## ANAEROBIC DIGESTER WORKSHOP:

The future of manure and food waste management

James DeYoung, CJD Farm Consulting, Inc.

Thanks to our hosts Brightmark LLC & Chevron U.S.A – Castor Project Digester Ottawa County Farm Co. LLC – Greg Stahl (farmer lead)

## On Farm Manure

- Manure is stored until field and weather conditions allow the farm to spread these nutrients to crops while minimizing environmental risks.
- During storage, the anaerobic conditions and degradable OM result in the production of methane (CH4) and other gasses through naturally occurring processes.



- Farms with animal production make manure. A full grown dairy cow makes around 2.3 cu-ft of manure per day (18 gallons). When fully populated the farm we will be visiting today produces around 53 million gallons per year.
- That manure is comprised of digested and undigested food that passed through the animals as well as other waste (urine, parlor water, spoiled feed, runoff and leachate from feed, as well as precipitation.
- Manure is used as a nutrient source for the farm's crops and we all know that manure is also a great source of organic mater.
- That manure is stored in designed structures and held until field conditions are appropriate for spreading the manure.



- There are designs that can easily be implemented on small scales that are as simple as using one bucket to hold manure and another floating bucket with a vent on top to capture and hold the biogas.
- Fossil fuels were cheap, however, we are witnessing the hidden costs of cheap non-renewable fuels on the climate



Global climate issues are also driving more renewable energy and the public's willingness to make changes to greener energy sources.

Efficiency of scale. A minimum of 2000 cows is needed to make it work. Digester cost estimate is around \$30 million to build for a 2500 head dairy. Each additional 1000 cows reduces the cost per cow by 15-20% Source: CoBank Knowledge Exchange whitepaper "Interest in California Dairy Manure Methane Digesters Follows the Money" By Annie AcMoody and Paul Sousa Western United Dairies (https://www.cobank.com/documents/7714906/7715329/Interest-in-California-Dairy-Manure-Methane-Digesters-Follows-the-Money-Aug2020.pdf/be11d7d6-80df-7a7e-0cbd-9f4ebe730b25?t=1603745079998)





Animals make manure. Manure is added to the digester. The digester is heated. Agitation of the manure mixes in the digester. Biogas bubbles to the surface. Biogas is collected, scrubbed, cleaned and the methane is compressed and ready for use. At today's farm the remaining manure is pumped out of the digester, then separated into solids and liquids.



I tell farmers that the digester is another animal with a very big stomach to fill at the farm. Just like any other animal at the farm, it needs appropriate feedstock, living conditions, and time to work.

But like animals, it can also get sick.

The digester provides the optimal conditions to turn the organic matter feedstock into biogas.



Reach out to EGLE early in the planning process to ensure that there is ample time to work through all the details

2-3 years from concept to final permit issuance...



Talk to EGLE permitting section for actual information.