled content from PET plastic bottles.

   Our PlantBottle platform is also helping to advance future potential commercial technologies that take agricultural residues, or waste, and turn it into ingredients for also making PlantBottle. We currently have active programs around the world working on turning residues from sugarcane, corn and rice crops from waste materials to valuable resources.

2. You have partnered with a few companies to produce these bottles, one of which is Virent, which is around the corner setting up for our biobased showcase today. How has your partnership helped companies like Virent expand and find new opportunities?

   Many of our PlantBottle technology partners, including Virent, were focused primarily on the production of bio-based fuels when we initially approached them. Through our partnerships it helped to raise awareness that many of the technologies being developed for fuels could also be used for bio-chemicals and that chemicals might even be a better starting point given the potential demand, higher value and smaller scale. Our partnerships with technology companies also have increased investor and manufacturing company interest in the bio-chemical space.

Senator Tom Harkin

1) In recent years, the Administration has created four manufacturing innovation centers as part of its National Network for Manufacturing Innovation. These centers, which are public private partnerships, will help to accelerate the development and adoption of cutting-edge manufacturing technologies. Given the application of biomanufacturing, I believe that it makes tremendous sense to establish a manufacturing innovation hub focused on biomanufacturing. The administration's FY2015 USDA budget in fact proposes the creation of such a center.

   What I'd like to know is whether or not the companies at this table believe that there would be value in a biomanufacturing innovation hub? Would your companies want to participate in a center like this?

   We fully support the advancement of open innovation platforms for developing and supporting bio-manufacturing. There are several other countries already doing something similar and we would welcome the advancement of such a center in the United States. The Coca-Cola Company would also be very interested in evaluating its own direct participation in such a center in collaboration with an appropriate technology partner.

2) Each of your companies are doing incredibly innovative things with the creation of new bio-based products. Where do you see the bio-manufacturing industry heading in the coming years and what are the major challenges facing the industry that you think the federal government can help overcome?

   We believe a movement toward renewable, bio-based materials that can be reused and/or recycled is critical for helping sustain our business growth, the communities we serve and the health of our planet. Our stated goal is to have all new PET plastic we purchase for bottles contain PlantBottle technology by 2020. We also have the intent and are focused on working to commercialize the first 100% plant-based, fully recyclable PET plastic bottle in the nextseveral years. This work will not only help enhance the sustainability of our business but will catalyze positive change for other stakeholders in the polyester value chain.

   To help advance the development of a robust bio-chemical manufacturing sector in the United States the federal government might consider a number of supporting

activities/initiatives. A key challenge for many technology partners is getting the capital required for building first-of-kind bio-chemical plants. The Energy Title of the recently enacted Farm Bill has several important incentives designed to spur the development of biorefineries for the development of biochemicals, e.g., Section 9003 for Biorefinery Assistance. Elsewhere in the statute are incentives in the tax code that aid the development of advanced biofuels. These incentives, like accelerated depreciation and production and investment tax credits should be revised in order to apply more generally to biorefinery development, specifically to allow the incentives to be claimed for the production of biochemicals.

Another area of potential support is to consider the removal of duties, tariffs and other trade barriers on bio-based (green) chemicals. This support could also be extended to manufacturing equipment needed to produce bio-based chemicals. The current multilateral Environmental Goods Agreement negotiations taking place in the World Trade Organization are the best opportunity for governments to help foster the deployment of this technology. The United States Trade Representative Michael Froman has said "By eliminating tariffs on the environmental technologies we need to keep our air and water clean, for example, we can make them cheaper and more accessible to everyone. American companies are some of the world's leading innovators and exporters of environmental technologies, and a WTO environmental goods agreement can support green jobs here at home and level the playing field abroad for U.S. businesses."

Consideration might also be given to helping balance the disadvantage that bio-chemical end users face in the US when sourcing ethanol or advanced biofuels that can be converted into biochemicals or biopolymers. Because of the RFS, other buyers of ethanol or advanced biofuels must add the cost of unused RINs to the purchase price of these commodities. This puts biochemicals at a significant price disadvantage vs. fuel use.

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