

Transcript: Biomass Clean Cities Webinar – Workforce Development

Alicia Lindauer: My name is Alicia Lindauer. I work for the Department of Energy's Biomass Program. I'm going to get this Webinar kicked off today. So, this is the Biomass Program on Clean Cities States Webinar. And the topic for today's webinar is on Workforce Development. So, I'm going to go ahead. This is our agenda for today. We have three speakers. We have Daniel Cassidy, Jill Stuckey, and Troy Runge, who are going to be speaking today. And I'm going to go ahead and just pass things over to Daniel Cassidy. Daniel's with the National Program for Forest-Based Bioenergy and the National Institute for Food and Agriculture from the USDA. So Daniel, we'll go ahead and pass the controls over to you. [Silence] So Daniel, we can see your screen, but we can't hear you.

Daniel Cassidy: You know, that's the great thing about phones; sometimes you forget to take the mute button off.

Alicia Lindauer: We can hear you now.

Daniel Cassidy: That's great, because I was just having a wonderful time here talking to myself apparently. My name is Daniel Cassidy. I am the National Program Leader for Forest-Based Bioenergy with the National Institute of Food and Agriculture. This has been around for about two years. Prior to this, we were the Cooperative State Research, Education, and Extension Service. We're a part of the Research, Education, and Economics Missionary of the USDA. Our mission and our charge is to advance knowledge in agriculture, environment, and human health. And we do this by really looking at five different societal areas. One of those is climate change and bioenergy. We do this through research, extension, and education, working with land-grant institutions. You can see here, on this screen, a whole list of partnerships with our colleges, from agricultural colleges, experimentation, forestry schools, historical black colleges, Hispanic-serving institutions, native tribes. But we have very strong relationships also with industry and NGOs—nongovernmental organizations. And now I'm not wanting to advance for some reason. There we go. Our approach to the issue of bioenergy, first and foremost, at the heart of it is sustainability. And when we talk about sustainability, we talk not just if it's going to be an economic plus for our community, but is it also going to provide positive environmental impacts? Is it going to be accepted by society itself? A lot of these rural communities we're looking to, to really come through and provide the biomass, to provide the footprint for us to put our industry in. So, we're looking at it at a regional scale. Secondly, we look at the entire feedstock supply chain. From the very, very basic genetic research that needs to be done, there's only so many, so much biomass we can grow on an acre right now. So, how can we actually improve the species to increase our feedstock supply? All the way through market pull, working with industries, setting them up to be able to deliver a product. We get into the conversion technologies. We get into the coal/carbon issues. We get into the greenhouse gas air emissions.

And then finally, and I think what's most important for this talk today, is that we take a transdisciplinary approach. And we do it at all levels. We start very simply with programs like 4-H, and I'll get into some of that a little bit later. But we're looking at having economics working with engineering. Having sociologists working with conversion technologists, because if you develop a feedstock, but it doesn't meet the conversion technology, or that conversion technology is not acceptable to the community that's going to be hosting that plant, then we really aren't going to be anywhere. So we look at multifaceted education. When you hear the word education, development of a workforce, the first thing that kind of comes to most people's minds are sitting in a college classroom and listening to a lecture. And of course I did that, I did that for many years a lifetime

ago. But, probably some of the best education I've ever gotten is in the field—provided through fellowships or cooperative educational programs where you would work a semester for an industry and then come back to school and apply what you've learned. So, we work through, not only in the classrooms, but we work through programs like 4-H. They're starting young. I kind of look at bioenergy like the recycling program in the '70s, where you would talk to the, you go into the younger classrooms—the fourth, fifth, sixth graders—and get them excited about recycling. They would go home and encourage their parents to do it. And now everybody, at least on the street I live, we have nice, wonderful green barrels that we put all of our recycling in, and it's picked up every day. We also believe in Extension. In the past, Extension was wonderful because we had an office in every county and every state. It had a presence everywhere. But with the way the economy is right now, a lot of those traditions are falling out. You don't necessarily have a natural resources-based, or a cattle-based, or a Switch Grass Extension Leader in each county. So we're moving more towards more innovative ideas, such as e-extension. This is an online community where people can go to their Internet at any time of the day or night and learn the information that they're looking for. You know, is growing switch grass going to be something that's effective for me? Is there a market for it? What is this? How do I do it? So, we're really looking at all matters of education here.

In 2010, we had what's called the AFRI Education Grants. AFRI is the Agriculture and Food Research Initiative. This is NIFA's flagship program. In 2010, it was \$262 million spread across five different areas. We really wanted to look at supporting the development of the new scientific core for bioenergy. And we awarded two grants. These are the two largest grants that have ever been made for education out of our institute. They are both \$5 million over the next five years. The first one is the Northeast Bioenergy and Biobased Products Program. It's housed out of the University of Cornell. But the wonderful thing about this program is that it works with the University of Maryland-Eastern Shore, it works with Delaware State—these are two of our underserved minority institutions. They also are working with Pace Institute of Law, Ohio State, and the Ohio Bioproducts Institution. They support kindergarten through college teacher education. Last year we had 25 educators that came to different mirror sites—sites either at Maryland Eastern Shore, Cornell, Ohio State, Delaware State—and they would learn things that they could actually apply in their classrooms, such as making a biobased plastics, plastic containers that would go around water bottles. And they went to the Ohio State Fair and were able to demonstrate, you know, how some of this actually can be used in practice. They also provide internships with industries for college students to go off and learn. And, they provide a research exchange, where one student that wants to study, say, gasification or biochar, and the scientific expertise is not at that institution, they could go to another one that's within this project. The second project is our Play Space Opportunities for Sustainable Outcomes and High Hopes or POSOH, which is actually out of the University of Wisconsin with the College of Menominee Nation, which is fantastic, because, again, it's \$5 million for five years; they are bringing in western science—our ideas of setting up hypothesis and no hypothesis and trying to prove different—with the cultural beliefs, understandings, and respect that our Native American tribes believe. And how they operate their lands, and manage their lands for biomass and biomass production. And, you know, this is an area that there is a lot of growth and potential in. And [we are] a huge supporter of this. The College of Menominee Nation is kind of setting up that template that can then be used and transferred to other areas of the country.

We have several other programs in NIFA that I would like to highlight that also build this new scientific core. The first one is our Integrated Coordinated Agricultural Projects. These are grants that range anywhere over the next five years from \$40 million to \$10 million. We set up, basically,

five regional bioenergy CAPs (Coordinated Agricultural Projects)—programs that are going to physically start supplying biofuels for either jet aviation or transportation. And one is at, the five are at the University of Washington, Washington State, Iowa State, Louisiana State, and the University of Tennessee. The great pride here for me is that nearly \$100 million was invested in the investigation of forestry and woody biomass. But these CAPs are not just research based. They have significant education extension programs that also go along with it. And that's why we called them integrated, because it is research, education, and extension. These CAPs are able to take students and train them and develop them on all levels. For example, the University of Washington CAP is working with several of the local community colleges. So you're talking about two-year students that are going to come out and have maybe not the scientific research background, but they're going to have the technical expertise to take care of the actual day-to-day operations of a plant. We also have the Biomass Research and Development Initiative. I know you see research and development there and you say, "What does that have to do with education?" A lot of these projects are also demonstration. And again, the best way to get a grasp on learning is to actually take somebody out in the field and show them. We currently have our National Needs Fellowship Program—that is open. I think the actually deadline is probably, I think the 20th, so it's a very, very quick one. But that allows us to provide fellowships for students that continue their education. The Biodiesel Education Program has been around for about three years out at the University of Idaho. It's a fantastic success story. And then we do Higher Education Challenge Grants for secondary schools. And then our Formula-Funds, such as McIntire-Stennis and Hatch, which really help with our agricultural students looking for their secondary degrees.

So, to wrap up, what are some of the challenges I see in workforce development? And the first one is "keeping up with the Joneses." It seems like, at least for me, every day—I'm just a dumb dirt forester—but every day I turn around and there's some new technology or some new claim that we can produce this much biomass or we can produce this much biofuel through this process. And just simply understanding what we can and cannot do is a challenge in and of itself. And having students that are wanting to learn about this and keep up with it is where we need to be. I think the second challenge goes back to the transdisciplinary approach. You know, I need somebody that can grow a plant, who also understands that this plant can be fed into a conversion system, and then also understands the sustainability and the rural payoff. And I don't know too many students that want to stick around for six, seven, eight years to get a degree, because that's what it would take. You're talking about an Agronomist, a Chemical Engineer, and a Sociologist. So, how can we build these teams, this workforce team, essentially, to meet our goals? Then of course there's the chicken and the egg environment when it comes to biofuels and biobased products. How do you get a landowner to want to grow, switch from growing corn to switch grass, or hay to switch grass, or, you know, genetically modified poplar when there's not so much certainty about having a market to sell it to? And then I think a fourth issue here is really essential. And it's, a lot of the times, we'll see our agricultural students will come out of these rural environments, go to places like State College in Penn State or come to the University of Maryland just, you know, right here outside the nation's capital, and they fall in love with the urban environment and never want to go back. So how can we keep people working in rural environments once they've seen the big lights and big city? And then finally, funding, funding, and yes, funding. I'm of the idea that you can never throw enough money at education. Thomas Jefferson is one of my huge heroes. And he thought that the best thing that society could have was a well-educated democracy. And I completely agree. The more education we can provide the better. So with that, I believe it's my turn now to turn it over to Jill. And I will stop showing my screen. Change presenter. There we go to Jill.

Jill Stuckey: Alright. Thanks, Daniel. We'll get my PowerPoint loaded here hopefully. Okay, we don't see my PowerPoint on here. Alright. Now we're ready to go. Again, I'm Jill Stuckey. I'm the Director of the Center of Innovation for Energy for the State of Georgia. You know, the Governor a few years ago created six centers of innovation—areas that we wanted to concentrate on in Georgia that we thought were important. And our, we're a critical link between strategic industries, research universities, financial resources, and the regulatory community. What we try to do is connect the dots for people. So what's driving us here in the Center of Innovation for Energy? Well, our forestry industries and our economy. Unfortunately, we have about 25% unemployment in our logging industry. Our housing starts are down by 92% in the State of Georgia. So we really need some alternative uses for our forests. So, I'm spending a lot of time in Europe chasing mandates. There are many mandates there for them to get off coal. And we see a key role that we can play until we find ways that we can cost-effectively use our biomass here in Georgia. We're looking to export it probably for the next three to five, six, seven years. We're going to be exporting a lot of our biomass. And of course it's cleaner. That's one thing that's driving us. And energy security, I spend a lot of time looking for technologies that can cost-effectively take biomass and make drop-in fuels. You know, during the '70s, we were only down by 5% in our incoming fuel supply, and it crippled it. And, with a lot of the things that are going on in the Middle East today, we see some areas where we could possibly be down 5% or even more. So we're looking at ways that we can produce that material—the gasoline, jet fuel, and diesel—right here in Georgia. We have a lot of forests in Georgia. We have more biomass than any other state, except Oregon. And of course, you're not going to cut a Redwood tree down to make a kilowatt of electricity or a gallon of fuel. In the State of Georgia, we grow trees like Iowa grows corn. We plant them in nice straight rows, and they're a crop for us. So, we know how to do it. We've been supply the pulp and paper industry for many decades now. So, we're ready, willing, and able to assist with the new technologies and industries that are going to be coming. In fact, in 1995, we were harvesting well over 51 million green tons a year. And today, we're, well yes, less than 40 million green tons harvested. So we have a long way to go just to get back to where we were. But, we're, and our trees unfortunately are growing—or fortunately are growing—38% faster than we're utilizing them. So, we're definitely the leader in biomass production today. But, we also want to be the leader tomorrow.

So we're looking at other crops that grow well in Georgia without a lot of fertilizer, without a lot of water input. One of the crops we're looking at is miscanthus. And it's a crop that can grow—our pine trees grow on an average of five tons per acre—miscanthus looks like it can do double, triple, or even more that yield per acre. And there are a lot of benefits to it. When you chop miscanthus down, it's dry. So when you chop a tree down, it's 50% moisture content. So it's going to cost you, if you have a technology that utilizes the dry material, it's going to cost you \$12 to \$20 a ton to dry that pine tree. Miscanthus pretty much comes out of the field at 10% to 20% moisture content. So you're a long way down that path, so you have less cost to get it into the way that these technologies are needing it. You know, I see a lot of folks that come in front of me and they're presenting a project that they have an idea for, a company or an expansion of a company. And they want to, they're here looking for my help. And so many times, they sit here, and 80% of the time they talk to me, they're talking about how bad the other guy is. And, you know, I like to tell them, "You know, I know most of these other folks that you're talking about. So you know what you might want to do is just focus on how good your technology is. And don't try to trash the other guy too much." Another thing that happens is they throw out these high numbers. Like Daniel, he had a slide that alluded to kind of the same thing. You know, they come in and they tell me they can take a kind of biomass and they can produce two hundred gallons of jet fuel. Well, it's not scientifically possible to do that. But, you know, try not to tell me that you have the goose that laid the golden egg. And

they also come in and they say, “You know, I can produce fuel for 15 cents a gallon.” That’s probably not possible either. But I am hoping to see some of these projects. I hope people can prove me wrong. But for the most part, when you’re coming in talking to the economic development people, please try to shoot them straight. A lot of folks come in and they’ll see a picture of my dog on my desk and say they’re going to give 30% of the profits to the Human Society or poor children. And, you know, that’s probably not going to be a cost effective business. The numbers, margins are pretty close in this industry. So here again, you know, try to shoot straight with me. And probably the other thing that I get from folks coming in talking to me is that they don’t need any money from the state or federal, city or county government. That they’re going to do it all on their own. Which usually, by the end of the day or when the project gets close, then they come back to me and they are a little more honest and say, “Well, yeah, we do want 30% financing from the government.” And, you know, I may look like I fell off the turnip truck yesterday, but I really didn’t.

Government and common sense, this is probably some words that you never see put together. But we’re trying to in the State of Georgia. What we’ve done is we’ve put together what we call a One Stop Shop. And it’s a forum for new and expanding businesses. It’s a venue to explain state, federal policies and procedures. And we work to expedite your permitting for projects coming to the State of Georgia. We don’t rubber stamp anything. But we tell you up front all the hoops that you’re going to need to jump through, and try to make it as easy as possible for you to do it. So what I really do is I play Yenta the matchmaker. I try to put people together. So, the One Stop Shop, we have meetings about once a month. I give companies that have ideas to start businesses in the state, or expand, one hour of our time. It’s all federal or state employees that are in the meeting. In the first 10 or 15 minutes, the company tells me what they’d like to do in the State of Georgia, whether it’s biomass to electricity, or fuels, or chemicals—whatever they want. And then we go around the room with all the people listed in this page, and even some more, that can hopefully try to help them get through the regulatory regulations and find all the funding sources that they’re going to need. So far, we’ve been very, very successful. We have over a billion dollars’ worth of projects on the ground today in the State of Georgia. And I have over \$5 billion worth of projects that are in the pipeline that are looking to locate in the state utilizing our natural resources to produce energy.

So what do I say in the future? I get asked about my crystal ball a lot. And I think the placeholder right now is going to be the pellets, taking our biomass and shipping our pellets overseas. And I get criticized a lot from people that say, “Well we need to use it here.” And I totally agree. The problem is a lot of the plants that we’re working on aren’t up to speed quite yet. I believe that they’re going to be coming very soon. And we’re ready, willing, and waiting for those. But I need some help in the forest industry now. I need a placeholder, a place to sell these trees that are growing faster and faster. So I think we’ll be exporting a lot of pellets to Europe, the EU is probably going to be demanding close to 50 million tons of pellets to produce electricity in the next couple years. And I think the Southeast and other parts of the United States are going to be supplying those pellets. Biomass to electricity—in the State of Georgia, it costs about probably 9 cents a kilowatt to take biomass and produce electricity. The Power Purchase Agreements that the major utilities are giving out are around 6 cents a kilowatt. So there are some niche projects that have located in the Southeast that are working, but I don’t see large-scale biomass to electricity projects happening, especially in Georgia. We don’t have a Renewable Portfolio Standard. So I don’t see that coming in the near future. Now torrefaction is something that could change that. And, for those of you who aren’t familiar, torrefaction is taking biomass and simply turning it into a coal—increasing the Btu of biomass and making it waterproof so you can co-fire it, feed it just like you are coal. There are no commercially operational facilities that are torrefying wood today. There are several small projects

in the pilot stages. We're looking at companies all over the U.S. and in Europe that are working on this technology. So the jury is out. I think we'll see what will happen with torrefaction in the future, but it has a lot of potential. Ethanol, we have had lots of ethanol projects in the State of Georgia—biomass to ethanol. And it's been a tough road for those companies. I think what will be happening in the future, that the, we're working now projects that take ethanol and go on to a drop-in fuel. And, you know, the corn guys have done a pretty good job around the United States in producing ethanol. And I'll get into that a little bit more a little bit later. But, I think most of the projects that I'm seeing now are the drop-in fuels, so taking our biomass and producing gasoline, jet fuel, and diesel. In the State of Georgia, we have the busiest airport in the world. Hartsfield Airport uses about a billion gallons of jet fuel. And I'd love to see in the future that all of that fuel comes from rural Georgia, taking our natural resources and producing a drop-in jet fuel. The chemicals and pharmaceutical industries have been really coming on strong lately. And I love to talk with those folks, because they talk to me in pounds. All of these other technologies usually talk in tons. When you talk in pounds that means you're going to get a lot more for your feedstock dollars. So, a lot more economic development, and a lot more jobs—higher paying jobs. So those things that are going to happening in the future, and I'm hoping they're going to be happening sooner rather than later.

So let's talk about Iowa. And you say, "Well why is somebody from Georgia showing a map of Iowa?" Well, this is a map showing all the ethanol facilities and biodiesel facilities in Iowa. In 2002, they were producing about 25 million gallons of fuel. Today, they're producing 3.6 billion gallons of fuel. It's increased their GDP by 9%, and, you know, it's been a sustainable way to produce fuel. But now we've reached our threshold. We're up to our 10% mark with ethanol. And what I would love to see is Georgia's GDP increasing by 9% or more. I'd love to see circles all over Georgia where we have biomass to drop-in fuels facilities producing fuel. We have 24.7 million acres of forest in the State of Georgia. I think in the future, by utilizing some of that land for energy crops, as well as faster growing varieties of pine trees and other trees, that in the next 20, 30 years in Georgia, we could be producing 10 billion gallons of fuel in our state. So that's what we're looking forward to happening.

This is a picture of me and my license plate. We're trying to practice what we preach here. Being a state employee, I couldn't afford both "s's" in biomass. But I got most of it on there. So, thank you very much for your time. And we will pass it on to Troy.

Troy Runge: Okay Jill. Just waiting for it to come over. Alright, hopefully you're all seeing this pretty quick here. So, hopefully everybody is seeing my screen. If not, maybe Elizabeth can shoot you a note, but it looks to be working. What I want to talk to you a little bit about is different than Daniel and Jill. And I want to talk about imaging what kind of jobs and how many jobs—of course, I'm from Wisconsin, I'm an Assistant Professor in the Biological Systems Engineering, a part of the Wisconsin Bioenergy Initiative at the University of Madison—so I'm going to take a Wisconsin eccentric approach. But I think the lessons are pretty easily applied to any state in the nation.

So we'll talk about what the existing workforce is. We'll have to look at the potential of Wisconsin's bioenergy. You'll need to know that before we can calculate how much new jobs are, could potentially happen. And then, "What are the impacts and the takeaways?" Alright, so first of all, let's look a little bit about the need for economic development in Wisconsin. Wisconsin is both fortunate and unfortunate in that we have a little bit more than the national average in unemployment. I think we're around 7.8 right now. It's unfortunately been going the wrong way the

last couple of months. But it's lower than some of our neighbors. Unfortunately, we have pockets of very high unemployment, especially in our northern part of the state. It's a much more forested area there, less city, less manufacturing based. But you can see those darker colors, the oranges and browns, were getting up into the double digits unemployment. So, we definitely have areas of need. If we look at what's happened to the population, I think, I really like the way that Daniel said it, "We have people on the farms. They grow up. They really love the area. They go get an education, but they don't come back." Partly because they've seen the big city lights, but I also think that there's just not a lot of opportunity. I came from northern Wisconsin, grew up on a farm, got my Ph.D., and I love to go back, but there's just not enough jobs there to really sustain a family. And so you, we've seen this in Wisconsin, that we've had a lot of population changes lost really out of those northern counties, where there's just very high unemployment.

So the question is, this area, could it benefit from having bioenergy? Could that be that economic development for rural Wisconsin where there's a great need? So, the first question is, "Do we have the biomass in those areas?" And I know this is really hard to see, but in general, Wisconsin, for those that aren't familiar with the state, has really two biomass sections. In the south and west on that first graph on the left, in the map you can see there's a lot of color there. That's really an agriculture area. We have a lot of corn, a lot of hay. And so there's a lot of agricultural residuals in the south and the west. In the map on the right, in the green is where we have more of the forested. So that's more in the north and in the west. So the state is kind of split into two. It's great from a diversity standpoint, but really, we're probably talking mostly woody biomass and maybe some unproductive lands—marginal lands in the north where the unemployment is. The question then is, "Okay, so we have some biomass, how much?" And, of course, as an engineer, I like giving the answer, "It depends." Then nobody can pin me down on anything. But it actually does depend in this case, and we could talk about how much is out there as an inventory, but, really, from a bioenergy standpoint, you have to consider prices. That's really the driver. If you're not going to pay a lot for it, not all people are going to produce it. So for this talk, we use the NREL Baseline case. They had to update the Billion-Ton Study, and they really did a nice job of talking about future bioenergy potential beyond current uses. And they put in prices. And looking at quite a few assumptions, but we used all the same based-on assumptions, and we calculated how much there was for the state. And when you do all that, you come out with a little bit more than five million tons per year, about 40% forest and 60% agricultural. That's not how much we grow. That's how much would be available for bioenergy, and we have quite a bit of pulp and paper in the northern part of the state. There's quite a bit of lumber. The prices at \$60 a ton, really, you're not going to be competing very favorably. So, these are really the leftovers after those industries continue to use.

If you like to think about this on an energy basis, that's about 77 trillion Btu. And, unfortunately, that's only a small portion of what we use right in-state. We have 1,681 trillion Btu, so you can see that the energy is not as available—the small residual is not going to sell Wisconsin's energy, but it will be moving us in the right direction. The state doesn't have any natural gas or coal, so we really need to have biomass as our own homegrown fuels. Alright, so based on that five and a half million tons, how many jobs? It really depends on how you do the conversion. If you convert that biomass just through simple combustion and make heat and power, it's less. If you take and make chemicals as Jill was describing, that's more in the pounds, it's a much higher value, much more jobs, because it can produce much more value. For simplicity, and also because there's quite a bit of studies that we can compare to, we assume we were going to take this biomass and convert it all into ethanol. It's not as few jobs as combustion, but it's not as many as chemical. So, we thought this was a nice simple way of thinking about it. And so that's the way we did it, right or wrong. So we took the five

and a half million tons and we converted it to 442 million gallons. And that's about the same as we're making right now with 10 corn ethanol plants, just for comparisons sake. So, in general, it's a pretty decent-sized figure, but if it's—we're not exaggerating right now—it's very foreseeable. We actually came out with nine plants at 50 million gallons per year. So each processing site would have about 600,000 tons. So a small little circle that is comparable, it's imaginable having chip piles, the bales, could do that, we haven't done anything too crazy.

So based on that, how many jobs? Well, we can look at some of the early stuff that you said. Urbanchuck in 2011 indicated that there were about 400,000 ethanol-related jobs in the U.S. And so, if we proportioned that down to how many we would have, we would come up with a number of a little over 14,000 new jobs. In talking with some of my economist friends, we think that 400,000 Urbanchuck number might be slightly overestimating, overstating it. But this is probably the upper balance. So, 14,000 jobs is probably the most you could expect. If we look at maybe a little more reasonable estimate, we found a New York study that found that you could get 3,600 direct and secondary jobs if you add 354 million gallons, which is what New York kind of doing the same sort of biomass assessment came up with. So if we proportioned that out, we'd come up with 4,520 direct and secondary jobs. So, for each one of the plants, that's about 500 jobs of bringing in the biomass and converting it to ethanol, and any sort of banking or engineering or any of the other associated jobs that came along with that. Of course, if we drew more biomass, that could grow, but that's sort of what's foreseeable in the next 5 to 10 years if we could make this a reality.

So, that seems good. It's definitely not going to solve all the unemployment, but 4,520 jobs for, that can grow, that's definitely something that's in the right direction. But what kind of jobs? And so, we took a look at some different studies, as well as some of our own work where we were doing heat and power plants, and we looked to see where the jobs would be located. And from the numbers on that screen, you can see that very few are directly at the plant. There's only nine plants, about 344. Most of the jobs are bringing in that five and half million tons of biomass. This is the foresters that are planting the trees, harvesting the trees—the lumber, residuals, the forest residuals, baling that up, the trucking, the stores that transport any pre-processing. If you're doing grasses, the baling. So it's really in that farming field. The secondary jobs, this is the banking for doing the loaning, engineering consulting firms, all those accounting, all those other secondary jobs, not a huge driver as well. So really, it is the farm and field. It is great that it's in the rural—it's not going to be outsourced to any foreign countries. However, it is not the highest paying job. These are more in the trades. It is not in the high technology.

The other thing that I would like to point out is that with all new technology, or with all new industry, these numbers probably will be driven down in the future. If we look at any industry, I come from the pulp and paper industry, we know that our workforce continues to go down as we develop better and better machines that are, allow it to be more automated. It's not good or bad. It's just that this is how the United States can stay competitive. So these jobs with time, unless we continue to add more biomass, would probably go down. On the other point that I'd like to I guess make, is that this is looking at ethanol. If we were making more complex products, if we took the biomass and we made lumber out of it, you'd have more jobs. If you make paper out of it, you'd have more jobs. If you make chemicals out of it, you'd have more jobs. Similarly, if we are doing simple things and just combusting it just for the heat and power, or just making pellets, the simpler we have less jobs and also the simpler the product, the less professional jobs that are needed. They just have to do with how much economic development you could provide.

Alright, so going back to the original question that I hope to answer, “Can bioenergy be a driver for rural economic development?” And the answer is yes and no. So, in the short term, and we weren’t going to solve all of our state energy needs, or all of our nation’s energy needs, nor are we going to meet all of our economic development needs. We can provide a fair number of jobs both for Wisconsin and the nation. And this is, and I think you will see this for most states, it’s a great match; where the biomass is, it’s really where that, those challenges for rural unemployment exists. When you think the largest workforce, in fact, will be in the biomass supply area, but that means it’s also not going to be moving out of those rural areas. So I think bioenergy makes sense for Wisconsin. I think it probably makes sense for the states that you are in as well. To do this, obviously, we’ve been talking about bioenergy for quite a few years now. And I’m glad to see that there are some projects going forward and a lot being talked about. But still, a lot has to happen. My job as a professor is in education. I don’t think we need a lot more ability in the education—I think we need a lot more curriculum development. But in general, I think that engineers, the accountants, the foresters that we’re currently training, probably with the numbers I’m showing here, we probably will have enough. Policy is obviously huge, lots of uncertainty right now around policy makes it really hard for businesses. So anybody in the federal government that’s listening in, this is my plea that the more that this can get calmed down, the faster this will happen.

Dan did a great job talking about outreach, so I’m not going to talk about that. On the research side, I think Jill hit it spot on, in that we continue to have some great projects. There’s a lot of people, a lot of misinformation out there. So really understanding what can be done for improving conversion that’s reasonable, but also sustainable. I think it continues to need to happen. And, of course, demonstration—the more successful projects that occur, even if they have to be subsidized in some portion by the state or the county or the federal government, the more successes, the more projects we’ll see. With that, I thank you for your time. And let me push it back over to Elizabeth.

Liz Penniman: Hi, everyone. Okay, so we have a few questions. Let me just pull up my slides. And just so everybody knows, all the presentations will be available via this website following today’s presentations, probably in the next week or so. The first question I have is for everybody. What do you all find is the biggest need in workforce development in the bioenergy industry? So, we can start with Daniel, and then move on to Jill and Troy.

Daniel Cassidy: Wow, yeah. Just put me on the spot. What’s the biggest need? I’m actually going to echo one of Troy’s last comments. And it’s great, because I’ve been on panels with Troy and Jill before, and I think we all kind of preach off the same page. There really is a need for curriculum. We need to be able to have an understanding of how complex this issue is. It’s not just engineering. It’s not just financing. It’s not just feedstock development. It’s how do you develop students that can understand all this and work in an environment with a team. Because a lot of times you’re so focused on one aspect in one particular part, but you’re in an entire system when it comes to bioenergy, and knowing how to reach out to others.

Liz Penniman: Okay great. Thank you. Jill same question?

Jill Stuckey: You know, we’re, our universities and technical colleges I think are doing a great job right now, and until we really get some of these facilities up and going and see, you know, I have so many flavor of the months. And, you know, it’s very difficult to target something when we don’t know what we’re targeting. So I think we’re going to unfortunately have to take a somewhat “wait and see” mode to, “What is really going to be the winner in the future?” You know, is it going to be

torrefaction? Is it going to be the drop-in fuels chemicals? Or is it going to be a combination of all of these? So, you know, I think our forestry schools, are very important, as well as our technical colleges. And they're all trying. They ask me every day about, you know, "What do we need to do? What are we doing?" And it seems like every month I give them a different answer. So it's going to be a kind of a "wait and see." We know the general thing. We know it's going to be in the State of Georgia, biomass to energy. It's just what that direction that's going to take.

Liz Penniman: Okay, thank you. And, finally, Troy same question? Are you still there Troy? Are you on mute?

Troy Runge: Can you hear me now?

Liz Penniman: Yes.

Troy Runge: Alright. Something happened with my funny mute button. So I'm going to echo what Daniel said. We train really generalist students, but even with that said, if they're good at chemistry and biology, and you have to bring in business and rural sociology and accounting, and then you've got to sprinkle in some marketing. It's just you cannot find an individual that can do it all. It's really those networks that are needed. And so I think I'm going to answer that there needs to be these outreach specialists, these, I guess I would say, consultants that are easily available—and maybe through universities, extension, maybe through 4-H, maybe it's through the government that can help—and fill in the gaps for these companies that are doing typically something that's brand new to the company, or it's a start-up, and they just don't have the resources to do it.

Liz Penniman: Okay, great. Thank you. This next question is also, can be for anyone. Has any work in torrefaction been conducted on crop and food waste residue? If anybody wants to just jump in and start answering, you can do that.

Jill Stuckey: This is Jill. In the State of Georgia, we have some companies that are looking at crop residue, as well as trees and miscanthus switch grass, the usual suspects.

Troy Runge: I'm going to jump in too. So the crop residue has actually been looked at a lot in and looks exciting. The big thing on torrefaction is, and this is more towards the food waste, moisture is a real killer. So, actually making sure you're not wasting a lot of the energy that's in the biomass, to dry it out before you can actually torrefy it, is something to consider. And a lot of the food waste that we've been looking at has such high moisture content, has such high water content, it really challenges the economics. We found that in the wetter systems that a lot of times biological conversion, such as anaerobic digestion, is maybe a more preferred route.

Liz Penniman: Okay thank you. The next question also goes to everybody. It's kind of an opinion question. What does everybody think that states can do specific in their state to increase jobs and education in bioenergy?

Troy Runge: I can jump in again.

Liz Penniman: Okay.

Troy Runge: We were just playing with this, talking with our Office of Energy Independence last week. And I think what Jill does is actually a really great thing. And I'm hoping Wisconsin can catch up. But having a turnkey approach, so if a company or individual has interest in this area, not having to wade through multiple levels of bureaucracy, to get all the forms and the permits, to have some assistance on where they can site it, and if they'll have maybe some ready-made biomass inventory available to market. I really think it's a daunting task if we look at all the regulations that are required for a new plant. And there's so much uncertainty and regulation to begin with. I think it just, at some point, becomes a turnoff for entrepreneurs.

Jill Stuckey: [Speaking simultaneously with Daniel Cassidy] And, you know, one of things that... (trails off)

Daniel Cassidy: This is Daniel. I'm going to jump in also and echo that what Jill's group does is unbelievable. I had the opportunity from being at the University of Georgia before I came up here to D.C. to actually see what you have to do and what the hoops are to move through. And having an organization that will step up and help guide and say, "Okay, well, have you thought of this? Have you thought of this? Have you thought of this?" Really kind of grounds the growth of an organization and helps them out very much so.

Jill Stuckey: And you know one of surprising things that's come out of the One Stop Shop is how much it helps our panelists, our state officials, our federal government officials, our universities. I think we get more out of it sometimes than the companies that come through during our break times, our lunch times, that we're talking together, working, brainstorming, and all coming together. And you know when you have that much power in one room working together, there's just some tremendous things that can come out of it— with collaboration, with all of us, ideas. So I think that's been one of the really surprising things that come out of the One Stop Shop, as well as helping the companies.

Liz Penniman: Okay, great. Thank you. And finally the last question is also to everybody. Where can everybody who's on this call today find more information on educational programs in bioenergy, as well as more information on the initiatives that you all are involved in?

Troy Runge: This is Troy. On my last slide I had a website that can provide educational links, as well as the initiative that we're involved with. That's www.wbi.wisc.edu. It's on my last slide.

Liz Penniman: Okay. Great.

Jill Stuckey: And this is Jill. Same thing—on my last slide at energy.georgiainnovation.org. And please feel free to contact me anytime.

Liz Penniman: Great.

Daniel Cassidy: And this is Daniel. www.nifa.usda.gov. That brings you to the NIFA website, and you can search Bioenergy there. You can also find my contact information. One of the great things that I love about being on panels like this is the work that Jill does and the work that Troy does at the university there makes my job so much easier, because I can point you in the direction of them. But I, can also, am available to talk for any issue.

Transcript: Biomass Clean Cities Webinar – Workforce Development

Liz Penniman: Great, thank you all so much for being here today. Does anybody have any closing thoughts that they'd like to share with the group? No closing thoughts.

Daniel Cassidy: Well, this is Daniel. I think bioenergy is something we need to continue to pursue. I think that the education component is very, very important. As I said earlier, you know an educated democracy is what this country is founded on. And we need to continue to support this transdisciplinary work.

Jill Stuckey: And I'd like to say thanks to all the Clean City folks that are out there. They're great partners that we have here in the State of Georgia, and all over the country. And I appreciate all the work that they're doing.

Troy Runge: I just want to say thanks to all the attendees. This is, it's great to see that the continued interest, and I appreciate your time this afternoon.

Liz Penniman: Okay. Great. Thank you all again so much for participating today and giving these presentations. They'll be really useful to us to have on the Biomass website. And thanks again.

Alicia Lindauer: Yep, I think that about wraps it up. So have a nice afternoon everyone, and thanks for everyone for speaking and participating and sharing all this great information today.

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