# Phone call with Dr. Fredrick Michel from the Ohio State University, Wooster – 6/29/2018

* Dr. Fredrick Michel is a Professor in the Food, Agricultural & Biological Engineering at the Ohio State University at Wooster.
* Quasar is the private firm that built the anaerobic digester, they run the digester
* Quasar rents the land from the university, but it is an industrial operation
* Ohio State University at Wooster has no dorms and there is only one cafeteria
* They are not collecting food waste from the campus
* Feedstocks
	+ Walmart
	+ Jelly making facility nearby
	+ Expired dog food
* 2-stage digestion – Anaerobic digestion of waste
	+ A giant hopper – 50 ft length, 30 ft wide, and 10 ft deep. Initial digestion takes place here – 2-3 days residence time. This is the blending tank
	+ Then sent to the digesters – 20 days
	+ Industrial digestion, so the digestion is not complete. Only in the digester for 20 days
* The digestate is sent to the composting facility for odor removal
* 8-10 times more energy than before
* Electricity for WWTP and Water Treatment facility (for Ground water)

# Phone call with Adam Huwe from the Wastewater Treatment facility at West Lafayette (Purdue University) – 6/26/2018

* Adam is a city of West Lafayette employee.
* WWTP is owned completely by the city of West Lafayette and Purdue is not a partner
	+ They just collaborate
* Started the food waste to energy project with 4 larger dining halls and cafeteria
	+ Right now – all cafeteria
	+ Some cafeteria have pulpers and others don’t.
* Delivery to the WWTP is made by the University
	+ They have separate trucks for food waste
	+ Delivery is made every weekday during the school year. During the summer and winter break, food waste is not transported to the WWTP digesters.
	+ Adam was in favor of accepting food waste during the breaks but university declined (?)
	+ Summer – Pick up early morning and deliver the same day
	+ Winter – Pick up during the night and deliver the next day
* WWTP was
	+ Looking to upgrade their facility
	+ Looking to increase their digester volume
	+ Looking for alternative feedstock
* Digester at WWTP
	+ There are 2 digesters, each ~500,000 gallons
* Currently, WWTP accepting
	+ Food waste from the dining halls and cafeteria at the Purdue University
		- During school year, M-F they accept 3000-3500 lbs of food waste per day
	+ Grease-trap waste from the restaurants
	+ They provide bottles to the citizens and advise them to only send used cooking oil
* WWTP repurposed tanks to receive the food waste
	+ There is piping installed, that connects the collection tank to the digester
	+ Digester fluid is pumped into the collection tank, where the waste is mixed and homogenized before sending it to the digester
	+ They used to have mobile tippers, but now have platform based tipping
* Food waste has ~90% Volatile content, and regular moisture content.
* **Purdue does not pay a tipping fee**
	+ Net benefit for Pudue
		- Public perception
		- Diversion of waste from landfill
	+ Purdue does not claim any Carbon Credits, RECs, or RINs.
	+ Tipping fee for others is $0.10 per gallon (for grease waste)
* WWTP saves $3000-6000 per month on electricity
	+ They were already producing methane from other sources
	+ Adam was not sure about the reason of this variation. So with the thank you email, I asked for an explanation
* They have permit agreements with Grease-trap Haulers
	+ Restaurants pay the haulers to take the grease
	+ Haulers pay WWTP for the grease ($0.10/gallon)
* Adam gave me the contact information of Randy Drake, who is in-charge of the Delivery Crew at the Purdue University. I have emailed Randy and cc’ed Adam to that email.

# Meeting with Carter Phillips from the Bevier Café – 6/25/2018

* Bevier Café is only open from M-F
* Carter was concerned about collection and pick-up
	+ Ideal situation for food waste collection: 4 bins
		- 2 in the loading dock
		- 1 for pre-consumer (kitchen)
		- 1 for post-consumer
	+ They will have to train the Café staff and the BSW staff as well
	+ Collection point near the Busey Evans dining hall will be very challenging for them, especially during the winters
	+ Food waste must be collected by Friday of every week (at least once a week on Fridays)
		- Who will pick it up?
		- How often will they pick it up?
* Carter estimated that Bevier Café produces 50-100 lbs of food waste per day – post + pre
* Carter said that Food Science department
	+ is a learning lab for manufacturing
	+ they grow tomatoes for the pizza sauce
	+ they grow wheat which is milled at the Pilot Plant at the FSHN department
* Brian Jacobson is in-charge at IBRL
	+ Ask him if there are any projects currently that produce food waste
* Jane Norder at ECE’s Café Byte
* Carlos something at IGB’s Array Café
* Carter is very interested in this program. He offered to start weighing the food waste now so that we can have an estimate for the future.
	+ Although, I think that he would prefer to participate once we have started the pilot with Busey Evans.
	+ I told him that I would like this project to start by the end of October

# Meeting with Angela Urban from the US Army Corps – 6/22/2018

* Angela Urban works for the Army Corps in Champaign, IL
* She asked me to reach out to Dave Guth and Dawn Aubrey
* She said that the Dining Halls do not use much FOG
	+ Except for Ikenberry dining hall. They have a fast food place within.
* Department of Agricultural and Biological Engineering (ABE) working with **tomatoes**. There must be a lot of waste from tomatoes.
* Angela talked to Carle Hospital during her graduate studies, and they said that they don’t have any solution for food waste.
	+ Hospital food waste could be used
* Are Frat houses and sorority houses university-owned?
	+ They have a lot of food waste

# Phone call with Dana Kirk from the Michigan State University, East Lansing – 6/22/2018

* Dana Kirk is an assistant professor in Biosystems and Agricultural Engineering at Michigan State University
* 6000 acre campus
* They have 2 digesters on-campus and they are considering adding one more digester at the WWTP – Anaergia, Inc. constructed the digesters
	+ Industrial project construction cheaper than WWTP at the time
	+ MSU owns 40% of the Wastewater Treatment facility
	+ 2 digesters
		- 1 Plug-flow digester constructed in 2010. – Decommissioned for the last 4 years
		- 1 Complete-mix digester (commercial) constructed in 2013
			* Service units to the university
			* 400,000 gallon capacity
			* Usually reuns at 100oF, but currently at 103o or 106oF
* Total waste that they process – 22000 – 25000 tons/year
	+ Dairy manure makes up almost 50% – 9000 – 11000 tons/year
	+ 9 Dining halls (one big and 8 smaller)
		- Brody Hall – 35000 – 40000 meals every week
			* They have a pulper (Somat pulper)
			* 200 tons of food waste – both pre- and post-consumer
			* Bones are not recommended to go through the pulper. Smaller bones like chicken wings are acceptable
		- Rest of the 8 dining halls don’t have pulper
			* Only pre-consumer food waste is collected
			* 150-200 tons of food waste every year
	+ Remaining 10000 tons/year
		- FOG from restaurants and Milk Processing waste makes up 80%
		- Rest comes from the wash-down from Slaughter house material and some distilleries
* Food waste collection
	+ Brody Hall
		- 2 times a week during school year
		- 1 time a week during breaks (since they are always open and serve almost 25000-30000 meals a week during the summer and winter break)
	+ From all other Academic buildings
		- 3 times a week during school year
		- Not very frequent during summer and winter break
* On-site electricity generation – Internal Combustion Engine
	+ Maximum output – 380 kW
	+ Typically, 350 kW (because they don’t want to go for maximum production value)
	+ They are not claiming any high-value RINs right now. There are no subsidies right now.
	+ No Carbon Credits
* HRT – 20 days
	+ 20,000 gallon in and 20,000 gallon out
* GHG emission reduced – 5000 metric tons from GHG reduction and energy offset
* Total project cost – $5.1 M
	+ Funded completely by the University Foundation – Internal loan
	+ Payback period – 8-12 years
	+ 2 engines failed/malfunctioned, so they had to replace those – increasing the payback period
	+ Construction in 9 months – only idle time in the last 5 years
* Challenges
	+ Contamination from pre-consumer food waste
		- Nitrile gloves
		- Plastics
		- FOG have contamination problems
			* Only has 4% solid content
			* MSU considering a dewatering system
	+ Training the workers
* Tipping fee – $0.10 a gallon, and a flat fee for a load
* Operating Staff – 3.5 FTE