



Transcript of CleanLaw Episode 24: Joe Goffman Talks to Jon Lewis about Biofuels – Part 1, August 16, 2019

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- Robin Just: Welcome to Clean Law from the Environmental & Energy Law program at Harvard Law School. In this episode, our executive director, Joe Goffman, speaks with Clean Air Task Force Senior Counsel, Jonathan Lewis, about biofuels. They discuss the history of biofuel mandates, the challenges of lifecycle analysis, the problems associated with land use, the difficulty in meeting annual mandates, and they talk about what US biofuel policy should really be focused on. At around the 30 minute mark, the conversation moves from the transportation sector to power generation. It's also the same time a very loud thunderstorm moved through Cambridge, so you can enjoy some nature sounds as you contemplate the nature of bioenergy. We hope you enjoy this podcast.
- Joe Goffman: Hi Jon. Thank you for coming by to talk to us about a perennial Clean Air Act implementation issue, the Renewable Fuel Standard. I gather this is an issue that you've been following for a long time, and have developed a lot of expertise on.
- Joe: One of the reasons that we thought it would make sense for us to do a podcast episode on it is that the setting of what is called the Renewable Volume Obligation is the one regulatory action that everybody can count on the EPA doing every single year, no matter what the administration is, Democrat or Republican. It's always in the news, at least in the trade press, so I thought it would make sense for an expert like you to come by and talk. Just start out giving us a primer on how the Renewable Fuel Standard works.
- Jon Lewis: Sure. Well thanks for having me, Joe.
- Jon: The Renewable Fuel Standard was first created in 2005, then dramatically expanded in 2007 when Congress passed a giant piece of energy and environmental legislation called the Energy Independence and Security Act. At the time EISA, as that bill was called, was passed, the United States was producing around six billion gallons of biofuels, and EISA created a program to expand biofuel production and consumption in the United States from that roughly six billion gallons to 36 billion gallons by 2022. So a giant expansion, a giant commitment to biofuels as the transportation fuel of the United States.



- Jon: The reason that Congress said it was pursuing the RFS was to provide price support for farmers, to reduce greenhouse gas emissions from the transportation sector, and to improve US energy security.
- Jon: The program has had a mixed set of results on all of those fronts. In some cases, like energy security; to the extent the concept makes sense, it's been mooted somewhat by the extensive discovery of fracked natural gas and shale oil.
- Jon: On the environment's, I think we'll probably discuss later today: My organization, the Clean Air Task Force, has deep concerns about the environmental impact of the Renewable Fuel Standard, largely because instead of 36 billion gallons of different types of biofuels, including biofuel that's made from cellulosic feedstocks and other feedstocks that have low land use impacts, it's largely being filled by corn ethanol. And corn ethanol impacts the environment negatively in a bunch of ways we can discuss.
- Jon: And then on price support for farmers, it's not really an area that I can speak extensively about, but farm economies have, for centuries, been defined by boom and bust cycles. Unfortunately, the RFS hasn't really changed that. There's the same sort of booms and busts in the corn sector; they continue to be vulnerable to weather changes, to international market changes like the current tariff war, and so it's hard to sort out the signal from the noise on the economics. But it hasn't solved farm economy problems for corn growers and others.
- Joe: It just so happens that I was on the Hill working in the Senate when both the Energy Policy Act of 2005, EPOA, and EISA were enacted. If I remember correctly ... I guess my vantage point was working for a senior member of the Environment and Public Works Committee ... there was a lot of emphasis on the environmental, in particular the greenhouse gas, benefits of biofuels. There was a great deal of rhetoric invested in hopes that cellulosic and what were called advanced biofuels would be produced and used widely in the RFS program. It was a big selling point. I think, at least when the advocates of the program came by the offices of the Environment and Public Works Committee members, the farm subsidy aspects of it were muted, to some point.
- Joe: Could you lay out the sort of implementation process? If I've got it right, the agency is obliged every year to set volume obligations for ethanol, and separate obligations for what are called advanced biofuels. And EISA includes a net greenhouse gas impact, based on, at least, the snapshot of the production cycle. It's a technically complicated program, it would helpful if you could lay that all out.



Jon: Yeah. The legislation, EISA, creates four mandates, which are nested within each other, to some extent. You have, as you mentioned, what's often referred to as the implied corn mandates. By 2015 that was expected to grow to 15 billion gallons per year. It's around a tenth of the US gasoline consumption.

Joe: So basically it requires refiners of motor fuels to blend, in total, 15 billion gallons of ethanol.

Jon: Into the gasoline. That's the gasoline that powers our cars currently, is referred to as E10 because it's 90% gasoline, 10% ethanol.

Jon: The other four buckets of biofuels that were mandated by EISA were the advanced biofuels, and in 2022 when the production and consumption schedule described in EISA concludes, there were supposed to be 21 billion gallons of advanced biofuel.

Jon: To qualify as advanced biofuels, there are a couple of different criteria set out by Congress. The first is that it has to achieve greenhouse gas emissions that are at least 50% lower than those of petroleum motor fuels.

Jon: The second criteria, which was foresightful of Congress, is that biofuels made from cornstarch, which is the main ingredient of corn ethanol, cannot qualify as advanced biofuels, even if they were to somehow achieve a 50% reduction.

Jon: Within the advanced biofuel bucket, there are two subcategories. The first is biomass-based diesel, typically biodiesel, something that can substitute for diesel used in truck engines and other diesel vehicles. That, Congress wasn't as specific about how much that volume was to expand over the years. It was something less than five billion gallons, was the upper limit on that.

Jon: Then the big bucket, the bucket that most of the environmental hopes of the program were put into, so to speak, is cellulosic biofuels. And so the plan was for cellulosic biofuels to grow from basically being non-existent in 2007, to 16 billion gallons by 2022; so even larger than the size of the mandate for corn ethanol, which at that point was a fairly mature industry that was growing.

Jon: In hindsight, that seems like an impossible technical or commercial challenge. But there was a lot of interest at the time, a lot of support for the promise of cellulosic biofuels, both within the biofuel industry, but also at certain environmental groups, and around policymakers who were looking for ways to reduce greenhouse gas emissions from the transportation sector.

Jon: And so, to qualify as a cellulosic biofuel and get those types of credits, the fuel has to have lifecycle greenhouse gas emissions that are at least 60% lower than



those of petroleum fuel; has to be made from cellulosic material, which is heavy cellulose or lignin ... the parts of the plant that give the plant structure, but typically aren't parts that you can eat, so this is not the corn kernels but the stalk that support the corn kernel. That, like I said, was envisioned under the program to grow from essentially zero gallons of production to 16 billion gallons of production over the course of 10 to 15 years.

Joe: So the legislation really actually walked the talk. There was a certain amount of truth in advertising, because that's a major piece of market pull policy to project over a 10 or 15 year period, that amount of an advanced technology, in the form of a fuel that, as you just said, barely existed.

Jon: Correct me if I'm wrong about this, but I think it was actually the first piece of federal legislation to require greenhouse gas reductions.

Joe: I think that's right. You made reference to greenhouse gas reductions on a lifecycle basis, that required the EPA to do an analysis of the lifecycle from plant to tailpipe of the overall net greenhouse gas impact.

Jon: Right.

Joe: A very sophisticated definition of reductions and required the EPA to do sophisticated analytic work.

Jon: And the definition of lifecycle greenhouse gas emissions, in hindsight, is excellent. It's something that we encourage lawmakers to port into different bills that are being written now. But it's an incredibly complicated exercise, and that's been part of the reason the RFS has stumbled over the last decade or so.

Jon: The reason it's complicated is because a key factor in the total lifecycle emissions is the impact on land use. And so when you are setting mandates for the production and use of the biofuels this large ... 10% of the total US gasoline supply ... and you're building those biofuels out of plants, which are not particularly dense, in terms of the energy feedstocks they supply, it requires an enormous commitment of land. So the amount of land that was being used to grow corn began to grow quickly in the United States.

Jon: What happens when you create an additional market for an agricultural product but it's not a food product? It's not as if the rest of the world started to eat less to accommodate this new demand for biofuels. And so what it amounted to was a economically different process by which the rest of the world needed to bring more land into production, or increase the productivity of land that was in production, to accommodate this new demand for plants that are being used to make biofuel.



- Jon: So we know that process is happening, but measuring to the extent that it's happening, how much additional farmland is being created that's being turned from forest into farmland to accommodate this new demand, is not something that can be measured, it has to be modeled. And the models that are used, these lifecycle emissions models, are heavily dependent on a giant number of assumptions, some of which are poorly understood.
- Jon: So while it's really important to understand what the lifecycle of a greenhouse gas emissions of the different biofuels that are available to us and potentially available to us is really important ... this is a key aspect of the program ... we really don't know. And that's led to a lot of confusion, disappointment among some of us who really believe that we need to get concrete emissions from the transportation sector, and frustration from the companies and entities that are regulated under this program.
- Joe: What tends to grab the headlines every year, as the volume obligations that are set, is the tension or even conflict between the producers, but essentially the corn growers and the refiners, because the corn growers really, I think, in practice process this as a subsidy program, and they have to make commitments upstream as to what land they're going to put in their production, how much they're going to plant, how much the ethanol refineries are going to devote or invest in capacity to refine, so there's, if you will, a counting on the volume obligation be set at a certain level.
- Joe: Meanwhile, if I've got it right, the producers of gasoline, for the most part, use some amount of ethanol anyway for their own market reasons, but are resistant, and sometimes claim that it's impossible, to blend as much ethanol as the EPA, in its attempt to implement the statute, requires them to.
- Jon: Right.
- Joe: It seems like every single Congress, one side or the other ... and this is before you even revisit the environmental objectives ... is shopping for a way to change the program.
- Jon: Right.
- Joe: And they manage to create a nice dynamic stalemate. Do you see any progress? Is there?
- Jon: I don't know if I would term it as progress, but there's a couple new things happening on that front. As you mentioned, each year EPA is required under the statute to essentially translate the annual volume targets that are in the statute into a requirement that they impose on refiners each year.



Jon: Part of the challenge for EPA over the last 10 years has been while the statute envisioned this rapid scale-up of the production of cellulosic biofuels, that hasn't happened. And so there are provisions in the statute that allow EPA to waive down the cellulosic obligation, and there's another provision that allows refiners essentially to pay a biowaiver credit rather than buy whatever cellulosic biofuel might be available. And there's very little available.

Jon: For the last couple years, EPA has had to waive down the cellulosic mandate by 90, 95%, so that instead of being in the billions of gallons, it's in the hundreds of millions of gallons. Most of the cellulosic biofuel that's actually earning credits under that bucket isn't actually biofuel made from cellulosic material as envisioned. It's things like renewable gas from waste operations.

Jon: So anyway, the point of me bringing up cellulosic biofuel is that every year EPA has to do this massive adjustment to the program, and because the program is constructed somewhat like a Russian stacking doll, that affects the other buckets that we mentioned earlier, the advanced bucket, and then the overarching renewable biofuel requirement.

Jon: So a couple things happened. Because EPA has had to reduce the cellulosic mandate repeatedly, it actually triggered a provision that now requires EPA to rewrite the statute in a sense, as it applies to the annual volume obligations. This was going to happen in 2022 by the terms of the statute anyway, but now the timeframe for EPA engaging that process is moved up, and we are waiting on the agency to issue its first proposal for how it is going to set volumes going forward for each of these different buckets. That's the first thing that's happened.

Jon: The second thing is that-

Joe: Hang on.

Jon: Sorry.

Joe: I want to make sure I've got it. As you waive down the amount of advanced biofuel, cellulosic biofuel, that the agency can mandate, because that is a component of an overall renewable fuel and biofuel budget, or mandate, that overall has to be recalculated?

Jon: Yeah.

Joe: You said there's a second thing.



- Jon: Well the second thing is if you have a gasoline car in the United States, you're driving on E10, gassing on 10% ethanol. If you are driving a recent car, your car can tolerate something higher than E10, more ethanol in your gas. Modern cars, cars built in the last 10 years say, are certified to run on blends like E15. Older cars however, are not designed for that, and cars with poorly maintained emission systems are also not going to run well on what's called E15. And so there's a very understandable hesitancy to put E15 into the market in any real way. That has resulted in what people call the E10 blend wall, which means that in a lot of ways there's a functional limit on how much ethanol the US gasoline market can absorb. So because the RFS has so far succeeded pretty much only in putting a lot of corn ethanol into the gasoline market, limiting the amount of ethanol that can go into the market has its environmental advantages.
- Jon: However, if there were such a thing as cellulosic ethanol in commercial volumes, this would prevent that cellulosic ethanol which is by statute, 60% better than gasoline, from displacing gasoline.
- Jon: The blend wall issue is a complicated one, and it's one that Congress has tackled. There was a bill introduced a couple years ago by Senator Deb Fischer, proposing to change a section of the Clean Air Act that prevents essentially the use of E15 year-round. That was voted down by Congress, for legitimate reasons, reasons that we supported, reasons that we encouraged.
- Jon: EPA has looked at this several times. They previously did not think that they had the authority to allow the year-round sale of E15, but then last year President Trump committed to allowing year-round sale of E15 and EPA had not yet identified a legal basis for doing that, but they proposed a rule in spring 2019, and then finalized it very shortly within two months, even though there was a lot of other stuff, including the power plant GHU rule in the docket, they fast tracked this. So now, according to the EPA rule at least, this E15 can be sold year-round. Its stated purpose is to alleviate this bylaw concern.
- Jon: Many of us think that EPA's stated legal basis for allowing year-round sales of E15 is flawed and likely to not survive a legal challenge. All this sort of speaks to the complexity of setting these annual mandates because a bunch of different issues that EPA has to take into account. They can only get so much ethanol into the market, because of the blend wall. They don't have the fuels available to them that the program was supposed to incentivize, and then for reasons that are not clear to me, the statute was unclear about how much biomass-based diesel, biodiesel was supposed to go into the program and qualify as advanced biofuel each year.
- Jon: And so you've got a bunch of different sectors of the biofuel industry all sort of in there with EPA, arguing. The cellulosic biofuel industry doesn't like it when



EPA drops the annual mandate down close to zero because they think that removes the incentive for other industries to invest in their product. The corn ethanol industry, which is that 15 billion gallons of statutory maximum, would like to go above 15 billion gallons, and they have some questionable legal theories for how they might do that. The biodiesel producers don't like it when EPA shrinks the advanced mandate, when it shrinks the cellulosic mandate, because they want to fill a bigger chunk of that. The EPA is starting to understand that some of the lifecycle accounting around biodiesel is a lot more complicated than what was originally thought, and biodiesel might actually be the most environmentally damaging biofuel. And so, it's a tough job for EPA.

Jon: The Obama administration tried to, from my perspective at least, thread the needle and address some of these concerns, and address environmental concerns with those of us who are stakeholders, but not regulated parties have. The Trump administration, their main focus just seems to be just get these rules out on time. They've done a pretty good job on that, for better for worse.

Jon: We would like to see different volumes, but it's an issue every year. It spawned a bunch of litigation, and yet nothing has really been resolved. We're still dealing, as you said earlier, with the same problems and the same lack of solutions that this program seems to have engendered.

Joe: It's sort of the sense that, at least in the Obama era, a lot of observers and participants had of this program was that the system could tolerate tweaks, but tweaks weren't really going to get it, that the program might really need to be kind of stripped down to the studs and kind of reconfigured if we were still going to serve this range of policy objectives, which aren't necessarily aligned with each other. If this is an Ag-support program, that's one thing. If it's a kind of industrial policy to promote and land on a certain outcome, in terms of advanced greenhouse gas friendly automotive fuel, that's a different thing. It looks like it's going to be a while before we have the political configuration that can accomplish all that.

Joe: From your perspective, if you had the pen to sort of, let's say, revise the program, what would that look like?

Jon: Well my organization, the Clean Air Task Force, is focused on: How do we decarbonize energy use by mid-century? We think that's what the IPCC and others indicate that's necessary for us to avoid the worst consequences of climate change. And so, that's obviously the perspective that I bring to what role do biofuels play.

Joe: Right.



Jon: The question is: Can they play a role in helping us achieve that goal, by decarbonized transportation sector by 2050? And that's a different challenge than the one that Congress had in mind, those in Congress who are focused on the climate impacts, when they drafted EISA in 2007.

Jon: The question then was the comparison that's at the center of the greenhouse gas reductions in EISA: Is it better than gasoline, and by how much? Unfortunately, that's no longer the challenge that we're facing. It doesn't have to be better than gasoline, it has to be a pathway to zero.

Jon: And so to the extent that biofuel policy in the United States won't help us get to zero, it needs to be more carefully targeted at parts of the transportation sector that don't have other ways, cheaper ways, cleaner ways to decarbonize, more certain ways. There's a handful of options out there for decarbonizing. Some of them are a lot further developed than others, but for light duty vehicles, we'll be able to electrify a lot of that, we think. For heavy duty on-road and nonroad vehicles, mainly trucks but also potentially trains, there are a handful of options, like hydrogen fuel cells or ammonia-based combustion, that we think can decarbonize those vehicles. The same is probably true, similar engines and similar fuel cells could be useful for the marine sector, for large ships.

Jon: The portion of the sector that there aren't obvious, or even less than obvious solutions for, and which is expected to grow pretty significantly, is aviation. And so, if there's a role for biofuels in decarbonizing our transportation sector, and there may be several roles, but sort of the highest best purpose of biofuels, climate-beneficial biofuels to the extent they exist, was probably as a jet fuel.

Jon: The RFS is a volumetric mandate, or a set of volumetric mandates. You don't need to be focused on volume production at this point. We need to be focused on innovation. And the innovation that we need in this space is figuring out the right kinds of feedstocks that can produce biofuels that are truly climate beneficial. And it's probably not going to be feedstocks, like say corn or soy that require a commitment of farmland. It's probably going to be feedstocks that are made from waste, for example.

Jon: So the focus of our biofuel policy in the United States should be on identifying those feedstocks, figuring out the most efficient, least emissions-intensive way of moving them to refineries, converting them to fuels, and then producing fuels that can be used by the aviation industry.

Jon: There's a lot of progress on that front being made. Instead of turning oils, for example, lipids, natural oils, vegetable oils, waste oils into biodiesel, you can turn them into something that's called renewable diesel, which can then be converted into jet fuel fairly easily.



- Jon: So some of the downstream technical issues are being resolved because these upstream issues of where are we going to get the appropriate climate beneficial biomass, biomass that doesn't involve significant land use change, where does that come from, and how is it best directed to the aviation market would be the first focus, if I had a say.
- Joe: Well, it sounds like what you just described is a significant paradigm departure from the RFS paradigm. In retrospect, and without being a regulated stakeholder, I think it's easy to observe that RFS was, in a way, a successful experiment, if you define success as trying an approach and learning from it; allowing the lessons of experience, as they turned out to be, to be harvested ... no pun intended ... and then to conjoin that with a recognition of where we are, in terms of the problem we're trying to solve.
- Joe: I suspect that if you asked the core EPA staff that worked on implementing the lifecycle analysis, designed the lifecycle analysis, applying it and implementing that feature of the program, those folks would testify that there was a tremendous amount of learning that occurred. The focus on land use or the land use component of the greenhouse gas lifecycle was invaluable and might not have occurred at the precision, speed, and targeted focus that it did without having to do that. So even if you escape this paradigm and go to a different one, all that can really be useful.
- Jon: Right.
- Joe: Meanwhile, the agency, again whether it's a Democratic or Republican administration, whether it leans towards the oil industry and the refinery sector or it leans towards farmers, is stuck with implementing the law as written.
- Jon: The current administration is essentially trying to appease both sides. They recently passed this regulation I mentioned earlier that allows the year round sale of E15; that was the top lobbying priority for the ethanol industry, and so that gave them a win. It's not clear what that actually means, in terms of markets.
- Joe: Right.
- Jon: At the same time, the administration has been issuing these small refinery exemptions each year, when they waive down the volume. They go through this process where they set the volumes each year, and then with a separate process they waive down those volumes, because they say there are certain small oil refineries around the country that can't economically manage the costs that are imposed on them by the RFS, the cost of blending the biofuel.



- Joe: Yes.
- Jon: That has the biofuel industry up in arms, but it's greatly appreciated by refineries, particularly in some key states.
- Joe: There's were the politics/ political economics comes in because Scott Pruitt from Oklahoma was pretty transparent that his conditioning was to be sensitive in the first instance to the interests and needs of the refinery sector.
- Joe: Could you talk biomass?
- Jon: Sure.
- Joe: We talked about essentially biofuels as transportation fuel, but biogenic energy, there's a species of it in the context of electricity production, and certainly during the eight years of the Obama administration there was a lot of activity staged by different stakeholders promoting the adoption of biomass-friendly policies ... that is, again, the use of biogenic fuel to generate electricity. And then in the last year or two, Congress adopted language that was altered by, among others, Susan Collins of Maine, that created what amounted to a legislative fiat that biogenic fuels, biomass, should be treated for policy purposes as a carbon-neutral electricity sector fuel. So where are we with that?
- Jon: That's another quagmire. As it is with biofuels, the theory behind biomass based power generation and its impact on climate is that the CO₂ that's emitted when you burn wood in a power plant is the same CO₂ that was absorbed by the tree, so there's a circular process that the power plant somehow becomes part of. There's a certain logic to that, but it misses some key aspects.
- Jon: A big concern is that when you cut down a tree to use as fuel in a power plant, that tree doesn't regrow for decades, and so there's a big lag in the resequstration of the carbon that's put into the atmosphere when a power plant burns wood. And that lag is not inconsequential. Those CO₂ molecules are trapping heat for that duration of time, and so factoring in that climate impact is an important part of the lifecycle analysis here, but it's difficult to do because it, again, as with the biofuel context, depends on a bunch of assumptions that are then fed through an econometric model. And the outcomes of those models are highly uncertain.
- Jon: That's sort of the scientific challenge that underlies the regulatory and legal framework. Those issues are some the EPA has tried to address by tasking a group of scientists known as the Science Advisory Board, to present the agency with some recommendations. And they've done that to some extent. Their process was not entirely successful, but they did reach the conclusion that you



can not assume a biomass to be categorically carbon-neutral, that you have to do an analysis of the key factors, the type of wood, the regrowth period, the efficiency in which the wood is combusted ... all that stuff matters and needs to be taken into account. And so that's why things like the budget rider that was sponsored by-

Joe: That's right, the budget rider.

Jon: ... Senator Susan Collins and others is troubling because it really does not require any of that sort of analysis. It just says as long as the wood is harvested from a forest that doesn't turn into something other than a forest, the agencies are supposed to treat it as carbon-neutral.

Jon: And so your question is what's become of that?

Joe: Yeah.

Jon: It's still very much up in the air. This was a key issue in the Clean Power Plan. How was the Clean Power Plan going to address biomass-based power? Was it going to treat it as zero carbon or kind of as something less than what an emissions meter at the smokestack would signal? Because the emissions meter on the smokestack of a power plant that's burning wood will tell you that you're getting about 50% more CO₂ into the atmosphere when you burn wood than when you burn coal, because wood just has low energy density, so you have to burn a lot of it to get those electrons.

Joe: It's BTU inefficient and carbon inefficient.

Jon: And so, the Clean Power Plan envisioned biomass-based combustion being a possible compliance option, but it was going to require a process by which the net climate impact of that biomass combustion would be analyzed.

Jon: As we know, and I think you've discussed on other episodes of this podcast, the Clean Power Plan has been attempted to be replaced by the Affordable Clean Energy policy. In that policy, the Trump EPA, under Pruitt, now under Wheeler, have decided that biomass is not a compliance option, it's not a best system of emission reduction, which is the term of art for complying with Section 111 of the Clean Air Act.

Jon: The reason that the administration gave is scientifically and legally correct in my view, even if I sort of disagree with the reason by which they're adopting this. The reason for which they're adopting is prospective. And the reason they gave is that the reductions that are nominally attributed to biomass-based power generation do not happen at the power plant. The power plant emits more CO₂



than it otherwise would if it was burning some other fuel, gas or coal. The reductions come when plants regrow, either in a forest somewhere or on a farm somewhere. They don't happen because of anything that's happening directly at the power plant.

Jon: Because the Trump administration wanted to foreclose the use of things like solar or wind energy to achieve reductions at a coal-fired power plant, they drew a very tight circle around coal-fired power plants and said, "Anything you do to reduce emissions has to happen within that fence line." And those offsite biomass regrowth reductions don't happen with the fence line, therefore they are not eligible for credit under the Trump plan.

Joe: It's interesting to me that the Trump EPA was able to get away with that. And I mean it in a specific sense. The ACE, obviously as you described it, the EPA is intent on establishing, as if it were the 11th Commandment, that CO2 reductions in power plants can only count if they happen within the fence line.

Joe: And the reason I said it's striking to me that the Trump administration could get away with it is that the Obama administration essentially made the same genre of argument about why biomass was not a compliance option with various provisions of the Clean Air Act. Not because biomass, in the first instance, couldn't be established as categorically carbon-neutral, but simply because the different programs within the Clean Air Act for which, at least first blush, biomass might be a compliance option, the statute itself wasn't written that way.

Joe: I'm going to use the first person pronoun, since as while the EPA worked on these issues, we tried to get across first in 2010, when we were implementing the PSD permitting program, that we didn't have to take a position on biomass because as a matter of law, the reductions had to happen at the individual permitted emitting facility. And then when we did the Clean Power Plan, we didn't draw the boundary of obligation and compliance around the individual power plant, but we drew it around the sector.

Joe: And if you go back and look at the history of the treatment of biomass as a legal and policy matter during the eight years of the Obama administration, you'll see that, as you described, EPA just could not escape having to take the issue on frontally and having to at least provisionally adopt the premise that biomass was eligible for Clean Air Act compliance. And it really was a function of the fact that within the science community, there were some legitimate scientists, albeit a minority, that took the position that in effect, so long as the US was a net-sink, as long as our land, including but not limited to our forests, were absorbing carbon, then as a matter of rough justice, at least, you could treat the burning of wood and other biomass fuel as neutral, even though CO2 was coming up the



smokestack, because those molecules were being absorbed in the aggregate from the land.

Joe: Again, at first blush, from a legal point of view, our understanding was that the relevant statutory provisions just weren't written in that way that we could recognize that as a compliance option, however true it was.

Joe: But in league with the legitimate, if minority group of collection of scientist who are arguing for that, was a bipartisan coalition. I don't think I'm breaking news here to say that the Obama administration was sensitive to the fact that you had members, particularly in the Senate, from forest states, Ag states, that were both Republicans and Democrats. And the administration kept trying to find a way to stay on the right side of this understanding of the law, but still show some generalized support for biomass as a potential option, which is why the Obama administration convened a special Science Advisory Board exercise to examine, first the question of whether biomass was categorically carbon-neutral, and then if the answer turned out to be no ... which it was, according to the scientist we empaneled ... whether there were different fuel streams that could be treated differently.

Joe: And even in the Clean Power Plan, we put the burden on the states who, if they had a brief that they could include biomass within their state plans, we would give them the opportunity to show that their instate forest management practices, in the instance, substantiated the notion that the emitted CO₂ was being absorbed.

Joe: So it was really a confluence of science and politics. Like I said, I'm surprised they could get away with showing the palm to the biomass folks.

Jon: Yeah. So they kept biomass out of the ACE rule. They have signaled through the unified agenda ... it's unclear what they've signaled, but it appears that they want to revise the New Source Review program, that PSD program under the Clean Air Act, to be more flexible around biomass-based power plants.

Jon: And so you can imagine that a coal-fired power plant might want to install fuel handling equipment to allow co-firing of biomass that is wood chips with their coal supply.

Jon: Perhaps the administration's NSR revisions would exclude those from New Source Review scrutiny. We're not sure, but there's supposed to be a rule this fall, I think, is the timing. Because we haven't seen the rule yet, I don't know what the impact of that rule would be on forced economies, as compared to not having a role to play in the ACE rule.



- Joe: Huh. Interesting. The advocates for the administration, that is the Obama administration, either explicitly identifying biomass as a compliance option, whether it's in the context of an individual plant, or I should say, an individual modification in an individual plant, determining whether it required a permit to address its CO2 emissions, could use how it would account for the biomass stream or the biomass co-firing.
- Joe: Or whether it was including biomass as a compliance option, the advocates for that kind of specific policy outcome made an Allied argument to the Obama administration, which was that a lot of biomass fuel producers were selling to a global market, not just a domestic market. And that it was important to that market and to their prospects in that market, that the US government in some way, shape, or concrete form, signaled that it viewed biomass as renewable climate-friendly fuel. I think the budget rider probably accomplished that for them.
- Joe: What I think has been the question hanging over the process since that budget rider was adopted is whether or not legislative finding that biomass was carbon-neutral with land some place, whether it's in a rule like the Affordable Clean Energy rule or in a revised NSR accounting rule or an NSR or PSD compliance guidance, was really kind of an unresolved issue.
- Joe: It sounds like we should keep our eyes out for an upcoming NSR rule that goes right directly at the question of: How do you treat a plant that coal-fires biomass, and can you treat it in a way that's favorable to the proposition that biomass is carbon-neutral?
- Jon: Yeah that's right. I think an NSR rule is the most likely next possible landing spot.
- Joe: Yeah. The administration has been pretty thorough and consistent, and even relentless in going step-by-step-by-step-by-step through, maybe at this point, a dozen different components in the NSR program, and changing them in the ways to shrink the reach of the program and to weaken the requirements. So I think it would make sense, I think it's almost actually made to order, for a remit that wants to provide both support for biomass and shrink the reach of NSR, to write biomass into a CO2 accounting rule that allow the source, not the count, of the CO2.
- Jon: Right. The interesting policy and political question is that biomass is a fairly inefficient source of energy, and it's expensive compared to the options, and getting relatively more and more expensive as the price of gas goes down and the price of actual renewables, like solar and wind come down. And so it seems to need an affirmative...



Joe: Regulatory subsidy.

Jon: A subsidy. It seems to need a subsidy, and in a policy that's actually designed to reduce greenhouse gas emissions and atmosphere carbon levels and essentially pays for those reductions. There's a hook, provided there's either some agreement or some showing that biomass is achieving those reductions. In the absence of that, which is what we have under the Trump administration, the regulatory relief only gets you so far because you're still going to have to pay for this expensive fuel.

Joe: Right. And there's no, if you will, direct or implied market for-

Jon: Exactly.

Joe: ... incremental reductions in the CO2 emissions. There was a time, I think, before the fracking revolution, when biomass-fired electricity plants were competitive, and there are a number of them that were built, say, 15 or 20 years ago around the country, and they have been struggling economically for a while now since at least 10 years.

Joe: And they came to the agency and were quite upfront saying, almost in as many words, "We need a regulatory subsidy. You guys are creating value vis-a-vis CO2. We want to share that value." Again, it was not so much a science-driven case, and it was certainly not legal. Or it certainly didn't really comport with the conventional readings of the Clean Air Act, but they were quite upfront that's what they were looking for.

Joe: So there's like a series of disconnections in 2019 around the whole question of biomass, and not just at the core as to whether or not it's truly a climate-friendly way of fueling electricity generation. But in an administration that wants to create zero value for increments of CO2 reductions, there's really no place for it to land.

Joe: The policy problem is, I think at least two-fold, if you're where we are with our current understanding of what climate change needs as a response or as a set of solutions. One is what you said, really effectively, about needing to think about what kind of fuels we have to have, to decarbonize various segments of the transportation sector. And the other is: How do we keep as much land as possible in forest and other carbon storing and absorbing uses?

Joe: In the first bucket you need invention and you need innovation. And 10 or so years ago, we tried it by creating a particular kind of market pull, but as you said, we're past that paradigm and we're in a whole different paradigm.



- Joe: For the other problem, the land use solutions, the search is on to create real value in keeping the land or expanding the land that's forested, and beating the competition for other uses. What people have tried is using different regulatory subsidies, and they just don't match up well, either because of the other purposes the regulations are supposed to serve, or the way the rule is written, or the way the law is written.
- Joe: So speaking of paradigm shifts, I think we need to be looking at taking more direct subsidy approaches to make sure that there's a floor under the value of forest land.
- Jon: Yeah. We need to figure out a way to value forest that remains healthy forest. I constantly hear from biomass producers, and forest owners who supply the biomass industry, that if there's not a market for their wood, they're going to find other uses for that land. And that's legitimate. Policy needs to make sure that it's paying for the right outcomes.
- Joe: Right.
- Jon: Turning trees into pellets, and then burning them in a power plant, and using creative math to suggest that's climate-beneficial is not the best policy outcome.
- Joe: Right.
- Jon: Paying for them to sort of steward that carbon is probably a much more efficient outcome.
- Joe: You're paying for them for what you actually want them to do, and you're not creating this, if you will, ill-conceived blend between a regulatory program or business strategy, whose primary purpose is designed for something completely different.
- Joe: I think for a good 20 years, climate policy advocates or solution hunters have been trying to find economies and synergies between existing regulatory tools that could have a subsidy impact. And by and large, not really succeeding.
- Jon: Right.
- Joe: Hopefully we'll learn from what look like failures, so that at least the lessons learned are a success.
- Jon: Exactly.



Joe: Anyway, well thank you for this panoramic tour of biogenic energy in the transportation and electricity sector.

Jon: Thanks so much for having me.

Joe: Sure.

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