

## Response to questions by Agronomist Haily Sand

Nature Energy is pleased to provide the following responses to the questions provided by agronomist Haily Sand. In the following responses, digestate is the term used for the organic biomass that exits the digester. A portion of the digestate will be separated into a fiber fraction and a liquid fraction, termed nutrient water, using a screw press and a centrifuge.

1. If driving to farms to pick up raw-manure, why not haul digestate products back to same farm, therefore saving a trip and getting by-product out further than the 20- mile radius?

The Nature Energy business model is to deliver digestate products back to participating dairy farms in the same truck that picks up the raw manure. This ensures efficient use of trucks since they will be loaded both ways when hauling manure and digestate or nutrient water.

2. Would it be acceptable to require that if raw manure is used from a farm, a certain amount must go back to the farm?

Yes. The agreement with participating dairy farms is that Nature Energy is “borrowing” their manure to capture the biogas produced in the digester and that digestate or nutrient water is returned. The volume returned will be based on nitrogen (N) content such the same amount of nitrogen that their raw manure contained will be returned to them along with phosphorus (P), potassium (K) and other nutrients that was in the manure.

3. It was noted that digestate products may ‘replace’ the need for some fertilizers (P in particular), what is the testing (lab analysis) regimen for the digestate products?

The digestate exiting the digester will be tested by a certified laboratory<sup>1</sup> to determine its N, phosphorus (P), potassium (K), sulfur (S) and ammonium content on a weekly basis. These laboratories have all been certified under the Manure Analysis Proficiency program which serves as an independent evaluation of laboratory performance. More information about the certification is available at [www.mda.state.mn.us/pesticide-fertilizer/certified-testing-laboratories-manure-soil](http://www.mda.state.mn.us/pesticide-fertilizer/certified-testing-laboratories-manure-soil).

- i. How does Nature Energy (NE) plan to get this information to the growers?

Nature Energy will develop a web portal to provide participating farmers with the nutrient content of the digestate or nutrient water returned to them. Nature Energy is successfully utilizing a similar web portal in their European operations. Nature Energy operates an advanced logistics system to track and document where each load is delivered and what the nutrient content is. Information from the portal will be formatted so it can be easily transferred to nutrient management planning tools such as University of Wisconsin’s Nutrient Management Planning Software SnapPlus.

- ii. Will NE hire their own Nutrient Management Planner?

Nature Energy will not be preparing nutrient management plans but will document the amount of nutrients being returned to farmer. Each participating farmer prepares their own nutrient management plan or will utilize their own nutrient management planner. Nature Energy agronomy professionals will work with farmers and their nutrient management planners to ensure that the participating farmers are in compliance with their nutrient management plan. Information about the nutrient content of digestate or nutrient water can be entered directly into nutrient management planning tools, including SnapPlus.

- iii. How will the nutrient management plans (NMP) that have to be compiled for County/DNR reporting be paid?

Nature Energy will be participating with farmers that comply with all county and state regulations. Since the nutrient management planners are employed by and work for the farmers, the farmers will pay the nutrient management planners to prepare the necessary reports.

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<sup>1</sup> A list of certified manure testing laboratories in and around Wisconsin is at <https://datcp.wi.gov/Documents/NMSoilManureLabs.pdf>. A full list of all certified labs in the US is at [www2.mda.state.mn.us/webapp/lis/manurelabs.jsp](http://www2.mda.state.mn.us/webapp/lis/manurelabs.jsp)

iv. If NMPs are paid for by farmer, what is the benefit to taking this product?

The digestate product will contain the N, P, K, and micro-nutrients needed to grow the next crop and will cost less than the commercial fertilizer that the farmer is currently purchasing. Further, a higher proportion of N in digestate is in the plant available ammonium form, which means less total N needs to be applied to meet crop needs compared to manure due to higher first-year N utilization. The concentrations of N, P and K are 2-3 times higher in digestate or nutrient water compared to the dairy manure due to the inclusion of turkey litter in the feedstock. There are, therefore, fewer tons of digestate or nutrient water returned to the dairy farms than tons of manure picked up. This means fewer tons material needs to be applied per acre, thereby reducing application costs. The proportion of N and P in nutrient water is better balanced relative to crop needs compared to manure, which helps reduce the risk of excessively building soil P levels.

4. How will the price (or value) of the byproduct be created?

Enough of the digestate or nutrient water will be returned at no charge to participating dairy farmers to replace the nitrogen content of their raw dairy manure that was sent to the digester. The volume of digestate or nutrient water not returned to the dairy farmers will be marketed to other farmers at a price that makes applying digestate or nutrient water more economically feasible than purchasing commercial fertilizer.

5. Is it possible to sell digestate to Gardeners or Composters?

Digestate itself will likely not see a market for gardeners or composters as it is a liquid product and does not have enough dry matter. The fiber fraction that results from separation of the digestate into nutrient water is a solid product which could see a market for gardeners or composters. Nature Energy is actively working with a partner who is marketing bagged agricultural waste biomass for garden and orchard use to develop that market opportunity.

6. Proper nutrient management planning and marketing of the digestate is ESSENTIAL. What are ideas NE has for:

i. Documenting where the digestate goes?

Nature Energy will have signed contracts with participating farmers specifying how much digestate or nutrient water is returned to them, including how much N, P and K are returned with the digestate or nutrient water. Nature Energy will actively work with farmers and their nutrient management planners to ensure proper nutrient management planning is taking place and regulations are followed. The information is available through a web portal where participating farmers can track how much manure they have supplied and digestate or nutrient water is returned.

ii. Getting growers lined up?

Nature Energy is having ongoing conversations with participating dairy and crop farmers. Nature Energy has partnered with agronomy professionals with expertise in local conditions and operations. It is Nature Energy's business model to enter into bilateral partnerships with the participating farmers to ensure there are financial, production, environmental, and/or management benefits to the participating farmers while maintaining a viable biogas production.

7. Proper on farm storage will be needed to hold the digestate product until optimum application timing.

These storage facilities should be assessed to make sure they are up to date/code?

Most dairy farms already have storage facilities designed according to United States Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS) 313 Standards by certified engineers and are permitted by the Wisconsin Department of Natural Resources (WDNR) and/or the county. Any additional storage facilities will be designed and built according to NRCS 313 Standards by certified engineers so that they will be permitted by St Croix County or neighboring counties. Any existing, properly designed, on-farm storage can be used for the storage of digestate or nutrient water. It is noted that the manure will be picked up directly from a reception pit and not from the lagoon or other storage structure. Manure leaving the barns will be stored in a reception pit with enough capacity to store 2-3 days of manure production and is designed for easy access by Nature Energy's trucks.

i. Who will assess these storage pads/facilities?

It is the farmers' responsibility to ensure the storage facilities meets regulatory requirements. Most farmers already have their own design engineer to ensure the storage facilities follow NRCS requirements. The design engineer is required to

certify that the storage facility was built according to approved design criteria. Periodical inspections of the storage facilities are made by the WiDNR.

## 8. Processing

### i. Will a screw press be used to separate solids from liquids?

Yes. Depending on the requests by the participating farmers, a portion of the digestate will be separated in a fiber fraction and nutrient water. Because raw manure is an unbalanced nutrient source, some dairy farms who have applied raw manure to their cropland for many years have soils testing very high in phosphorus. Nutrient water has less P relative to N compared to digestate, and is a well-balanced nutrient source for e.g., corn silage, a crop commonly grown by dairy farmers. Nature Energy will work with the dairy farmers to deliver either digestate or nutrient water to meet their nutrient management planning requirements.

### ii. Why is there a 197-ft stack being proposed?

The manure unloading halls and storage tanks operate with negative pressure in order to minimize odors to the surrounding community when the internal and external loading activities are conducted. This air and all odor producing activities associated with anaerobic digestion is treated to remove odors in biofilters and then exhausted from the 197-ft stack. The stack height is specified by the air dispersion model in compliance with the WIDNR Regulations.

### iii. Can we abide by European standards and if so, how would this be enforced?

The plant will be designed to meet or exceed all applicable US standards and requirements. All nutrient management planning will be completed to comply with the applicable regulations. Nature Energy's plants also follow European standards which are typically more restrictive than US standards and requirements. Nature Energy's plant will follow the standards and requirements that are most restrictive.

### iv. Confirm that NE will take care of the discharge permit?

Nature Energy confirms that all required permits will be obtained. The only wastewater discharge from the Roberts plant would be from the staff locker room, bathrooms and kitchen, and that discharge would go to the Roberts sewage plant. All other water used at the plant, including truck washing, would be collected and added to the biomass stream into the digester. Construction and operations stormwater permits are handled separately as described in the Environmental Summary document, Section 3, Table 4.