

Crave Brothers Farm

Digester System Integral to their Farm



Digestate Barn, Genset & Digester, Crave Brothers Farmstead Cheese, LLC, Waterloo, WI

When Jordan Crave, Crop and Forage Manager at Crave Brothers Farm, described the manure digesters on their farm, he said they are “very integral to what we’re doing.” The digester system provides a number of functions: reduces and controls on-farm odors, creates versatile separated fertilizers, and produces biogas that is used to generate electricity and provide heat for the farm buildings and for the digestate dryer which yields high quality cow bedding.

The [Crave Brothers Farm](#) first had a manure digester and generator (genset) installed in 2006 to create electricity. Their Purchase Power Agreement (PPA) with We Energies to buy the electricity they produce ran from 2006 through 2022 without a change in price per kilowatt hour (kWh). Now that their PPA is coming to an end, the Craves are in the process of deciding what to do next with their digester system. Specifically, whether to keep producing electricity, or switch to producing renewable natural gas (RNG).

Initially the digester system was a partnership with other companies, which the Craves found very beneficial. A few years ago the Craves decided to put in the bedding dryer system heated with biogas and really go to the next step. Their partner wasn’t interested in this addition, so the Craves bought the digester system – two 750,000 gallon digesters and a 633 kilowatt genset – and took over its operation.



Crave Brothers Farm Dairy cows

Farm Facts



3,800 milking, dry cows,
and heifers

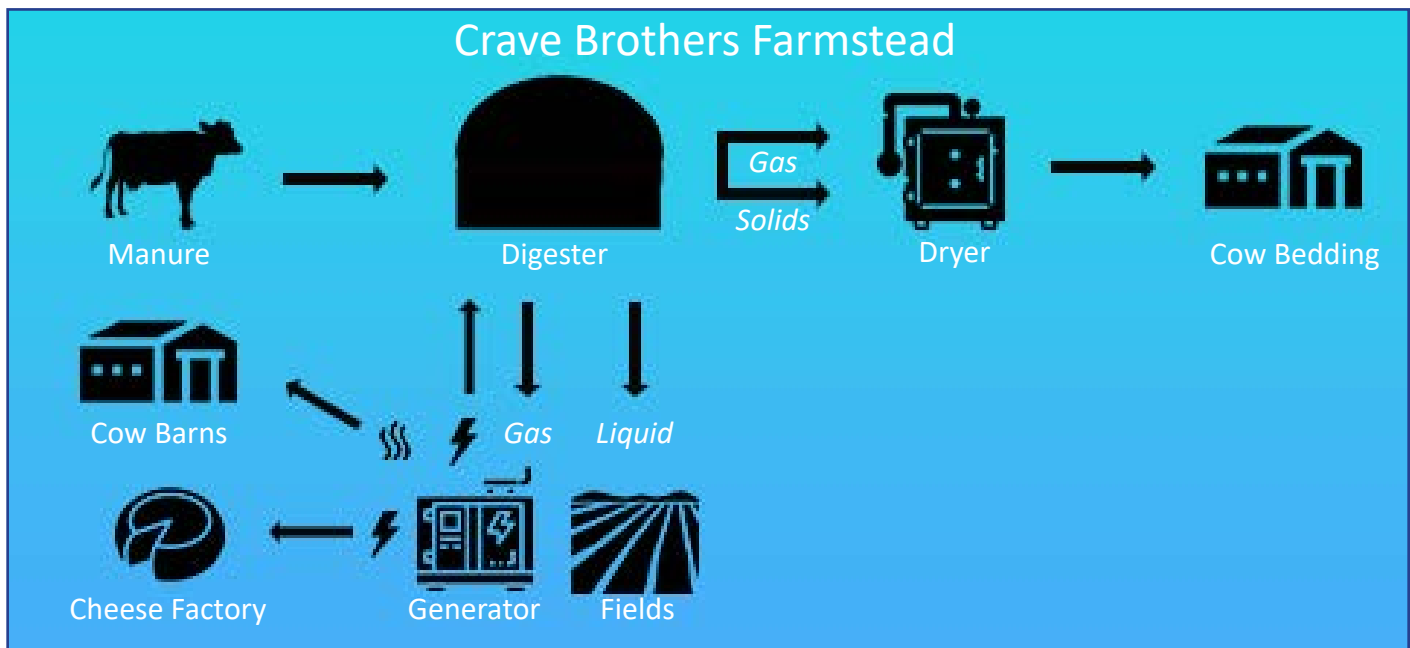
Two 750,000-gallon
digesters

633 kW genset produces
electricity for the farm,
cheese plant, and grid

Bedding dryer powered
by biogas

Digester provides cow
bedding, odor reduction,
versatile nutrients and heat

Connected Digester Benefits



Crave Brothers Farm Biodigester Connectedness

While deciding how to proceed with their digester, the Craves are considering many of the following connections that their digester system has with their farm, their cheese factory, and their community.

Cow Bedding

The Craves use wet and dried digestate as cattle bedding, eliminating the cost of purchasing and trucking in alternative bedding like sawdust or sand. In 2018 they installed a rotary drum dryer fueled with biogas from the digester to dry bedding.¹

Crave explained, “We take the digested manure, screw press it, down to this wet fiber product, which is about seventy to seventy-two percent moisture and then we can either drop that in a pile and use it for wet bedding which we do on our young stock, our heifers. We usually just bed them with wet or we feed it into our dryer [made in Watertown, Wisconsin] and dry it down to about fifty-five percent [moisture], which works really, really well for the cows. Two things [are] the quality of the bedding in the stalls so it doesn’t pack, and get as tight, it stays fluffier, softer. But then a big part of it is udder health – mastitis, bacteria. By drying it down and heating it up it really, really creates

a pretty sterile product. It’s very comfortable and absorbent. It does a really nice job.”

The Craves produce enough bedding each week to serve their 3,800 cattle. In addition, “We’ve been selling a little [bedding] the last few weeks, which has been really great. We’re getting more bedding, getting good electricity, hitting a lot of our goals,” said Crave. Many other farmers want to learn about bedding dryers, and the Craves report about a farmer a week comes to see theirs in action.

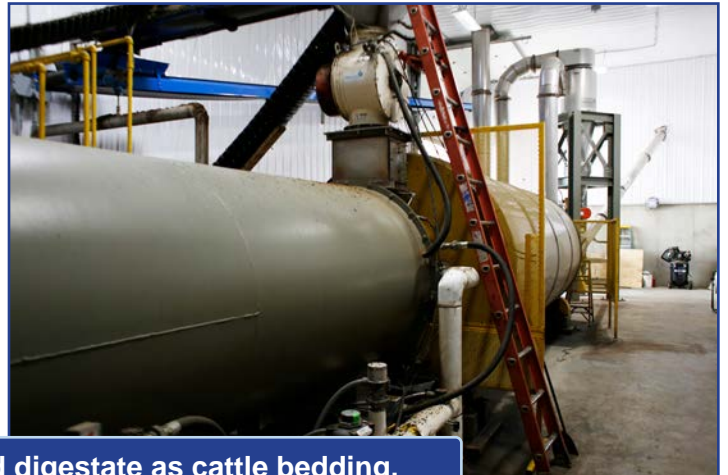
Odor Reduction

Crave said, “So for me the odor thing is something that I need to acknowledge because they [neighbors] just become accustomed to it. ...When we apply [digested manure] on the land, I get generally very good feedback from landowners and from neighbors. I mean, they know you’re spreading. They say to them usually it smells like compost. It just smells kind of earthy. It’s not like close the windows and leave town for a week.”

More Versatile Fertilizers

My main responsibility is the agronomy,” Crave pointed out. “I manage all of our field operations, agronomy, nutrient management. So from that standpoint, it [the digester] really helps me with phosphorus management. A lot of the phosphorus is contained in those solid portions. So by us taking three semi loads [of dried solid digestate] a week over to the other dairy, bedding with it, it goes into that pit, gets mixed in with that manure and gets used on that other farmer’s land base. It gets him phosphorus that he needs because he doesn’t have manure, and it pulls some levels of phosphorus out of my product.”

“From the agronomy standpoint,” Crave continued, “I really, really like the way a digester with separation helps. By changing the dry matter content of the manure and changing the nitrogen profile, it makes the fertilizer source that I have much more versatile. So we’re applying our manure in sort of different ways than traditionally speaking... Now we’re able to come out in the fall and transition from one crop to another. So we’ll plant the cover crop right away after we harvest corn - either a triticale or rye. I’ll be planting that and let that green up, and then we’ll come back and apply the manure on top of that crop.”



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Left: Digestate screw press; Right: Digestate dryer; Bottom: Dried digestate delivered via conveyor belt from the dryer

So we're just absorbing and utilizing nutrients so much better. ... This [digested manure] absorbs and infiltrates into the soil really readily, really easily. The nitrogen is very easily taken up by plants, so it just really pairs super well with our cropping system. If we had to go back to square one and just dump it in a manure pit, I would have to start really rethinking how



633 kW Genset

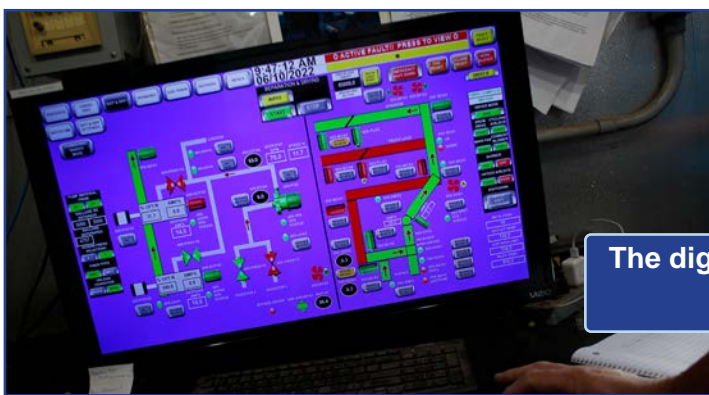
I'm handling manure. It [digested manure] becomes much more versatile and useful to me. I can apply it on hay crops and hayfields without burning plants."

Heat

"We're using a lot of heat off the engine to heat our shop, all the tanks, and some of our buildings," said Crave.

Electricity

The 633 kW genset running on biogas produces enough electricity to power Crave Brothers Farm,



Genset Monitoring

The digesters are "very integral to what we're doing."

J Crave

¹ <https://www.cravecheese.com/sustainability>

The Crave Brothers Farm Biodigester Connectedness graphic has been designed using resources from Flaticon.com: "Cow icon by Freepik - Flaticon.com"; "Industry icons by Freepik - Flaticon.com"; "Barn icons by Freepik - Flaticon.com"; Generator icons by smallikeart - Flaticon.com"; Land icons by Vitoruler - Flaticon.com"; "Cheese icons by Smashicons - Flaticon.com"

All photos taken at Crave Brothers Farmstead Cheese, Waterloo, WI by Ryan Michalesko.

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Crave Brothers Farmstead Cheese (which is labeled as produced with 100% green power).

Crave said "We're producing electricity. It's hitting the grid. Everyone's using it [gesturing to nearby homes and farms]. We don't need transmission lines this big coming from ninety-five, one hundred and fifty, two hundred, and five hundred miles away. The electricity just goes out, gets used. ...to me the electricity is more beneficial, more practical, and useful [than RNG]."

Another way to think about the amount of electricity produced by the digester system is provided on the farm website, which states "For every hour that our [digester] system runs, which is every hour of every day, we generate enough electricity in an hour to power an average Wisconsin home for an entire month. If we had to purchase diesel fuel to run our system we would need 1000 gallons of fuel per day"¹

Economics

After their current PPA with We Energies expires at the end of 2022, the Craves would get about three cents per kWh if they continued to sell the electricity from their generator. "What they [We Energies] did offer is that we can evaluate the opportunity to produce our own power to offset what we use here," said Crave. He continued, "because right now we sell everything we make and buy back. In Wisconsin there are no net metering opportunities [at the farm scale]."