



Anaerobic Digestion Mini-Series

Episode 4 of 4 | October 2019

AUDIO TRANSCRIPT

"Anaerobic Digestion done Right."

Lindsay De May: Welcome back to our discussion about anaerobic digesters. I'm Lindsay De May.

Austin Scarborough: I'm Austin Scarborough.

Abby Bruzas: And I'm Abby Bruzas, and we're with Vermont Law School's Farm and Energy Initiative.

Austin Scarborough: Our last three episodes covered what digesters are, how they work, and why you might or might not want to use them.

Abby Bruzas: In this final episode, we're going to look at three real world examples of digesters done right.

Lindsay De May: We chose to highlight these digesters because they're successful models for overcoming some of the challenges we talked about in the last episode, as they reduce greenhouse gas emissions *and* make use of their digestate as a valuable resource.

Abby Bruzas: These businesses have considered the larger system within which they operate. Their feedstocks are organic wastes that need management and their biogas helps meet a local fuel demand.

Austin Scarborough: We won't have to go far to get to our first example-- it's in South Burlington Vermont, just an hour and a half from our classroom.

Abby Bruzas: We've heard from Eric Fitch throughout the series. His company owns and operates the anaerobic digester at Magic Hat Brewery.



Lindsay De May: Is this the digester that's mixing barley and hops with ice cream and chocolate?

Austin Scarborough: Great memory! We reached out to Fitch for this podcast because his digester at Magic Hat is a prime example of a digester regionally addressing wastewater.

Abby Bruzas: Fitch has also created a pretty unique and successful business model for industrial food waste. I'll let him explain what his company does.

<<**Eric Fitch:** *So this, this concept started in 2006. And if you remember back then, the price of oil was about \$150 a barrel and the price of natural gas was over \$15 per million Btu. And one day on the highway, I realized I could actually manufacture natural gas at a lower cost than that, so we thought great opportunity would be to find industrial manufacturers, the products that we could turn into methane then also use that gas in a boiler. We thought we could make the energy on site with the boiler and make a profit that way.>>*

Abby Bruzas: Purpose Energy is primarily focused on industrial waste water treatment. Remember back in episode 1, we said digesters can be a useful tool for improving water quality. His company helps businesses with high levels of organics in their wastewater.

Lindsay De May: And investing in sustainable waste water management can really pay off-- like, in *money*, not just in environmental benefits.

<<**Eric Fitch:** *And then there's industrial wastewater treatment, which is- when you have an industrial manufacturer, specifically the food and beverage industry - the byproduct can have a lot of organic material in it. And typical municipal systems aren't really engineered for, or designed for that high organic load. If we insert an anaerobic digester in between our customer and municipal treatment plant, then we can reduce the overall cost of treating that byproducts. A lot of times, the byproduct can't go down the drain, and it gets trucked off site to some place. Who knows where? And that trucking itself is very expensive. By treating onsite, we can eliminate that trucking, and by doing that-- by a combination of reducing municipal wastewater surcharges, reducing trucking, allowing compliance with wastewater permitting, and actually increasing production capacity because we can eliminate waste water constraints, our*

systems have a payback. And they actually pay for themselves over time. So for us, we're really focused on opportunities that can pay for themselves. And food and beverage is a great market for us.>>

Austin Scarborough: In a lot of ways, Purpose Energy makes it easier for independent food and beverage companies to manufacture goods.

Abby Bruzas: And that's good for the economy! If we just look at small and independent craft breweries, which Purpose Energy works with a lot. That industry employed more than 150 thousand people in 2018. And they generated more than \$27 billion dollars.

Lindsay De May: And imagine all the hops they bought locally from farmers!

Abby Bruzas: Yeah, and that's just craft beer, let alone the rest of the food and beverage industry.

Lindsay De May: Ok, so we know Purpose Energy works with food and beverage companies, but how exactly does that relationship work?

Austin Scarborough: Well, it's really up to the customer. Purpose Energy is as involved in digester development projects as the customer wants them to be.

<<Eric Fitch: We consider ourselves a bio-gas developer. We like to develop projects. Every project that we developed has a few different steps in it. There's design, there's build, there's owning it, and then there's operating and maintaining it. As we put that together as an acronym, we call it DBOOM, we can do one or all of those functions for every project.>>

Austin Scarborough: DBOOM. I like that... Design what you need, then build it, own it, operate it, and maintain it. I also like how a client can choose all or just one of those services- whatever works best for them.

Lindsay De May: Which of those services do they provide at Magic Hat?

<< Eric Fitch: You look at something like our first project, at Magic Hat, that's a DBOOM project. We own that. You have state licensed wastewater treatment operators that staff it. We lease land. We get paid to take waste. We convert that waste



into energy, and then we sell that energy to the grid. So that's a system that we developed and we own.>>

Abby Bruzas: Magic Hat contracted Purpose Energy to do all of it- from design to operation.

Austin Scarborough: And that's not too surprising- if you remember in our last episode, we talked about how technical and demanding digesters can be to operate. This means Magic Hat never has to worry about hiring and training people to run theirs.

Lindsay De May: It's great that waste producers can have that flexibility and focus their operations on what they do best- Making beer! But, what about when a client only selects some of the DBOOM services?

<<Eric Fitch: Now there's other systems that we do, we call it design, build transfer. An example of a design, build, transfer could be something like Dogfish Head -- we built the project in Delaware for Dogfish Head, where we provided the engineering into design for the anaerobic digester. They, uh, they hired somebody else to build it, and the customer finances. So they own it. At the end of that project, we train their operators on how to use the system. Then the engagement's over. >>

Austin Scarborough: DogFish Head Brewery. Did you know they have a beer called Dragons & YumYums??

Lindsay De May: I do now!

Abby Bruzas: So even when Purpose Energy doesn't own and operate the digester, they can still help with making sure the operators are properly trained.

Lindsay De May: And regardless of who operates it, we know that both the DogFish Head and Magic Hat digesters will capture biogas. How do they end up using it?

<<Eric Fitch: The bio gas goes into a 300 kilowatt generator. It's a CoGen unit. So you turn a big engine, and the engine spins a generator. You produce electricity that gets exported to the grid, to Green Mountain Power, and the thermal energy is recovered from the oil, the uh, the cooling jackets on the engine, and the exhaust. We use that thermal energy to control the temperature of our bio-reactor.

Lindsay De May: Co-Gen. That means they are producing both heat and electricity at the same time?

Austin Scarborough: Yup. They use the heat to manage the temperature of the digester.

Abby Bruzas: And he mentioned green mountain power- we discussed their cow power program in episode 2.

Lindsay De May: Oh yeah! The program where cow poop powers my microwave! What about it?

Abby Bruzas: Well, it's another way Green Mountain Power is involved with digester development- the electricity produced by biogas can be net-metered, which means it offsets Magic Hat's electricity use, and then they are paid for extra electricity contributed to the grid.

<<**Eric Fitch:** *At Magic Hat, that facility is net-metered. So we get credit for the amount of power that we produce. It's actually a group net-metering arrangement, where Magic Hat gets the credit for the amount of power we produce. We also get to retain the attributes. In this case, we have Connecticut and Massachusetts class one RECs. We're dual qualified and we can sell those renewable energy certificates on the market.>>*

Lindsay De May: So it reduces Magic Hat's electric bills, but Purpose Energy keeps the RECs, or the digital ID cards, that show the electricity is renewable.

Austin Scarborough: They can sell those RECs in Connecticut and Massachusetts to help utilities in those states meet their renewable electricity obligations, or to anyone who wants to claim the renewable energy.

Lindsay De May: If they're selling their RECs out of state, Magic Hat can't claim they are using renewable energy.

Abby Bruzas: That's right, the person buying the REC is using the renewable energy. But the grid reliability benefits are local-- they built distributed renewable energy in an area with a lot of demand for electricity-- the city of Burlington.

Lindsay De May: I said it before, I'll say it again. I think Fitch's business model is just brilliant.

Austin Scarborough: Absolutely, he's really figured out a way to take waste and turn it into profit. His company makes money, and his clients can save money because they pay less for waste disposal.

Abby Bruzas: And his clients are getting credits on their energy bill for their net-metered electricity.

Austin Scarborough: Magic Hat produces about 180,000 barrels of beer annually, and Purpose Energy helps the brewery save about \$1.67 per barrel.

Lindsay De May: But wait, what happens to Magic Hat's digestate?!

Abby Bruzas: You mean that 7% of leftover waste that doesn't get converted into energy? It's still rich enough in nutrients to work as a hyper-concentrated fertilizer, which PurposeEnergy gives away to local farms.

Lindsay De May: It's kept out of the wastewater treatment plant and the landfill, and it's being used locally. That's awesome.

Austin Scarborough: I thought it was interesting to hear how different state policies affect where Purpose Energy decides to develop new projects.

Abby Bruzas: Yeah, Vermont has some rules in place that make it more cost competitive to use digesters for electricity production.

<<Eric Fitch: And that's one of the things that makes Vermont a really good place for us to do business. Vermont has the feed-in tariff called the SPEED standard offer, which provide a 20 year contract. Now it might not pay as much as the renewable natural gas contracts, but we have certainty for 20 years that there's a buyer for what we produce. And something like that is really helpful when you go to a bank or a lender and ask for a significant amount of capital, to build a project.>>

Austin Scarborough: So Vermont has a program where digesters can receive long-term contracts to generate electricity at a guaranteed rate.



Abby Bruzas: And remember, Vermont has a net-metering program for digesters too-- so their policies are pretty flexible.

Lindsay De May: It turns out that the price of electricity alone makes a big difference in financing.

<<**Eric Fitch:** *Well, one good example is Hawaii. Not because there's a special program, just because the electricity costs more than 30 cents per kilowatt hour, which is way higher than the Standard Offer. If all you do is avoid buying electricity by being behind the fence and supplying your own electricity, it's worth more than 30 cents a kilowatt hour. So Hawaii's great for that reason. We're in the middle of construction or a brand new greenfield brewery with Kona Brewing Company on the big island.>>*

Austin Scarborough: Beer, beaches, and great rates for anaerobic digester electricity? Like I needed more of a reason to visit Hawaii!

Lindsay De May: Same! But for our next example, we're not going to Hawaii. We'll be looking Westward, to Corvallis, Oregon, home of Stahlbush Island Farm.

Austin Scarborough: This is probably my favorite example of a digester gone right!

Abby Bruzas: Mine too. We spoke to Lauren Kahle, who manages the farm's biogas plant and the wastewater treatment system. First, she gave us a bit of history about the farm.

<<**Lauren Kahle:** *Stahlbush island farms is located in Corvallis, Oregon. We started in 1985 with just a couple of crops and about 300 acres. And so now we have about 5,000 acres, and we grow various fruits, vegetables, grains, and legumes. We are not only a farm but a food processor as well. So we, take those fruits, vegetables, grains and legumes, and we process them. We freeze them. We can them. And we do have a couple of retail lines as well, as we deal quite a bit of industrial sales to other food processors.>>*

Austin Scarborough: Stahlbush chose to install a digester to cut electricity costs and waste, both of which were growing as the farm was expanding acreage.

Abby Bruzas: Right, and pretty much all of the feedstocks for the digester come from on site. Lauren told us a bit about what feedstocks they use and why.

<<**Lauren Kahle:** *Our feedstocks they vary seasonally with different fruits and vegetables based on what's growing, what we're producing, et cetera. We do have a main consistent, you know, year round feedstock, which is corn silage. We take the waste from our corn processing and we ensile all that to give it a longer shelf life, to try to offset that variability. But beyond that, we do take in some outside feedstocks from other food processing facilities. But the majority of the waste from our own food practicing facility.>>*

Lindsay De May: Stahlbush Island farms digests different food wastes at different times of the year. In the last episode we talked about the need for consistency or else the digester might die. Do their bacteria have trouble with that?

Abby Bruzas: Well, the reason they don't have trouble with it is because they plan ahead. Stahlbush stores excess corn, one of their main crops, throughout the year to throw into the digester as a base feedstock.

<<**Lauren Kahle:** *When we're processing corn, it's about 70% of that that becomes the waste. So we take that waste and we put them into silage bags, and that can increase the shelf life up to about five years. So in that way, we have this large stockpile of stock that has a long shelf life and we're able to just feed that, you know, every day I've, you know, a supplemental feedstock on top of our other wastes coming at us.>>*

Abby Bruzas: Speaking of feedstocks, Lauren told us about her experience with some foods that DIDN'T work well for them.

<<**Lauren Kahle:** *You know, it's a biological system, so it's always just a balancing act of trying to keep the microbes happy, trying to keep everything consistent, you know, not giving a shock to the system. We have had one thing that kind of interesting is, we have noticed that onions tend to kind of upset the system a little bit. So when we do process onions, and have onion waste, we have to be careful to feed it in really slowly because, um, it can cause foaming.>>*

Lindsay De May: Oops, like acid reflux! Digesters really are just like our stomachs.

Austin Scarborough: And Stahlbush Island farm's digester is most similar to *your* stomach, Lindsay, since they also only feed it fruits and vegetables.

Lindsay De May: Except I don't occasionally eat poop.

<<**Lauren Kahle:** *Every once in a while we would take in some manure, just more like as a microbe boost rather than as a feed stock, but it's a pretty occasional occurrence.>>*

Austin Scarborough: Stahlbush Island farms runs their digester without raising any livestock. This shows that there's potential for on farm digestion OUTSIDE of factory farming!

Abby Bruzas: Really, all different kinds of farms may benefit from a digester, and you hardly need any manure to keep it running well.

Austin Scarborough: Another cool aspect to Stahlbush is that their digestate meets organic certification standards, since it basically only takes farm and food-processing waste, and it can be field spread without concerns about contamination.

Lindsay De May: Yup, they're serving up their digestate in three ways.

<<**Lauren Kahle:** *We're kind of unique over here. We do some interesting things with our digestate. We have kind of three products that we turn it into. So we do an initial liquid solid separation. So we have a solid digestate and have that liquid digestate. And then we also have a third product where we're filtering our liquid digestate down to a drip quality, so that it's able to go through drip emitters without plugging them. So we use all three of these products on our farm as an organic, nutrient source, and we are also able to sell some of that to outside of farmers to, you know, get some income for the biogas plant.>>*

Lindsay De May: They have turned their digestate into so many different products.

Abby Bruzas: And because they use the digestate as a source of nutrients for the farm, they save tons of money by reducing their dependence on expensive synthetic fertilizers.

<<**Lauren Kahle:** *So that's a really great thing is that we've drastically are able to reduce the input from outside fertilizers. So pound for pound of nitrogen, we substitute that need.>>*

Lindsay De May: Ok, so most of the organic material going into the digester comes from the farm, and the digestate goes back onto the fields. What happens to the biogas?

<**Lauren Kahle:** *We have a combined heat and power engine here on site. So we take our bio gas and we convert it into both heat and electricity. So the heat we use back in a bio gas plant as a heat source for the digesters, as well as in the processing plant for you know, steam or um, speed drying and applications like that. And then the electricity we're also able to use here on site for, um, you know, the full facility, and we are also able to put it back onto the grid to power homes around us.>>*

Abby Bruzas: Their electricity generation is net-metered, just like Magic Hat's.

Austin Scarborough: And the electric demand from a food processing facility is going to be much more than, say... from a house. So, this kind of system reduces strain on the electric grid-- it's a load reducer, just like Josh from Green Mountain Power described in episode 2.

Lindsay De May: This whole systems sounds like a closed loop. They thought about where all of their digester inputs are coming from, and where all of the outputs are going. And found environmental benefits in each step of the process.

<<**Lauren Kahle:** *I would definitely say that this is a closed loop system. We're growing these products, we're processing them. The waste product from that, goes into the, digesters. And from there we're able to create, like I said, heat and electricity to go back into powering that processing. And then we're also obviously able to create that byproduct, that digestate, which we can use, back as a fertilizer input for growing goods, fruits and vegetables in the first place.>>*

Austin Scarborough: I swear it feels like magic.

Lindsay De May: They're really doing great things. But it's not magic, it's just smart!

Abby Bruzas: Smart use of resources, benefitting both the farm and the world.



Lindsay De May: Ok, let's shift to our final case study, where we'll stay on the West Coast with Tim Taylor. We've already heard from Tim a few times during this podcast, but we'll finally let him introduce himself:

<<**Tim Taylor:** *My name is Tim Taylor, and I'm with the Sacramento Clean Cities Coalition, and I'm retired from the Sacramento Air District, and in both capacities who've done a lot of work with the biodigester systems here at Sacramento.>>*

Austin Scarborough: The city of Sacramento-- and the state of California-- have been investing heavily in digester development as a way to reduce emissions from agriculture and transportation, and clean up the air.

Abby Bruzas: Right, a big focus is on the tons of emissions coming from large, hauling companies that transport everything from our trash to our groceries, to our elementary school students!

Lindsay De May: Sacramento is all-in on using digesters to produce renewable transportation fuel for these big fleets of vehicles.

<<**Tim Taylor:** *I happened right now to be sitting at the county of Sacramento, a fleet management operation where I have a 10 o'clock meeting. Everything that they use is renewable, natural gas. Caltrans, which has the largest fleet in the state of California, Department of Transportation. California State Department of General Services, which is basically the vehicle provider for most of the light duty vehicles that are used by state agencies. They use 100% renewable natural gas.>>*

Austin Scarborough: Tim went through the three digesters operating in the city. Two are upgrading the biogas into renewable natural gas, and one is generating electricity.

<<**Tim Taylor:** *The first one was a 10 ton per day food waste biodigester at a private industry site that was built by Clean Rural Partners to sort of, I guess you might say, proof of concept. Then they built a 25 ton per day digester at a site that was co located with Atlas Waste Disposal. The 25 ton per day site was ultimately built out to a 100 ton per day site. Again, using cleaning up the gas appliance and using it for fueling heavy duty refuse trucks and heavy duty vehicles that came by the site Then, there was a 40 ton per day digester built by the same company in the, on the UC Davis campus.-But*

in that case they're making their, they have four capstone turbines that are just basically making electricity, which goes straight back into the UC Davis campus grid. We like to think of that one as a transportation fuel provider because of course electricity is a perfectly good transportation fuel, and some of the electrons had come of that generation system in fact go into electric cars on the Davis campus. But some of them also go into running the lights in the air conditioning systems and everything else.>>

Lindsay De May: I like that he thinks of the electricity-digester as creating transportation fuel, too. It reminds me just how flexible these digesters really are.

Abby Bruzas: Yeah! It's all about lining up uses that benefit the system you are working in.

Lindsay De May: So, we know digesters can be expensive-- and Austin said that California has been investing a lot of money in this technology.

Austin Scarborough: Right, Tim talked about some of the investment in the largest Sacramento digester.

<< **Tim Taylor:** *That digester started off with an investment from the California Energy Commission and then it went from the 25 ton per day to 100 tons a day with another investment from the California Energy Commission. So that that system was funded-of the potential to provide renewable natural gas for transportation. So the two agencies that I'm aware of that it provided a digester funding, grant funding, are the California Energy Commission and the Cal Recycle.>>*

Austin Scarborough: Speaking of investment, in the last episode, we talked about federal incentives for turning biogas into renewable natural gas and transportation fuel.

Lindsay De May: Right- the federal Renewable Fuel Standard and RINS incentivize pipeline injection of biogas from digesters. And the California Low-Carbon Fuel Standard provides an additional incentive for gas coming into the California market.

Abby Bruzas: Tim talked to us about how those incentives created an enormous market for renewable natural gas in California.

<< **Tim Taylor:** *But in California you have both RINS and a state program that's associated with the cap and trade program called low carbon fuel standard, LCFS,*

which also has credits from renewable natural gas. So there's an enormous market in California for renewable natural gas. And so it turns out that there's an enormous surplus of renewable natural gas coming out of landfills all around the Midwest, Kansas and Oklahoma and Texas and all over the place. It all gets dumped into a pipeline. So how many of those renewable molecules will make it all the way to California as a little hard to tell? Not very many probably, but the fact that they exist makes them renewable, and so CO2 to being an international emission, not localized emission like particulates; you can claim the GHG reduction from a renewable natural gas landfill in Kansas, if you buy that credit, in essence, in California.>>

Lindsay De May: If these incentives encourage digester developers to upgrade their biogas and put it in the pipeline, rather than using it more locally, why is Sacramento on our “best of” list? I mean, ultimately, those renewable gas molecules might have come all the way from Kansas.

Austin Scarborough: Well, we chose to showcase Sacramento because they envision the same kind of closed loop system that we saw at Stahlbush Island Farms, but on a much bigger scale. They are using digesters to capture biogas locally in California.

Abby Bruzas: They're using renewable natural gas for transportation, but they are also focused on closing the loop in the food industry-- from production to disposal. And that means turning the waste from the food system into a fuel for the trucks that pick up the waste in the first place-- in what they call the Farm to Fork to Fuel to Farm System.

<<Tim Taylor: Sacramento is at the northern end of the Central Valley of California, which is a sort of a bread basket. It's kind of logical for the Sacramento area to have kind of moved forward with this farm to fork concept. Farm to fork to fuel was a logical outgrowth of that because of the digester system producing methane and then farm to a fork to fuel to farm was the end part, of managing the digestate, the last bit of the product that you would have that's produced by this digester system, which is the sludge in the slurry and what's left over in the end. So that's how it came to be a farm to fork to fuel to farm.>>

Lindsay De May: Instead of this cycle occurring on one site, it includes multiple businesses all working together to create a resource loop.

Abby Bruzas: But on a much larger scale than some other projects.

Lindsay De May: So, how can we get more people to use digesters the way like Purpose energy, Stalbush Island Farm, or Sacramento do?

Austin Scarborough: We asked a lot of our experts how they would like to see regulation and incentives for digesters change.

Abby Bruzas: The first suggestion is pretty practical. Nora Goldstein wants to make sure that digesters are operated correctly, and well maintained.

<<**Nora Goldstein:** *You have to be a certified operator. I think that should be an industry wide requirement. Maybe it will be voluntary, but if you know somebody is there that knows what they're doing, and you see a discharge or you see something, you know, they should know how to fix it. So it kind of sets a bar.* >>

Austin Scarborough: She also suggested nutrient credit trading policies as an incentive for digesters to make water quality improvements.

Abby Bruzas: A nutrient trading program would put a price on phosphorus and nitrogen and allow polluters to trade their allowances. Farmers *with* digesters, who are polluting a lot less, would be able to sell their credits to farmers *without* digesters.

<<**Nora Goldstein:** *And one is nutrient credit trading. Some of these, environmental attribute trading type tools, uh, would be very helpful to incentivize digester development because it creates another revenue stream for the credit trading.* >>

Austin Scarborough: Bill Crossman also touched upon using digesters as part of a greater holistic scheme for nutrient management.

<<**Bill Crossman:** *Okay. So the Digester is taking in nutrients from a broad area and eventually needs to disperse these nutrients. So there's been talk about establishing nutrients sheds where, the digester would be taking nutrients within a certain area and then they'd be redistributed within that same area in sort of a circular loop, where you wouldn't be importing phosphorus from wherever Morocco or wherever it comes from. And necessarily creating nitrogen or as much nitrogen from petroleum products. Then I think people are looking at it from a larger perspective where they realize they have to integrate waste, nutrients, energy into a holistic system where they understand the implications of each aspect of it on the other aspects of it.*

Genevieve Byrne: So who are the partners in that system?



Bill Crossman: *Well it doesn't really exist yet, but it would be like, say the digester. It would be farmers. It would be generators, mostly like probably restaurants and food processors. And then it would take sort of an overall management scheme, and pretty much tracking where everything was going and, but, um, I think ultimately, I'd like to see a closed loop with the farms, whereas they aren't importing as much or as many nutrients. And we're recycling the nutrients from the digester.>>*

Austin Scarborough: When Bill says closed loop, he means closed loop.

Lindsay De May: Like Stahlbush Island Farms closed loop?

Abby Bruzas: Yeah, but even beyond just one farm- closing the loop within even a community of farms.

Lindsay De May: I'm all in for that! But... knowing how costly it is to get a digester project off the ground, what needs to happen to make systems like this more affordable?

Austin Scarborough: Well, digesters sure are expensive, that's true. Nora suggested that it would help the digester industry develop if utility companies were more engaged, and if states required production of renewable natural gas.

<<**Nora Goldstein:** *State utility commissions and the way the regs have worked is the renewable portfolio standards, so many states have met those, the, uh, wind energy and solar, and so they hit their 20% carve out for renewable. And I think we're seeing, since the utilities have met those requirements, when digesters go to negotiate their next a power purchase agreement, instead of getting 8 cents or 9 cents or 10 cents a kilowatt hour, they're getting 3 cents. And you can't even operate the engine and at a breakeven for less than 5 cents. And those are numbers I'm giving you are a few years old, so maybe it's even higher now. There's some conversation, like in the Pacific northwest, about doing carve outs for renewable natural gas. North Carolina has that on their hog and poultry sectors, I think for utility gas utilities.>>*

Austin Scarborough: So here, she's talking about the existing renewable portfolio standards that require electric utilities to source a certain amount of electricity from renewable sources. Then, she's suggests we require the same thing for gas utilities.

Lindsay De May: But we talked to Tom Murray from Vermont Gas Systems- aren't they already offering renewable natural gas to their customers?

Austin Scarborough: They are, but they aren't required to. It's a voluntary program. If all gas utilities were required to do something similar, it would create more local markets for renewable natural gas, instead of having such a huge incentive to send it to California.

Abby Bruzas: Tom Murray told us how important it was to have state regulators willing to work with them, because a lot of renewable natural gas policies are still pretty new.

<<**Tom Murray:** *A lot of states look at me like, how the heck do you ever get this over the finish line? The reality is we've got a pretty progressive group of regulators. You know-this is very much like the renewable electric world was in 2000 or 1995. There isn't a complete matrix of policies that makes it easy to enter this market. It's complicated. If you're a solar or wind entity, you can pretty much jump into business in any state and, you kind of know what your business model is. You're going to get on their net meter credit, or you're going to get a power purchase agreement. In the renewable natural gas world, they've got to find an end customer. We're willing to be to that end customer. But in many places, that just didn't exist. We're willing to talk to suppliers saying, "Look, build a digester, we'll take off the gas."*>>

Lindsay De May: 20+ years without a great incentives to build digesters and expand renewable energy. I bet after listening to this podcast, our regulators would agree that we definitely want digesters to work well.

Abby Bruzas: Yes, and when we look at the suite of laws and incentives, we want to try and incentivize closing loops where no materials are wasted.

Abby Bruzas: Nora Goldstein told us why it's helpful to think of organic waste management and energy production, as part of a system, or a circle. When we start to remove usable waste from our trash, we realize just how much of our waste is usable- and that realization helps us create less waste in the first place.

<<**Nora Goldstein:** *Thinking of it in a hierarchy is very limiting. Thinking of it as a circle is, you know, you grow food, you need to get it to people. Some of it gets processed, then the rest goes to grocery stores and then food isn't sold or consumed. And you try to grab all that, or it's made and not used, and get it to people. We came up with this circular you know, graphic of, of what we call the food system life cycle. We have seen some of the best initiatives in prevention, reduction, and donation happen when composting happens first, because that so raises awareness of how much food is over purchased, is overprepared. And, since you've prepared it, you're*



going to be way more mindful of making sure it gets consumed. So you're going to do more donation. And at the end of the day, you have less going to composting, or AD, or animal feed.>>

Lindsay De May: But if we are creating less waste, are we still going to have enough feedstocks for digesters to be a good idea?

Abby Bruzas: I don't think we'll be running out of organic waste any time soon. Most states haven't even passed an organics diversion law yet-- so tons of organics are just going over to the landfill.

Austin Scarborough: But even in places that are reducing waste effectively, there's still a lot left over. This is Carolyn Grodinsky from Grow Compost, talking about the amount of organics diverted away from landfills in Vermont.

<<Carolyn Grodinsky: One of the things that I've taken away from this meeting so far is there's a lot of different strategies to manage our food scraps in the state. Out of the 77,000, and these are all approximate numbers, about 42,000 tons are being diverted, which leaves about 35,000 tons available, which all of these different systems that we're talking about are really all viable, all complimentary options.>>

Abby Bruzas: Going all the way back to the first episode, we described digesters as a tool. They are one of the many complimentary options for managing organic waste.

Austin Scarborough: Building organics management capacity and infrastructure is important if we want to keep organics out of landfills and put them to productive use.

Lindsay De May: And it feels like they need to be part of a larger organics and energy management plan.

Abby Bruzas: Yeah, for sure, Nora talked about the importance of planning to use a digester as a piece of municipal infrastructure-- supported by economic and regulatory policy.

<<Nora Goldstein: As standalone operations, they're so vulnerable to costs and economics and new regulations. And the more that they can be, the more they will be more successful if they have a role beyond just being a waste management tool. So again, I don't see negative impacts on the environment, if properly operated, but I think their value, can't truly be recognized until they're sort of just part of part of the

infrastructure. So they're permanent and they're supported. So there's investment in the maintenance and all the things you need to, to run any piece of infrastructure.>>

Austin Scarborough: As more universal recycling and organics diversion laws get passed, more organic material will be available.

Abby Bruzas: Which means biodigesters can be used within more comprehensive organic waste management and energy production systems.

Austin Scarborough: We've highlighted some of our favorite examples of digesters operating around the country-- providing real environmental benefits that help us meet our environmental goals.

Abby Bruzas: But digester policy is relatively new, especially as we think about integrating this technology into our renewable energy systems and using them to manage waste in a whole new way.

Austin Scarborough: This has been kind of a wild ride, learning about digesters.

Abby Bruzas: I agree. But there's a lot more to them and hopefully this podcast got you interested in learning more, maybe visiting a local digester, or reaching out to regulators.

Lindsay De May: So next time I drink a Magic Hat, or eat a pint of Ben and Jerry's- I'll remember the system used to manufacture it.

Abby Bruzas: And just how much there is to digest when it comes to anaerobic digesters.

Austin Scarborough: Thanks for listening, y'all.

Lindsay De May: And for more great discussions about climate change, energy, and the environment, you should listen and subscribe to Vermont Law School's more regularly scheduled podcast, Hot House Earth.

Abby Bruzas: The Farm and Energy Initiative is a project of the Institute for Energy and the Environment in collaboration with the Center for Agriculture and Food

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Abby Bruzas: And thanks to you, for listening!

Austin Scarborough: And remember, waste is only waste if it's wasted.

<<**Bob Spencer:** *Boy, You're about as green as it gets!!* >>

DISCLAIMER

The Farm and Energy Initiative is a project of the Institute for Energy and the Environment in collaboration with the Center for Agriculture and Food Systems at Vermont Law School, and funded by the USDA National Agricultural Library. Laws regarding the development of biogas and anaerobic digesters can change rapidly. The information presented is for educational purposes only and does not constitute legal advice.

