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[TECHNICAL]

ASHLEY ZANOLLI

Good morning. I'm Ashley Zanolli and on behalf of EPA Region 10, I'd like to welcome you to today's webinar on Advanced Biofuels. This webinar is actually a part of a larger series of webinars that we designed in collaboration with our Office of Research and Development as well as other EPA program offices. The overarching goal of this series is to broaden the dialogue

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among internal and external stakeholders and to convey a regional perspective surrounding biofuel issues on a more national level. Past webinars we've recorded, in case you missed them, include one on the Renewable Fuel Standard referred to as RFS2. Another on infrastructure issues related to biofuels like underground storage tank compatibility, and a third on Regional Economics behind biofuels. You can access these recordings and transcripts by visiting the web link, which should be displayed in your chat box. This one

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also is where you can download the presentations for today's webinar. I'd also like to give you a heads up that our next webinar will focus on various tools related to biofuels for researchers and policymakers. It's tentatively scheduled for July 20th so stayed tuned. Today's webinar on Advanced Biofuels and Environmental Considerations was developed in response to stakeholder feedback. Our engaging presenters will focus on second-generation renewable fuel feedstocks, process design, and permitting issues. Other topics

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for discussion include environmental considerations associated with permitting and siting of biofuel facilities. Our panelists today include Dan Parker from E3 Energy Partners. Jim Jordan from Parametrix and Erik Peterson from EPA Region 10. Please be aware that these presentations are part of an EPA webinar, but don't constitute EPA policy. And, any mention of trade names or commercial products does not constitute endorsement of recommendation for use. We really appreciate you taking the time out of your busy schedules to join us

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today and encourage you to ask questions to our experienced and

knowledgeable panelists. Furthermore, your feedback is valuable to us. So following this webinar, we'll be sending out an evaluation and we really encourage you to fill that out. And with that, I'll turn this over to Tommy Jean Valmassy, who will be facilitating today's event. She'll tell you more about the logistics.

TOMMIE JEAN VALMASSY

Thanks, Ashley. Hi everyone this is Tommie Jean. We're glad to have you here with us today. I want to go over a few things and let you know that the slides are being moved for you today.

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So you might have a small delay between when we move the slides and when you see them depending on your web connection. As Ashley mentioned, in the chat box we sent a link where the slides are already posted. So if you want to go there and download them just follow along, or if you want to download them afterwards and that you'll have them for reference, you can do that. I also want to let you know that your lines are muted today. That helps us because we do record these webinars, but then we do have to get permission to use your voice,

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and we still want to have you participate. And as Ashley said, we encourage your questions, and the way we do that is there's a little question box. You can type your questions in there. So if you're having any technical difficulty, you can use the question box. Also, when you have questions of our presenters, you can type them in there. As Ashley said, we do have three presenters today. So what we've done is after each presenter, we've set aside just a little bit of time for you to ask them questions. And then at the end of the webinar, after all three

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people have presented we have more time set aside. So, you can really type in your question at any time. Also, if we run out of time or if we need to get back to you, we have your email address because you've logged in for this and so we'll try to send you all a response. There is something on here called the "Raise Your Hand" feature. This is really difficult for us to respond to. So if you have any kind of question or comment, it's easier for us if you just go ahead and type those into the question box. Speaking of feedback that Ashley mentioned, we would like your feedback.

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And what's going happen is after this event is over, the "Go to Webinar" system is going to send you an email with a link to a survey just to ask you for a couple questions. And then something open-ended where you can give us ideas for future webinars or

any kind of general feedback. We really appreciated getting that form you. So with that, let's just move into our presentations. Like I said, the slides are being moved for you and there's a link where you can download those. The first presenter today

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is Dan Parker. Dan Parker is a P.E., and he's a principal at E3 Energy Partners, which is a chemical and process engineering firm in Seattle, Washington. Dan has 34 years in chemical process and design engineering for bio-energy, pulp and paper and petroleum products worldwide. Dan has led engineering design projects across various bio-refinery applications, including biomass fired cogeneration, high screed body acid biodiesel feedstock pretreatment

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and processing, cellulosic ethanol pretreatment and process creation and reviewed pyrolysis gasification in anaerobic digestion systems. His teams have offered USDA, DOE and various state grant programs from bio-energy projects with awards over $30 million. Dan holds degrees in chemical and electrical engineering. So with that, Dan the floor is yours.

DAN PARKER

Thank you Tommie Jean. I appreciate that. If we could move to the next

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slide, the Agenda. Just very briefly we're going to cover some of the EPA RFS-2 targets for advanced biofuel. We'll talk a little bit about what those targets are. And then we'll move on to discuss some of the more typical advanced technologies that are being used for biofuel production. It's not going to be a comprehensive review of every single technology. There's not enough time to do that.

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But, it will provide at least a basic introduction to what these technologies are, and some of the issues particularly dealing with permitting and environmental factors on these technologies. And then Jim Jordan will talk further on the NEPA issues. So we can move to the next slide. This next slide is just an introduction to E3 Energy Partners.

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And just as previously stated, we're a chemical engineering firm who pretty much explosively biofuel advanced renewable energy project development, and as well a number of audits including RFS-2 audits. So we can move to the next slide. And I'd like to introduce my partner. Rich

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Bacigalupi is also here and he might be participating in this call when we get to answering questions, and he also has a lot of expertise in the biofuels arena. So getting into the Energy Independence and Security Act of 2007, and also the EPA RFS-2 of 2010, 36 billion gallons of blended from renewables have been

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mandated by 2022. And that's up from 9 billion gallons in 2008. This applies to all transportation fuels except jet fuel. The renewable fuel must have a certain greenhouse gas replacement level. In the case of corn ethanol it is 20% a biomass based diesel, a 50% reduction. Cellulosic biofuel is 60%

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and any other advanced biofuels are at the 50% level. The table on the right shows some of the acceptable biomass feedstocks. There are quite a few different feedstocks that are acceptable. This just gives an idea of some of the more typical ones and definitely the ones that are being focused on by a lot of technology suppliers and researchers. The next slide, please.

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This table shows the mandates in billions of gallons of the various fuels. Under the advanced biofuels category, biomass based diesel and this is primarily biodiesel, right now the main contributor to this, which is listed as transit verification. That's just the chemical nomenclature for the process

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that forms the bio-diesel. There is also a smaller contribution by pyrolytics or gasification or other similar technology bio-diesels. So that's a very small percentage of this 1.15 billion gallon number. At this point, it's primarily being contributed by the bio-diesel. That will change as the other technologies become more commercial and begin to come more into

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full-scale production. We'll start to see that shift, and I would estimate that a significant portion of that number, half or better will eventually shift to other forms of biomass based diesel fuels. Cellulosic biofuels this is primarily cellulosic ethanol. That number has been revised downward to

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six and a half million gallons for 2010. It was previously a good bit higher, and cellulosic biofuel is primarily ethanol that's derived from a woody or other cellulosic type of biomass by various chemical means that we'll get into a little bit further. And then other advanced biofuels. This includes a wide variety of technologies involving pyrolysis,

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gasification, fermentation and various other chemical, thermal and hybrid processes to create these fuels. And again, the mandate is 295 million gallons for this year. Under the renewable fuels category, ethanol is at 12 billion. And again, this is conventional polymer wood based ethanol using standard infomatic

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fermentation processes. If we can go to the next slide. Biomass based diesel or biodiesel it is basically either a biodiesel, which is an ester formed from vegetable oil, triglycerides or it can be an non-ester based renewable diesel including

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that diesel that can be derived from cellulosic biomass or other organic biomass. This diesel needs to be made from an eligible renewable biomass. Again, which is defined in the EPA RFS-2. Its life cycle of greenhouse gas emissions need to be 50% or less than the gasoline or the diesel that it replaces.

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And, this excludes the renewable fuel that's been derived from either co-process biomass or petroleum based feedstocks. The biomass-based diesel is tracked at the blender using renewable identification numbers or RINs. There is quite a bit on RINs and how RINS are developed and tracked in the EPA Regulations.

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And, I think that's a topic of other webinars. Feedstocks, just to go through a few. The typical feedstocks that we see primarily for the biodiesel, the esterified product of various oils and fats. Waste vegetable oils, brown greases, animal fats and corn oil from the ethanol process all qualify for

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an 86% GHG reduction. Again, this is much better than the 50% target that they need to hit. Soybean oil has a 57%. So that's a little bit closer to that 50% target but still qualifies. Other vegetable oil and other possible feedstocks openly qualify again as approved

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and certified by the EPA. Next slide. Now, this diagram shows a typical flow diagram for a biodiesel process. In the center of the diagram is the fairly typical biodiesel process that's used in 90% flocks of all biodiesel plants today. The biodiesel is made by taking a feedstock

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that's low in free fatty acids. And again, free fatty acids are the triglycerides that make up … Most vegetable oils are composed of free fatty acids tied to a glycerol backbone. As oils degrade, the fatty acids break off that glycerol and just float around free in

pollution. The free fatty acids in the transit verification reaction creates soap, which is a major problem in the biodiesel process.

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So there needs to be some form of pretreatment for pre-fatty acids. That's shown just as pretreatment on the flow diagram. But it's most typically either stripping the acids out of the oil or doing an acid verification to pre-convert the free fatty acids to an ester. The main transit verification reaction is reacting they triglycerides

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with methanol and a catalyst to esterify them and form the fatty acid esters. Glycerin comes off as a bi-product. This again is the triglyceride backbone, and the free fatty acid esters then is what forms the biodiesel. And that's purified by a variety of means either a washing with water, ion exchange, distillation, or various dry wash processes that

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can remove the impurities. On the far left is shown a pretreatment phase, and this is for very high free fatty acid materials. Degraded fats and oils, track grease, brown grease, other materials that are typically above the 10% range. Specialized pretreatment is required for these materials, and there is a lot of work begin done right now on the various technologies

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including a glycerolysis process, which reforms the free fatty acids back to glycerides. There is also solid phased catalysts, acid esterification that can go to much higher levels of free fatty acids. And various other technologies to clean up and pretreat these lower grade oils. Of course, there is a lot of advantage to using these lower grade oils. They have a much better cost structure,

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and also as seen on the previous slide have a much higher greenhouse gas reduction percentage. So again there's a good bit of incentive to go to using these oils. Typically, the process uses a small amount of energy usually it's steam or hot water, but could also be natural gas or electricity. There are various catalysts

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that are used in the process, mostly metal oxides are metal organic compounds like methylates. Methanol is a reactant and then various resins that are through all their compounds that are used for cleaning up the biodiesel. Again, outputs from the process is the biodiesel, glycerin, other solid waste

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that might come from resins or other materials that are used for purification. And small amounts of water and a methanol vapor. Methanol vapor is the primary one to be concerned with for

environmental fermenting. It's a hazardous air pollutant and as such it's limited to ten tons per year of amounts you can emit without going to a Title 5 type air permit. So

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typically for permitting and environmental issues this is one of the key issues to look at is the sources of methanol, how much is being emitted and what measure is being taking to control methanol emissions. Methanol emissions are generally fairly easy to control. Methanol condenses fairly easily and usually only comes out of the smoke biodiesel processes at one or two points. So it's fairly easy

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to be able to put in good condensing equipment and be able to control methanol emissions. Solid waste is another issue particularly the glycerin frequently becomes a solid waste, usually due to an inability to market it. And, frequently it also contains a certain amount of methanol and other contaminants. There have been a number of cases where glycerin has accumulated on site

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where it had to be dealt with as a hazardous waste. So having off stakes for the glycerin and making sure it's properly handled is a key issue in design and permitting of these facilities. Other issues to be concerned with is occupancy classification. This gets more into local building codes, but typically anywhere you're handling methanol is a classified area that requires special equipment,

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special handling and can create a number of permitting issues as far as the square footing of the space, fire protection and egress and access. Storm water runoff, surface water runoffs, again, generally dealt with through the federal NPDES permitting process. And, needs to be taken into consideration in

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these facilities, particularly where large tank farms or other paved areas are being put in, in particular if they're not in some sort of containment or have blind sumps to collect surface water and surface water runoffs. You can go to the next slide, please. The next biofuel I want to talk about is cellulosic biofuels, and also

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frequently called lignin. Lignin is kind of a glue that holds the woody biomass together, and the cellulose is the fibers that you're familiar with. If you look at a piece

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of paper that's primarily cellulose fibers. So the lignin holds the cellulose fibers together and gives the material its strength and flexibility. Separating the lignin and the cellulose is the biggest

issue in cellulosic biofuel. That's generally where most of the development work being done now and the development of technology is focused. It's how they split

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apart the lignin and cellulose. We have a wide variety of technologies and treatments that are being developed to do this both thermal processes, chemical processes, and biological or enzymatic processes to be able to break these down and separate them. In particular, biological process show a lot of promise, and there is some very interesting work being done on

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white rock fungus and various other fungus are microbiological organisms that will eat away at the lignin and leave the cellulose behind. Once the cellulose is broken down, it is enzymatically converted into sugars and the sugars are fermented, very similar to any conventional ethanol process whether it's corn or sugar cane

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or other materials. Again, the ethanol is tracked at the blender using RINS, and, a wide variety of crop residues, wooden biomass, perennial grasses and various other materials can be used as feedstocks. Greenhouse gas emissions from these feed stocks can be quite high, up above

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100%. Again, the target for this year is 6-1/2 million gallons, which is down from the original target of 100 million gallons. One of the interesting things in cellulosic biomass is that there's frequently more value in the bi-products from this than there is in the actual ethanol that's produced. Many of the companies and research organizations

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focusing on this or focusing on the value added chemicals that come from the lignin and from the hemicelluloses, which are also another component of the wood. Frequently you can derive a wide variety of very useful chemicals at a much better value than the actual sugars from the cellulose itself. Next slide, please.

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This diagram shows type blocked flow diagrams for cellulosis biofuels. Again, there is a pretreatment phase, which is the key phase in taking any cellulosis material. And that is being able to separate the cellulose from the lignin, hemicellulosis and other chemicals typically a part of cellulosis materials.

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The cellulose which is mostly … Cellulose is composed of a chain of C6 sugars. So it can be broken down enzymatically into

conventional glucose and similar sugars. And these sugars can be fermented in the conventional process. Now, the hemicellulose is primarily C5 sugars. These are

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pentoses. They don't ferment as well. There is a lot of work being done now on breaking the hemicellulose down into its base C5 sugars, and then coming up with ways to ferment those C5 sugars either with the C6s or to separate them out and treat them all in a separate process to either isomerize them and ferment them separately or to process

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them in other ways into either an ethanol or other value added chemicals. From the fermentation stage on it's very much a conventional technology in process forming a beer which is then purified through distillation and separated into the pure ethanol and other materials called values on the slide here.

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Very often this is material that has some value itself and can be separated out and used as animal feed or sold separately. One of the issues with cellulosic ethanol is that it tends to make a very dilute beer, corn based, wheat based and sugar cane and other sugar crop based beers are typically

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on the order of 10% ethanol. Very often in the cellulosic process you're dealing with 5%. So there is also a good bit of focus being paid right now on coming up with cost-effective and energy efficient ways to evaporate the additional water. Again, typically twice as much water as is normally seen in conventional ethanol processes.

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So an area that a lot of work is being done in the trade to improve the efficiency on this. Process consumables. Again, energy is the big one. There's a lot of energy that goes into evaporation of the water and purification and viscillation of the ethanol. There can also be a fair amount of energy depending on what the process is that goes into the pretreatment phases.

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Chemical consumption very often it's acids, enzymes, yeast, also various alcohols and other substances depending on the process. Again, the process output is ethanol. Lignin or lignin derived chemicals, in most cases the lignin is pretty severely broken down. So it has less value and is often burnt for energy. But there are

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processes out there, and more and more processes being developed that produce value added products from the lignin. And

then enzymes the bottom syrup mash and other bi-products that are produced. Environmentally, many of the same emissions that we saw in the biodiesel processes. Again, dealing with flammable substances. So classification

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of hazardous areas for flammable materials is a very big issue. Ethanol processes generate a lot more water waste. Water waste has to be triggered in some way. So that's a significant issue to focus on as well as potentially more air emissions not just from alcohols and volatiles, but

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there are various chemicals derived from the lignin that are hazardous air pollutants as well as the fermentation process produces a large amount of CO2. So in most ethanol processes the CO2 is captured and liquefied and sold as a liquid CO2. Storm water and surface water. Again, on any project where you're clearing a large amount of land, and ethanol plants tend to take up

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a fair amount of square footage, surface water is a significant issue. And, hazardous solid waste there aren't as many in the ethanol process but there potentially are a few that need to be dealt with especially that can't be sold as bi-products to process. Next slide, please. Just quickly to go over some of the other advanced biofuels. I'll talk a little bit about

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pyrolysis. Pyrolysis is heating the feedstock in the absence of oxygen to basically break down the organic and volatilize those organic froths as a vapor. Depending on the level of breakdown that's done, which is a factor of time and temperature

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we make sure we … Go on to the next slide.

TOMMIE JEAN VALMASSY

I'm just having a little technical glitch here.

DAN PARKER

All right. Hopefully, it can switch to the next one. I'll just keep talking about pyrolysis anyway until we get there. So what happens is that

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pretty much feed stock is heated in the absence of oxygen, and based on time and temperature, various organic vapors can be pulled off of that, which can either be re-condensed as a bio oil or if it's broken down to more basic methane or very short chain organic trades for the thin gaps and the thin gaps

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can either be a re-condensed through a Fischer Trope type of reaction to form longer chain organics. And again, make a bio oil or it can also just be used as a natural gas analog. Many of the processes making thin gas are either burning the thin gas directly in a turbine to make electricity

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or cleaning up, compressing and re-injecting the thin gas into the natural gas grit as they are renewable replacements for natural gas. There is also a char, which is a generally a fairly pure carbon that's left over and again there are a number of uses for that including activated carbon type filter materials, soils

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or remediation material and various other uses for a fairly high purity carbon char, which is a process which concentrates a large amount of the energy from the biomass into the bio oil, and thin gas. So it's very useful in taking feedstocks that might

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be forest waste or other fairly low-density organic materials and converting them into a high value, high concentration of energy material that is much more easily transported. Again, this is also tracked with RINS, and with RFS-2. It has a number of feedstocks that are listed as being suitable for

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pyrolysis or gasification. Greenhouse gas reduction, very similar to what we see on the cellulosic biomass side of things. Typically in the high 80s to well over 100%. Just to note that some feedstocks that are not approved is plastics and rubber tires, although there is a fair amount of work being done toward obvious environmental reason on that, converting those

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as well through pyrolysis or other means. And if we can go to the next slide, please. This diagram shows a typical process. Again, it's not very specific because there's a lot of difference in various processes that are being used out there. So it's very hard to show any one process too typically.

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Typically, there is some level pretreatment done on the biomass to dry it, maybe to remove inorganics, silica, other impurities or materials. Generally, the organic material is reduced to a fairly uniform size pyrolysis, and then the pyrolysis system itself, removal of the char and the recovery of the products

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that should be either a thin gas or a bio oil. A lot of work is being done on controlling the conditions of the pyrolysis processes to be

able to get specific grades or types of bio oils. For instance, to get like a number two fuel oil or a diesel fuel analog. Again, being able to carefully control the process conditions. Most

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of the pyrolysis systems tend to be self-sustaining once they're operating and using their own organic material to heat the re-enaction. So generally, energy is only needed at the beginning to get things started. But again, that varies with the process. Environmental issues, again classification is a significant one on the permitting side. Air

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and water very much depends on the process, but there is potential for a wide variety of organic materials including carcinogens and other hazardous materials to be released from the system. So air permitting, solid waste permitting, and waste water permitting are all issues that need to be looked at very carefully when designing and siting these systems.

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The next slide, please.

TOMMIE JEAN VALMASSY

I just want to let people know that we'll be taking questions in just a minute or two. So you can type in your questions, and if you have a question you need to do that instead of raising your hand. Thanks.

DAN PARKER

All right, thank you. This table shows the typical yields based on time and temperature for a pyrolysis and/or gasification reactions. And again, the primary difference between pyrolysis

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and gasification is just time and temperature. Higher temperatures, longer times produces thin gas, less gasification. Pyrolysis is primarily lower temperature and shorter time. I'm sorry, higher temperature, shorter time. And that pretty much completes the presentation. The one thing I would like to comment on

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is that a lot of these projects have federal funding involved either through the Department of Energy, the USDA or stimulus funds. And almost all of this funding requires some level of NEPA Analyses on the project. And a lot of owners don't fully understand that a lot of this NEPA work has to be done up front to actually secure their funding and that typically

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at some point they're paying out of their own pocket. So it's something to be aware of in developing any of these projects that there can be a fair level of NEPA work that needs to be done. And again, Ken will be talking about that in further detail next here. So I'm ready to take questions. And I can be contacted if you look on the last slide phone number and email address is there if anyone wants to send in questions

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off line or later on.

TOMMIE JEAN VALMASSY

Great. Well, we did have a few questions come in and go ahead and keep typing your questions. As we said, we'll break between each speaker for a couple questions, and then we'll take some more at the end. So, Dan, a couple questions for you. One person writers they have seen POET and NOVA vines quoted in the press as saying they will get the production costs of cellulosic ethanol to under $2.00 in the near future and down to close to $1.50 within a few years.

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The question is, "Do you think those companies will meet those cost targets, and that cellulosic ethanol will become economical practical?"

DAN PARKER

I think it will. There's a lot of work being done on the technology, and advances literally everyday that are occurring. I think their time frame is very aggressive, and I'm not sure it will happen within short of a time frame. But I'm fairly

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confident within the next five to ten years we'll be seeing commercial cellulosic ethanol operations that are profitable. And again, as the technology develops and they kind of learn from their mistakes, that this will become a cost-effective technology. There are certainly a lot more cellulosic biomass out there available than any other feedstock.

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And, more than anything else, this really puts us on the road to energy independence. So I think all the work that's being done is very worthwhile and will definitely show cost benefits in the future.

TOMMIE JEAN VALMASSY

Okay, great. A few more questions here. "Can you talk about crushing algae as feedstock for biomass derived diesel?"

DAN PARKER

Yeah, that's a good one. We get a lot of requests now for algae

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biodiesel. Unfortunately, it's another area where the technology hasn't quite caught up with all of the hype. There's a lot of interest in algae, a lot of work that's being done, a lot of pilot operations are ongoing and a lot of research is being done on how to extract the oils from the algae. There's some fairly significant hurdles to overcome. Algae tens to have

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a very strong cell wall. It doesn't like to give up the soil very easily, and so extraction of the oil and doing it in a cost-effective manner has been one of the issues with using algae in feedstock. We do expect it within again the next ten years or so to come into commercial use with the feedstocks. But at this point in time, I don't know anybody doing any commercial algae that

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is able to do it and do it cost-effectively at least. I would certainly be interested if anyone has further information on that. We think it is one of the waves of the future here, but it's not quite here yet as far as commercial production goes.

TOMMIE JEAN VALMASSY

Okay. So someone writes in, "Can you talk about FOG, F-O-G, Facts, Oils and Grease from restaurants and

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other grease for other generators who might generate that like airports, schools, hospitals." The person notes that as municipal agencies it's a problem in their sewer systems, and they would like to learn how to convert that kind of waste to energy.

DAN PARKER

That's a great question. There's a lot of work being done now on the FOG and track grease is also another acronym for FOG.

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One of the issues is that it's typically very degraded. Generally, we're seeing free fatty acid levels of 50% or higher in collected FOGs. So the technologies need to be developed to handle this high free fatty acids. There's one we've been doing a lot of work called glycerolysis that converts the free fatty acids back into glycerides that can then be used in conventional biodiesel

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processes. And then this appears to be a very effective way and it can go all the way up to 100% free fatty acids. Some of the other issues we're seeing with FOG, and we've done a lot of testing in

our labs on FOG collected from all over the country is it's typically very high in sulfur. So there needs to be a sulfur renewable stages, and there are various ways to do this and it's practical, but it does add the

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process and costs. And typically the equivalent needed, the high initial capital costs to get set up to process solvents to biodiesel in terms of removing the phosphates, removing the sulfur compounds and processing the free fatty acids. But once all of this is done, it is a suitable feedstock. We are seeing some commercial operations now

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turning FOG into biodiesel and we're in the process of developing many more. And, I think this is definitely an area that we're going to see a lot more of in the future as these facilities prove themselves and show that they can process this material. And that will, of course, stimulate more collection. So that's really what we need is to get FOG on the waste water stream, keep it away from the

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sewage treatment plants and the public utilities and get it into the private markets where it can be turned into a viable fuel.

TOMMIE JEAN VALMASSY

Okay, great. So if a municipality is interested in pursuing that, where should they start? What's going to be first for them?

DAN PARKER

Well, certainly they can contact me and I'd be happy to put them in touch both with

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collectors and with the various technologies that we know of for processing the FOG and converting it into usable feedstocks for biodiesel. There's a few people a few people out there actually doing it. And I think it would be great to get some of them together with the ones that are looking at doing it. Maybe we can get some good solid forms going on how to do this.

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TOMMIE JEAN VALMASSY

Okay, great. Well, let's just take one more question right now before we move onto our other speakers. I know we have a few here so we'll try to get to those at the end and if you have a question go ahead and keep on typing it in. So Dan, someone asks, "For the high value bi-product from ethanol production, what types of industries typically use these chemicals and are there

good partnerships between producers and users or are the chemicals sold kind of on the open market,

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so to speak?"

DAN PARKER

To some extent it depends upon the chemical. There's a huge variety of these bi-product chemicals that can be derived. Some are base commodities like acidic acid, furfural, acid aldehyde. These are kind of base stock materials that were used in a wide variety of plastics and other chemicals. And if those are produced

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then typically you'd be selling those as a commodity on the open market. There are some specialty uses. Thermofitting resins, is one in particular. Lignin can be made into a replacement for formaldehyde based thermofitting resins, urea formaldehyde, melamine formaldehyde type resins. And this is a potentially huge market because obviously with the formaldehyde components these resins

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have some emissions that can be a problem. And if that can be replaced with an organically derived resin without those problems, there's a big market there. That market is not a developed market and so that would need to be done in partnership with probably the end-users so the thermofitting resins, the wood products industry, furniture industry, those sorts of industries that typically use those

[00:47:30]

kinds of materials. So I think it's going to be kind of a multiple front that this has to be addressed depending on the specific chemicals that are derived.

TOMMIE JEAN VALMASSY

And if you didn't, go ahead and write in and let us know if you have a follow up to that. And let's go ahead and move onto our second presenter, Jim Jordan, and you can keep on typing in questions for Dan. So Jim Jordan is a Senior

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Consultant with the firm of Parametrix. Jim's areas of expertise include land use planning, industrial facilities siting, socio-economic analysis, public involvement and impact analysis. He has managed both environment impact statements and environment assessments in compliance with NEPA guidelines as well as projects requiring compliance with Environmental documentation guidelines for several states. Jim has worked with clients to develop strategic permitting plans for project permitting

and subsequently

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directed investigations required for permit operation. So, Jim Jordan, the floor is yours.

JIM JORDAN

Thanks very much. Dan did a very nice job of outlining some of the environmental issues that projects sometimes have. And I'll just pick up from there. I really have two goals in my presentation today. First is to help create a little bit better understanding of the NEPA

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process and how it fits in with permitting and other types of things. And secondly, to offer some suggestions and recommendations to make the NEPA process a little easier to navigate. The first question is when is NEPA required because not all projects do need to go through NEPA. Typically, when a federal approval or decision is required NEPA is engaged

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or triggered. And those types of approvals or decisions are most commonly a permit. Use of federal funds would be a second one. For example, a grant from a federal agency. And third, federal projects themselves. So all three of those could be the basis for triggering some level of NEPA Analyses. And I like to think of NEPA as a public

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disclosure process to help decision-makers make informed decisions. And the better information and clearer information that we can provide to the decision makers typically the faster our process will go. Next slide, please. Now here are some terms bandied about that I'd like to give a little clarification to, if I may. And these are the environmental

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impact statement, environmental assessment and something called a categoric exclusion. And think of them in terms of no impacts, some are probable impacts and likely significant impacts. The greater the potential for significant impacts, the greater the level of environmental documentation that needs to be prepared. For example, if it's a project that has

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pretty good controls incorporated into your proposal, there may be a need for some technical studies, and a document called an environmental summary classification may be appropriate. Now, a lot of small projects that are using proven technologies that have their act clearly together would fall into that category. Bigger

projects there may be some

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using a less proven technology, might require an environmental assessment. And there's a whole process to prepare that document including something called scoping, and that is getting comments from agencies and the public on what needs to be addressed, conducting technical studies. There is a draft environmental assessment prepared, a public comment period and

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a final EA, or actually it's called a finding of no significant impact or FONSI. So now there's an EIS. This is when there's really a likelihood of having significant environmental impacts. And I'll talk in a bit about ways of lessening impacts. Another thing that can drive

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you into a higher level of environmental documentation, and this is very, very important, is public controversy. A couple nights ago I was watching the news on TV and someone was talking about a biofuel project, and one whiff whether it comes out of that staff is going to kill you. And that's the sort of thing that creates the public

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controversy that triggers warranted environmental analysis sometimes. And one of the things to do up front when you've developed a project description, which I'll talk about a little later is to meet with the federal agency to talk about what type of environmental documentation needs to be done. Can I have the next slide, please?

[00:53:30]

So who's going to look at this environmental document, and who do you need to prepare it for? There's something called a lead agency. And that's the federal agency that will be responsible for reviewing and approving your environmental document. It's called a lead agency, but there's also a whole series of other federal agencies that may be

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involved. For EPA it could be air and water hazardous materials, the Corp of Engineers. For fish and wildlife the National Marine Fishery Service if we have potentially endangered species issues. And then there's a whole range of other agencies that will have some interest with your project. These include Regional Air Quality Agencies,

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state resource agencies, tribes, and then, of course, that is as Dan mentioned earlier local agencies will be interested in things such

as planning, zoning, and building permit and the like. One thing I really recommend is that you try and understand who all these different audiences are, and write the environmental document,

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or have the environmental document written so that it responds to the interests and concerns of each of these different groups. And one of the reasons I say that is because many states, such as Washington State, have a state environmental policy act that is relatively parallel to NEPA. It's possible to prepare one document that covers both NEPA

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and SEPA. And if there's a good understanding of the issues, the audiences, you can kill multiple birds with one stone by preparing a very thorough document. Next slide, please. So what goes into one of these environmental documental documents? Generally speaking the more complex the document going from the categoric exclusion up to the

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EIS there is a more and more level of detail involved. So we have to talk about the effects or impacts associates with construction. And these may be things like noise, light and glare that's taking place at that time. If there is soil being moved around, it may be issues associated with water quality or erosion and so forth.

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And then there's the operation of the project, which includes the emissions from the project, maintenance activities that may have to take place associated with malfunctions, everything that has to do with actually making that project operate on a day-to-day basis. And Dan talked about a lot of the processes and some of the environmental

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issues with it. And I certain agree with that. Another ting that is many times forgotten is when an environmental assessment or an EIS is prepared; we need to according to NEPA look at alternatives to your proposal. That's something that gets forgotten and only gets picked up later on when me and the lead agency mentions it. And those alternatives may be process alternatives and there might

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be ways of laying out the project on your site, or they may involve different sites for your project asking you to consider a site that may have fewer environmental impacts than the one we're proposing. Okay, oh, one thing that's pretty important I want to mention here, and that is as you're going through this process

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or having someone go through the process for you, make sure that the documentation of what they do is very thorough so that someone could go to the literature or go to the field studies that were conducted and present with someone air quality and know the days they were out there the times of day, the conditions that were out there, everything that would help a reviewer understand what was going on at that particular

[00:58:30]

time and location. Next slide, please? I think that the part of environmental documents whether that's NEPA or some other environmental document what gets overlooked is the importance of a good project description. And I say this for a couple of reasons. One, is what we're trying to do is help the decision makers, regulatory

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agencies and the public understand what is it that you're exactly proposing to do? The second thing is that a good project description is not just used in the NEPA document. It can be used in state environmental documents and all your different permits can be used in the public relations materials. And it could also be used as a handout or a piece of information for

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people who might want to be investing in your project. When you're going ahead and developing that project description there are a couple things to keep in mind. One is that you need to upfront make a determination about what permits and approvals you are going to need, and write that project description so that you answer the questions that different agencies

[01:00:00]

want to know about your project. And I said, it's used again and again and again. And it's similar to practically everything that you do. I know that sometimes when I get a form to fill out for a permit, it leaves me a space that's maybe an inch high and says, "Describe your project." Well, a project can't be described in two sentences, not well.

[01:00:30]

So a good way to handle that is to say, "See attached project description" and append it to the permit application. That way you can write a much more thorough, understandable description of your project. And finally, clear graphics. Many times I've seen projects that have a location map that leaves me puzzled to where that particular project is.

[01:01:00]

In fact, we don't want that. We want to describe the process. And Dan showed you some excellent examples of an overview of a

particular process. Those are the kinds of things that need to be added to project descriptions for a better understanding. Next slide, please. Now, just as a philosophy in developing your project,

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because it goes with a number of federal and state policies, is how you deal with environmental impacts. There's a mantra, if you will, of three things to do. First of all design your project, if possible, to avoid impacts to the environment. Secondly, if you can't avoid them figure out how to minimize impacts. And then, if you can't

[01:02:00]

avoid impacts, detail what you're going to do to mitigate those impacts. And, in fact, if you approach a federal agency or state agency with a project description that says, "Here are the things that we're going to do to avoid impacts. Here are the things that we're going to do to minimize impacts, and here's what we're going to mitigate impacts." And make that part of your project

[01:02:30]

description. It does several things. One, it allows you to use the technologies and methods you want or think are appropriate to deal with impacts. And, two, it creates a stronger project description with a higher level of credibility, if you will. And finally, it's this material that

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you need to take pre-application meetings to help you be fully prepared to talk with agencies, whether it's a local planning agency or EPA or some other federal agency. And again, and try not to; not try; do not in your project descriptions try to minimize or understate impacts. It decreases

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your credibility and ultimately you will have to go back and do more studies. It's going to cost you more time and money. Next slide, please.

TOMMIE JEAN VALMASSY

I want to let people know that we will be taking questions in about five minutes. So if you have questions for Jim, you can type those in.

JIM JORDAN

I have five minutes? Okay. That's a subtle way to tell me. There are two different types of

[01:04:00]

impacts that we see in the literature. Those are a positive that we're trying to sell as a project as negative impacts that we

associate with things that we need to mitigate. And I just have presented some of those concepts to consider. Next slide, please. One of the things that you can do is as you're developing your

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project is to identify sites for that project that have low impacts. For example, you want to avoid sites if at all possible that have anything to do with wetlands or habitat. It greatly increases the cost and time involved in getting permits. It's often good to have a site reconnaissance done to determine you have no archaeological or cultural resources, there has been no prior

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hazardous materials on the site. And look at your neighbors to make sure that your project will fit in with the land use that's already there. Next slide, please. Dan has talked a lot about process impacts, and I just want to reinforce that by saying that certain air emissions, public health, if there are sensitive land uses like schools or hospitals

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nearby. All of these things need to be considered. And finally, one other point here is that you need to consider future costs of monitoring your project development to deal with the impacts. Next slide, please. I want to make brief mention about

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economic impacts particularly employment impacts because that's something a lot of the grant applications are requesting that you document, particularly as it relates to job creation and stimulus funds and so forth. And, in fact, there's a whole range of methodologies around to help you do that. Typically what happens is that if your project creates

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one new job in the overall economy of the region, it may be creating one or two additional jobs so that it's not just your one job on site. It could be three jobs total in the region. Not only is that important for grant applications and environmental documentation, it's also good for public relations information, too.

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Next slide. When you're evaluating impacts, something that's very important is to prove all of your statements about impacts. There's a whole range of ways that we can do that. Use of existing studies, things that manufacturers have documented about performance and equipment, any

[01:07:30]

new studies that agencies have already done or the projects you've done. You may need to site-specific studies and at times hire experts to come in and provide additional supporting

documentation. It's your job to prove the level of impacts that you currently have. It's not the federal agency's or the state agency's job to do that. Next slide, please.

[01:08:00]

The schedule. This is something you don't always have control over. But there are ways that you can minimize the length of the time line. And one of those is by having a good project that has few impacts, that you avoid public controversy and that you prepare thorough documentation. I encourage you to meet with agencies early

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and discuss issues associated with your project so that you can go out and deal with those issues, develop documentation, and then submit a good piece of information or good permits in those documents to the agencies. Last slide, please. Public relations. This is something that I think is

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really, really important. The public can be a wild card and they get upset. If they have bad information about a good project, it can upset elected officials. That has an impact on agencies and it can certainly require you to prepared more documentation than otherwise thought was necessary. So think about public relations,

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develop some materials whether it's handouts or what have you about your project. And in some cases you may in fact want to hire a public relations expert to help you. And you may have a public relations person from time to time assist you in the future simply to maintain good relationships with your neighbors and with the agency's elected officials. And one final comment and that is

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a philosophy I have and that is to plan the work and then work the plan. A lot of planning is critical to putting together a good project and making it successful. Thank you very much for listening to me.

TOMMIE JEAN VALMASSY

Great. Thanks, Jim. Well, we have time for a question or two here. And you can keep typing those in. So one for you. "Are there any benefits for public essential facilities siting?" Someone notes that

[01:10:30]

some agencies may have exclusions for essential facilities.

JIM JORDAN

Under the Growth Management Act in Washington there can be

some ways that you can site central public facilities in different zones that might otherwise be the case. I'm finding it difficult to think of

[01:11:00]

biofuel projects being the central public facilities, but I am sure there are some projects that would fly in that situation. But that's kind of a tough one.

TOMMIE JEAN VALMASSY

Okay, you were talking about public relations,

[01:11:30]

and anticipating issues and concerns. You know, there are probably standard concerns that come up with the public as far as locations and things like that. But is there anything specific to biofuel that would be an issue of concern for the public that people should anticipate?

JIM JORDAN

I think the biggest thing is emissions and then what are you going to do with the waste materials from your facility? But, you know, biofuels and lots of

[01:12:00]

different energy projects are interesting in that there are groups that want to use those fuel materials in different ways. For example, solid waste facilities that want to do a waste to energy project are opposed by recyclers in a lot of cases because they want to see the material recycled instead of incinerated.

[01:12:30]

So I guess opposing groups or groups that have different interests can come from a wide variety of different places. And then, of course, there are the sensitive area issues. If you have a lot of truck traffic near a school or a hospital or a park, certainly that will be of concern.

TOMMIE JEAN VALMASSY

Okay. Thanks. Well, if you have more

[01:13:00]

questions for Jim you can go on and keep typing those in. Thank you so much, Jim. Let's move onto our third presenter Erik Peterson. Erik, give me a second to pull up your presentation here. So, Erik Peterson is an Environmental scientist in EPA Region 10's Office of Ecosystems, Tribes and Public Affairs. As a member of the Environmental Review Unit, Erik reviews and comments on environment impact statements. His areas of expertise are forestry with a focus on the impact of roads and trails

and water quality, and

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transportation. His received is Masters of Science and Forestry from the University of Washington in the spring of 2007. Erik, the floor is yours, and if you will give me one second here, I'll pull up your presentation. And there we go.

ERIK PETERSON

All right. Thank you, Tommie. Thank you everyone

[01:14:00]

and thank you, Dan and Jim for the excellent introduction and all of the great information on biofuels. I put together this presentation really in a similar way that I would be preparing for the review of the environmental impact statement on biofuels. Unfortunately, there are no examples of environmental impact statements on biofuels that have occurred in Region 10,

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and that's Washington, Oregon, Idaho and Alaska. So the results of this literature view on national. They have implications for any analysis that would be done within this region. I'm going to start by just talking really briefly about the National Environment Policy Act which is Jim has done a really excellent job of introducing. And then, I'm looking to go into the issues that I

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discovered by reviewing existing NEPA documents across the country. Those include environmental assessments and environmental impact statements, as well as a report about some of the sort of discussions that are going on between project opponents and the Department of Energy, USDA and EPA. And I split those issues into sort of traditional NEPA issues, which is not

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a formal term. It's just my way of characterizing issues that sort of will be covered in the NEPA Analyses sort of regardless of the industrial process and then biofuel issues, which would be issues that I think are sort of conceptually unique to the products associated with biofuel as well as the benefit. Finally, I'll present and include some links to the specific NEPA analyses that are

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currently out there in the country at various stages, scoping, draft final and then I will have time for questions. So next slide, please. So I thought what Jim said about planning your project to already incorporate the mitigations is an excellent idea. And I think that another way of

[01:16:30]

putting the same ideas is to just plan your project in order to be

consistent with the intent of NEPA in sort of a complex world of environmental permits and regulations, but the original intent of NEPA, which is one of the original environmental laws in 1969 is to foster and promote the general welfare, to create and maintain conditions under which man and nature can exist in productive harmony, and fulfill the social, economic, and other requirements

[01:17:00]

of present and future generations of Americans. It's an easily understandable concept and I think if you keep that in mind it will help you to come up with a big project plan. The next slide, please. Some key resources, which I think really will just help link you to the sort of the regulations that speak to the concepts that

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Jim covered so well include the law itself, as well as the CEQs, Regulations for Implementing NEPA and NEPA's 40 most asked questions, which serve as a supplement to the NEPA regulations. I think it's really important to mention that each federal agency is going to have its own NEPA procedure. So

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you can't make generalizations about which agencies will require which level of NEPA Analyses like what time in your project planning. Jim is actually right that that speaks to sort of federal nexis the permit funding or it being a federal project itself. And the two agencies that are really funding

[01:18:30]

biofuels projects right now are USDA Rural Development Office and DOE Office of Energy Efficiency and Renewable Energy. I'll come back to link the specific offices and the needs analyses that they have out there right now. And, of course, there is case law. Next slide. So this map which I know you can't read the

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small text it and I apologize for that, but my intention is not to get into the details of this map. What is shows is the locations of existing biomass conversion facilities in the United States with 50-mile buffers. The point is, is that there is already a significant amount of biomass conversion facilities and a 50-mile buffer is what they decided to use as a sort of

[01:19:30]

zone of influence for each facility. Most of these I think are cellulosic ethanol facilities. So they're going to be interacting with those sources of feedstock. The reference on the bottom is to one of the only national level programmatic draft EIS on feedstock production and that's the biomass crop assistance program

[01:20:00]

of the USDA's Farm Service Agency. So the impact that I'm going

to talk about for the remainder of my time really relate to each facility and then their 50-mile buffers. I'll also speak a little bit to greenhouse gas emissions, which is obviously a global issue. Next slide.

[01:20:30]

So this slide is just giving us the idea that in your NEPA Analyses we really expect you to cover the impact associated with all of the phases involved in producing biofuel; feedstock production, feedstock logistics, conversion, distribution and end use. I think each of these phases is probably relevant for all of the different feedstock.

[01:21:00]

And so, in the next few slides I'll talk about traditional issues and then we'll go a little bit into greenhouse gas emissions and land use. Next slide. So I think when Dan said that most of his current advanced technology is going into cellulosic ethanol,

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I think that's reflected in the current literature, the current NEPA Analyses. They seem mostly to deal with cellulosic ethanol plants. This list there are resources from the table of contents of environmental assessments on the Blue Fire Fulton Renewable Energy Project in Mississippi. This list of resources I think

[01:22:00]

either use something very similar or you may include a few more categories on really any biofuels facility. Just to pull a few, sort of to take examples out of these issue categories. Obviously, each resources they have their own analysis done in its own and will be dependent upon the context of the project, and

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the EPA's viewpoint on that analysis, which is my core duty would be both related to the adequacy of that analysis and the impact that it disclosed. So I can't speak to all of the projects that are out there and their impacts on all of the resources. But just to use one example, I pulled out ground water and

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there's a project in Kansas called the Abengoa Biofuels Refinery. There's a draft environmental impact statement produced to analyze the impact of this facility. And one of EPA's concerns with their analysis was that they had characterized their use of water in terms of volume and rate but not in terms of percent of total capacity. Either the capacity of the municipal water supply or the

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capacity of the ground water. That being the overall aquifer or some side arm of the overall aquifer. The issue is certainly more complex than that relatively simplistic criticism, but the nature of

that sort of debate is an appropriate topic that takes care of the new NEPA Analyses. Other key issues

[01:24:00]

would be just different in terms of scale for biofuel refinery would be traffic. We would otherwise refer to it as transportation. This would be impacts like increased truck traffic that's going to have air quality implications. It's also going to have implications for the road infrastructure that the trucks are traveling on. I thought Dan did a nice job of mentioning

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hazardous materials such as glycerin, air quality, methanol emissions both of those associated with the production of biodiesel. So in your NEPA Analyses these various sections would be the appropriate place to disclose those impacts. In addition to analyzing resources, I think it's important to think about these kind of key components

[01:25:00]

of NEPA, those being the purpose and need and the range of alternatives. The purpose and need often can be written either too broadly or too narrowly. They were looking for the appropriate middle ground and sometimes in the NEPA Analyses that I read on biofuels they are limited to the legal mandate that they are trying to meet and

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don't speak very much to the broader public interest. So in an adequate purpose the needs statement you would want to address both the agency's purpose and need as well as the project component's purpose and need and in that you would want to capture the broader public interest in engaging in this activity. On the range of alternatives, I really appreciated Jim's discussion of

[01:26:00]

sort of how you're going to think about the timing of engaging in the NEPA process and how are you going to develop alternatives? If you engage in the process at a late time decisions like where is the facility going to be sited or how will it be constructed or the processed technology, they will have likely already been made and cannot form a real alternative.

[01:26:30]

So we simply recommend that the NEPA process be started as soon as possible, but obviously you have to coordinate with the lead agency in terms of when their permit process is triggered or their funding source. I think that's good enough on traditional issues. Let's move onto the next slide.

[01:27:00]

So I thought one of the key issues associated with biofuels would

be the lifecycle greenhouse gas emissions. And, this has been sort of legally mandated by the Energy Independence and Security Act of 2007 and the EPA have conducted the renewable

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fuel standard program regulatory impact analysis, which is a large-scale lifecycle analysis. But you can learn much more about by going to the Office of Transportation and Air Quality. It's EPA's Office of Transportation and Air Quality. They have a section on fuel and fuel additives. Within that website you'll find a lot more information on the renewable fuel thing. I simply included this table

[01:28:00]

because the it's the type of table that we would expect to see disclosed in a NEPA document. And then we would expect this to be related in some way to the project itself. So I've quoted the bottom line conclusion from the Blue Fire Fulton Renewable Energy Project, which is the cellulosic ethanol plant in Mississippi. They use their percent of petroleum greenhouse gas emissions reduction

[01:28:30]

rate of 86% and come up with 107,612 tons per year CO2 to offset as compared to petroleum. I think is the type of conclusion that we would expect to see in this section in a NEPA Analyses. and definitely referencing EPAs Renewable Standards is important. Next slide.

[01:29:00]

The other issue that I pulled out, which I think these are not the only two issues which are conceptually linked to biofuels production. But I think feedstock production is the key issue that has caused some intriguing debates that makes the analysis

[01:29:30]

of global indirect land use change, which they give tackling through their renewable fuel standard lifecycle analysis, and I just quoted a list of area feedstocks. I don't think it's comprehensive. From that list, I just pulled out the feedstock that would come from agriculture and forestry. I thought I would mention a few of these sort of discussions that are occurring from the NEPA

[01:30:00]

literature. In terms of agriculture EPA commented on the Abengoa Bio Oil Refinery in Kansas and their analysis of impact to the soil. And basically, if you take off an unsustainable amount of biomass, you are going to adversely impact soil. EPA's

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comment was that based on USDA's Renewable Energy Assessment Project was that using the rate of biomass retention

that would maintain soil erosion or would prevent soil erosion is actually less conservative considering what is required to maintain soil productivity and soil carbon. That's a

[01:31:00]

somewhat complex idea and when I get to the links to the specific need to document, I also have a link to EPA's comments on that need to document. In terms of forestry, what we're looking at in terms of the feedstock production would be the difference between sort of business as usual, which is burning trash piles in the forest versus transporting those materials to one facility.

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Those are going to have impacts again on the soil and the forest, the micro nutrients, the soil productivity. Also you're going to have implications for air quality, whether that air quality is spread over a large area or brought to one central facility. And a whole suite of other issues associated with the difference between sort of business as usual and what is required to produce feedstock.

[01:32:00]

All of those are going to be relevant within that 50 mile arrangement. Finally, adequate feedstock. This is another element that we would expect to be disclosed in the need to document that would say that the bio facility will be located inside X for the Fulton Project in Mississippi their analysis concluded that there was three times the amount of non-merchantable timber

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surrounding the facility itself than what is required to sustainably continue running the study. So that type of conclusion and analysis you would expect in these documents. So, next slide.

TOMMIE JEAN VALMASSY

We will be opening up the floor for questions in about two or three minutes.

ERIK PETERSON

Perfect. This is I think going to the sources themselves. It's better

[01:33:00]

than getting my sort of sampling of the issues that are considered in these NEPA documents. There are many more related to all of those resource areas and they are specific to the context of each project. So I've pulled out just a few I think interesting examples and recent examples. For the U.S. Department of Agriculture Rural Development they have a few

[01:33:30]

funding mechanisms that are triggering NEPA, a recent environmental assessment with the Sapphire Energy Integrated

Algal Biorefinery. I think that is probably a big source for more information. For the person who was asking about algae. Also, a national level document the Programmatic Environmental Assessment for Rural Development's Proposed Rules Related to Biofuels Development. It's a great brief understandable document on the sort of broad scale impact.

[01:34:00]

I already mentioned the EIS from Kansas, from the Department of Energy and there's a link to the EPA comment to that as well as a link to the environmental assessment on the Mississippi project, which I just discussed the impact. The next slide. On the NEPA Analyses the four that I've

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listed are four of about eight or ten that exist nationally. I think that this is really a new and emerging technology and there is not a long history of NEPA Analyses. So many questions remain unanswered. But EPA, of course, supports clean sustainable energy and our mission is to protect human health and the environment and that is the intent of NEPA. And NEPA is about accurately disclosing impacts and trying to mitigate them

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and just trying to make decisions in the light of day. Thank you.

TOMMIE JEAN VALMASSY

Great. Thank you, Erik. We had a couple questions come in. If you have any more questions go ahead and put those in. And this one I think is kind of for Jim Jordan as well as Erik. And so both of you might want to comment on it. Someone asks, "Do you see any conflicts with a biofuel plant adjacent to a waste water treatment plant with the goal to use the fuel to help offset costs to run the plant?"

[01:35:30]

DAN PARKER

I guess I would answer it depends. I mean, that's actually a serious answer. And it depends really on what the impacts of one facility and adding another one would be. In general, using one type of material to fuel

[01:36:00]

another facility is a great idea, but it doesn't mean you're home free. It does need to be looked at in terms of those cumulative impacts. Erik, what do you think?

ERIK PETERSON

Yeah, one mitigation strategy within a lot of the NEPA Analyses is sort of co-location of these facilities. It helps with the transportation

infrastructure. Which is generally

[01:36:30]

inadequate, or if these are ... Jim, you and I spoke about this briefly when a facility is built in a totally new location, you have all of the infrastructure concerns

JIM JORDAN

Good.

ERIK PETERSON

Co-Location depending on the capacity of the local infrastructure could go either way but it may be a mitigation.

JIM JORDAN

Sure.

[01:37:00]

Good point.

TOMMIE JEAN VALMASSY

Someone mentioned the EPA Region 7 had published two comprehensive documents, Environmental Laws applying to building modifying and operating of biodiesel or ethanol plants. And provided us a link to that. So that's something we are happy to send out to folks. Erik, are you familiar with those documents?

ERIK PETERSON

Is this the EPA Region 7?

TOMMIE JEAN VALMASSY

Yes.

ERIK PETERSON

Right. Yeah. I am familiar with that document.

[01:37:30]

I think it's a good document. It's produced by the same units that I knew here in Region 10 and right excellent document 2007. So fairly recent.

TOMMIE JEAN VALMASSY

Well, great. Someone asked, "What is the typical time line for a lead agency to review and respond to a biofuel NEPA Analysis, and how does that compare to a traditional NEPA review?"

JIM JORDAN

Erik.

[01:38:00]

ERIK PETERSON

Well, EPA reviews the lead agency's analysis so Jim may be better at speaking from a project dependent perspective.

JIM JORDAN

I think the only thing that might make a difference is if there are new technologies involved that might cause the lead agency to ask for more information, but generally speaking

[01:38:30]

there probably shouldn't be much difference. Again, as I mentioned earlier, inside public controversy, a strange new idea. Something, an area he isn't familiar with can add to that review process. It just does.

TOMMIE JEAN VALMASSY

Okay. A few more questions here. Does EPA evaluation of the sustainability of feedstock

[01:39:00]

production include a review of the nutrient uptake demands of the specific feedstock?" The mention, "The nutrient flow will determine how much nutrient replenishment it needed in the use of crop residues as a variant fertilizer and cover mulches are critical for continued soil fertility and feedstock sustainability."

ERIK PETERSON

Yeah, I think that's a key question that gets to the heart of what I think I went over

[01:39:30]

quickly in terms of the soil impacts. I put notes of agriculture up there because it's a conservation project practice, which is probably thought to be environmentally beneficial. And if you remove that biomass at what rate can you remove that biomass and still maintain the productivity of the soil? Which depends on the nutrient cycle and the amount of organic in the soil profile. So EPA's comments on that

[01:40:00]

topic. We referenced the USDA's renewable energy assessment project. And I think the Programmatic Environmental Assessment that I referenced on the website does a good job of summarizing the sign on sort of what rates of biomass removal or different crops are sustainable and at what point are they sustainable from a sort of wind and water erosion perspective.

[01:40:30]

And at what point are they sustainable from a soil productivity

perspective and at what point are they sustainable from a maintaining soil or organic carbon in the soil profile as that relates to lifecycle greenhouse gas emissions? I think there's a lot to be … It's a huge area of question for feedstock production.

TOMMIE JEAN VALMASSY

Let's see.

[01:41:00]

"Are there any biofuel projects or studies from bamboo or bamboo biomass?" I believe that's directed to Dan Parker.

DAN PARKER

Yeah, there's been some work done on processing bamboo, and not as much as other resources. And, I'm not sure why and I think maybe there are some environmental implications

[01:41:30]

to be used in bamboo that might cause some concern, but bamboo is used as a paper making fiber, and as such it's processed in a very similar way to cellulose ethanol processes. So it could be used. But I know that what has been done to date has been fairly limited. It's mostly focused on other agricultural bio.

TOMMIE JEAN VALMASSY

Okay.

[01:42:00]

Dan, someone is specifically asking for your opinion. They want to know do you think that as the cellulosic ethanol industry and some better diesel industries matures that thermal chemical and Fischer Trope pathways are preferred to enzymatic and fermentation pathways? Mainly because lignin can be converted to thin gas, but not fermented.

[01:42:30]

DAN PARKER

No, that's a good question. I think the Fischer Trope and the other synthetic chemical pathways are definitely going to become more prevalent. There's an inherent potential for higher efficiencies there than you get through the fermentation. Also, it's much easier to custom and tailor those processes to get specific products

[01:43:00]

such as a specific diesel fuel rather than a fairly broad spectrum, a group of organics that you then have to deal with and separate which can be energy intensive and fairly expensive. The one advantage, of course, to fermentation is it is simple. And we've been doing this for many thousands of years, and that does make it kind of a straightforward

[01:43:30]

and reliable direction to go. But I think as the technology improves there's a lot of the research that's being done on these synthetic pathways gets better, but we will see them become probably the majority method and some of the other methods will either go away entirely or become smaller contributors to the fuel stream.

TOMMIE JEAN VALMASSY

Okay.

[01:44:00]

In RFS-2 someone said that they felt like EP put a lot of stock in cellulosic diesel and they wanted to know your take on development of cellulosic diesel. And is it coming along faster or slower than cellulosic ethanol?

DAN PARKER

Well, definitely slower. There's a lot more money being put into cellulosic ethanol at this point not quite the same level of funding in cellulosic diesel.

[01:44:30]

So I think although we're going to see some advances in it, it's not going to happen nearly as quickly. Obviously in cellulosic ethanol there's already a number of demonstration plants at a commercial or near commercial scale that are being built, are in operation. And many more are being planned within the next couple of years. We are not seeing that same level of development

[01:45:00]

going on in cellulosic diesel fuel. And as I mentioned in my presentation, I think cellulosic diesel will start to be a larger percentage of the renewable diesel area. But it's still going to be a very, very small part of it for a number of years to come.

TOMMIE JEAN VALMASSY

Okay. Well, earlier we were talking about FOG, The Fats, Oils and Greases, and someone said they're aware that

[01:45:30]

the City of San Francisco is using FOG from food vendors to create biodiesel for their agency fleet. Are you aware of any other agencies and municipalities that are using FOG or track grease for biofuel?

DAN PARKER

Well, actually, I'm familiar with the project in San Francisco and I believe they're still developing that. I'm not sure if it's 100% in production at this point. But it is

[01:46:00]

one of the first of its kind and an excellent project to demonstrate the technology. There are a number of other cities that are talking about it. New York, Miami, are a couple that we've talked to fairly recently on the project. But, I must admit I can't think of any at this point that are actually developing

[01:46:30]

a project. Most of these projects need a fair amount of funding. There are certainly intensive in terms of capital equipment that needs to be put in up front. And a lot of them have a lot of private dollars that are needed to really push these projects forward. We are seeing a lot more grease collectors who are collecting FOG

[01:47:00]

and processing it. For a while it was kind of the chicken and the egg. Even if you wanted to make biodiesel out of FOGs you couldn't because nobody was actually collecting it. So now we're seeing a lot more collection with more brown grease available, and now it's sort of the profit and technology needs to keep up with that. And probably even more importantly is funding needs to come in to be able to fund these for a project.

[01:47:30]

We know maybe a dozen or more private organizations that are looking to partner with public agencies to convert FOG with biodiesel, but at this point none of them actually have operating facilities. Probably the best place to look for that sort of thing is Europe at the moment. They're a little ahead of us in that area, and are doing

[01:48:00]

a little bit more in the area of both collecting and processing waste, oils and grease that will lead into fuel.

TOMMIE JEAN VALMASSY

Okay, and what did you say about New York and Miami, they don't have programs there but they were looking to start them?

DAN PARKER

Yeah, they're looking right now to start the programs, primarily being driven by their waste water treatment and utilities.

[01:48:30]

They're already getting grease problems with a large amount of waste grease that's just thrown into the sewer system and then plugged up lines. And if it makes it all the way to the plant, it causes a number of problems in plants. And so they see it as a problem that they do need to address especially as the populations expand and more and more it becomes a problem.

[01:49:00]

We probably get contacted three to four times a week by someone looking to do these sorts of projects, especially in a lot of interest in towns there. And I think as more and more people build the interest and the funding starts coming into it to fund these sort of projects we're going to see more happen.

TOMMIE JEAN VALMASSY

Okay great.

[01:49:30]

All right, well someone actually wrote in and just wanted to mention about the San Francisco project for FOG. They're using technology from Philadelphia.

DAN PARKER

Yeah, the company used to be Philadelphia for biodiesel. They're now called Black Gold, is the name of the company where they're based out of the Philadelphia area. And either they use solid phase catalyst acid verification technology to

[01:50:00]

process FOG up to I believe it's 40% free study acid level. So we can take a moderately degraded FOG up to about that level.

TOMMIE JEAN VALMASSY

Okay. Well, I want to give all of our presenters kind of a chance to give us your take home message or your parting thoughts here before we have to close out. So maybe I'll just go in order. So Dan, is there any real take

[01:50:30]

home message or tip or closing thoughts that you want to share with people today?

DAN PARKER

Probably the main thing is that there's a lot happening right now in the biofuels arena. There's a lot of interest in renewable fuels, and the one thing we really want to see is a lot more research into including the technologies

[01:51:00]

and improving the energy efficiency and the cost-effectiveness of the technology. As engineers who get asked on a regular basis to install these sort of systems we frequently have to say no that we can't do it. That as much as we would like to there is not a technology that is commercially viable out there. So we definitely want to see more work done on that end.

[01:51:30]

And, in particular we're seeing a trend toward low cost feedstocks to get away from the food based higher quality oils and fats and materials and make use of resources that right now are just going to landfills or other waste directions. And, we definitely hope to see that trend continue. And as people kind of work their way down the food chain,

[01:52:00]

to the waste materials.

TOMMIE JEAN VALMASSY

Okay, great. And Jim Jordan with Parametrix, what about you? Any take home message or closing thoughts you wanted to share with us?

JIM JORDAN

Sure. Biofuels, as Dan was saying, certainly are going to be a growing industry. We need to know more about the environmental issues associated with biofuel processing. And one of the things that I would like

[01:52:30]

to see is federal agencies, whether it's EPA or the Department of Energy, start to develop some more programmatic analysis about those impacts that can help the individual project component document his types of impacts.

TOMMIE JEAN VALMASSY

All right, thanks, Jim. And last but not least

[01:53:00]

Erik Peterson with EPA Region 10. Any take home message or closing thoughts for us on this topic?

ERIK PETERSON

Yes, I think that one of the most interesting things that I learned was that there really is not a lot of precedence in the NEPA world for these analyses. So the links that I provided really are to the eight or ten analyses that are out there. So they've got a real opportunity for creating a better

[01:53:30]

understanding of the environmental and energy tradeoffs associated with biofuels production. And there is indeed a need for more programmatic assessment. I just wanted to mention one that I did not mention, which was the USDA's Biomass Crop Assistance Program, which does have a national analysis of a feedstock production, which is different than a lot of the other feedstocks mentioned in the webinar,

[01:54:00]
but that's my closing thought.

TOMMIE JEAN VALMASSY

Okay, thanks, Erik. Well, I want to thank everyone so much for attending today, and thanks to all of our speakers. I want to remind folks that later you will get an email from the go to webinars, and it's going to ask you for a little bit of feedback today. And that's your opportunity to give us some input and also let us know what you would like to hear about in the future. With that, I'm going to hand it over to Ashley Zanolli from EPA to wrap up and remind you about

[01:54:30]
the next Biofuels Webinar. Ashley.

ASHLEY ZANOLLI

Great. Thanks Tommie Jean. And I would especially like to thank all of our speakers again and all of you for taking time with your busy schedules to join us today. The next webinar is going to be on Tools for Researchers and Policymakers and that's tentatively slated for Tuesday, July 20th from 10:00 to 11:00 Pacific Standard Time. So look out for that evaluation you'll receive from Go To Webinar, and if you have ideas for future topics you'd like to hear about or if you have additional follow-up questions,

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feel free to email me directly. Thanks again, and we'll be signing off.

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