

Lewis County Community Digester Project

Frequently Asked Questions

Project Description:

The project began with a discussion about what could be done locally to increase the strength of the agriculture industry in Lewis County. These initial discussions involved representatives from various agri-service providers, farmers, local and county government officials and experts from universities such as Cornell and Clarkson that specialize in digester technology and economics. The idea of a community manure processing center, that includes an anaerobic digester centrally located in Lewis County, is currently being explored as it would provide benefits to three key groups in Lewis County: dairy farmers, local industry and residents. The list of questions below is designed to answer questions about the project.

What is an anaerobic digester?

Anaerobic (without oxygen) bacteria break down or “digest” organic material and produce “biogas.” Anaerobic decomposition occurs naturally in swamps, water-logged soils, rice fields, deep bodies of water and in the digestive systems of termites and large animals, including cows. Anaerobic processes can be managed in a “digester” (an oxygen-free tank) for waste treatment. The primary benefits of anaerobic digestion are nutrient recycling, waste treatment and odor control. Secondary benefits of anaerobic digestion include renewable energy generation, including electricity and heat.

What is the difference between natural gas and biogas?

Biogas and natural gas are very similar in that methane is the major component of both. While natural gas is a fossil fuel that was created thousands of years ago by the anaerobic decomposition or “digestion” of organic materials, biogas tends to refer to gas harvested from the managed decomposition of organic materials. Biogas is typically composed of 50-60% methane, 40-50% carbon dioxide and trace amounts of other gases including hydrogen sulfide and ammonia. Natural gas is typically more than 70% methane, with most of the rest being other hydrocarbons (such as propane or butane) and only small amounts of carbon dioxide and other contaminants. When biogas is purified, it can be called renewable natural gas.

What kind of material would this digester “digest”?

Manure digesters are commonly used in the dairy industry to remove odor from manure and to produce renewable energy on the farm. Food processing wastes can be added to the digesters as it offers an environmentally friendly alternative to landfill disposal and increases the gas production potential of the digester. In Lewis County, we have a large dairy cow population that could contribute to a manure digester. Food wastes from local schools, restaurants and the hospital could also be added.

Currently, a group of engineers from Cornell University are leading a feasibility study that would help answer a lot of the particulars about this project. A key component of this study will be to identify the available farm and non-farm material that would be suitable for a digester and to determine the quantity, composition, and gas-production potential of these materials.

What can the biogas be used for?

Biogas is a renewable energy source that, once impurities are removed, can be utilized in several different ways. Biogas can be used in gas powered equipment such as boilers (although modifications to the equipment are required before biogas can be used). Biogas can be converted to electricity with the use of a generator. The heat produced by the gas powered generator can also be harnessed and utilized. Systems that fully utilize the generated heat and electrical power and those that utilize the biogas directly as fuel can operate with very high efficiency. Utilizing biogas as a fuel may offer greater opportunity in Lewis County as engineers involved in the discussion have identified potential uses in local industries.

Who could utilize this locally produced biogas?

The great benefit of the proposed idea is that it would generate locally produced energy that would also be *used locally*. Because biogas contains impurities, it would have to be cleaned and purified in order to replace natural gas as a fuel. Existing natural gas systems can be modified to use biogas, but the modifications are expensive. The modification costs could probably only be justified by large industries that have large energy requirements. Locally produced biogas, if it can be produced economically, would be attractive to local industries in the county and help draw potential industries to the area. For example, our

own local Kraft plant utilizes a digester designed specifically to operate on their processing waste and uses the resulting biogas to power their boilers.

What is a feasibility study?

A feasibility study is an analysis of the technical and economical viability of an idea. Until now, only the concept of a community digester has been discussed. The feasibility study will help answer the question “is this a financially feasible idea that could benefit the region’s dairy industry, our local farmers and our community?” And if so, “should we proceed with the proposed project idea?”

What else will the feasibility study tell us?

The feasibility study is intended to answer a variety of questions, including:

- How much energy could potentially be produced with locally available feedstocks, i.e. manure and/or food waste?
- What sale price for the energy would make the project financially viable?
- Would the costs associated with transporting the feedstock from various locations to the digester be cost prohibitive to the overall project?
- What would be the best ownership/operating structure for such a facility?
- Would it be most efficient to use the energy as biogas, as electricity or as a combination both?

Where would such a facility be located?

Central Lewis County is being evaluated as the preferred location because there is a large concentration of cows and the largest concentration of potential industries that could use the energy. The feasibility study will help evaluate whether it is best to locate the digester near the industries or to locate the digester in a more rural setting, closer to the manure sources, and pipe the gas a longer distance to the industries.

What would it mean for jobs for the community?

A certain number of jobs will be created during the construction phase and during the operation phase, the exact number is yet to be determined.

How much money will this project cost?

The feasibility study will include the estimated construction and on-going operational costs. In order for the project to move forward, the feasibility study needs to show that this plant would be self-sustaining (run in the black financially) while still meeting the core goals of the project (see the list of core goals on the attached sheet). Current interest in renewable energy increases the possibility of receiving grant monies to help cover the cost of the project.

Haven’t I heard about other community digesters?

The idea of a community digester is not new. Community digesters have been used in Europe for over 20 years and have been investigated by more than one rural community in the US. Often times the location of these projects limits the potential end user of the energy and form (electricity or biogas) in which the energy can be used. For a project such as this to be successful, it is critical to find the most efficient use of the energy that is produced. Lewis County offers great opportunities to maximize these efficiencies.

What are the benefits of an anaerobic digester to the community?

- Green energy produced locally and used locally
- Lower energy costs than present – attractive to existing local businesses and those looking for new locations to build
- Helps strengthen local agriculture by making it more efficient
- Odor mitigation – the digestion process reduces the odor of manure considerably
- Act as a model renewable energy system for other small towns
- Recognition for a dairy/industry/community partnership
- Marketing tool for attracting new businesses that want to be located where they can use renewable power and market their products under a ‘green’ label.

Sources:

Energy Efficiency and Renewable Energy Consumer’s Guide: How Anaerobic Digestion (Methane Recovery) Works. Published by the U.S. Department of Energy. www.eere.energy.gov/consumer/your_workplace/farms_ranches/index.cfm/mytopic=30001

Lewis County, NY Community Digester:

A Partnership of the Supply Chain with Benefits to the Community and the Dairy Industry

Core Goals

Overarching goals for the region's dairy industry:

- Encourage continued economic growth.
- Lessen the negative impact on county residents (i.e. manure odor).
- Reduce the environmental footprint.

For the Farmer:

- Provide greater flexibility in manure handling and nutrient management that results in an economic advantage (vs. today).
- Reduce odor associated with manure storage and land application.
- Allow a greater number of animals per unit of land area with less environmental risk.

For Industry:

- Gain access to sustainable energy at lower (vs. today) cost.

Farm Specific Questions

What would be the benefit to a farmer who participates?

Potential fertilizer savings – The digestion process does not change the nutrient composition of the manure but does convert some of the nitrogen to a more plant available form. Similar to soil bacteria, the bacteria in the digester can convert organic-N to ammonium-N. If digested manure is applied directly before corn planting and is incorporated to prevent ammonium-N loss to the air, it will have higher fertilizer value than non-digested manure.

Opportunity for manure “balancing” – For farms where expansion is restricted by insufficient land base to handle manure nutrients, their digested manure could be returned to another farm that could use the manure. This could create a win/win situation allowing more milk production from a given land base.

Odor mitigation – Public complaints about odor are an important issue and they will likely increase. The digestion process reduces odor considerably and allows manure to be spread without the odor that neighbors might find offensive.

Production of value-added products – At a facility such as this, the digested manure could be processed into compost, bedding, or more concentrated fertilizer products.

Potential for Carbon Credits – Carbon credits are a relatively new area that would have to be investigated further.

Who would pay to transport the manure?

In order for the project to move forward, the operational costs of the facility (including transportation) must be shown to be covered by the income generated from selling the energy the system produces.

How do the digesters in Europe work?

Due to their comparatively high fuel prices and government policies and subsidies, digesters have been used in Europe for the last 20 years. Germany currently has 4500 operating digesters. In Denmark, digesters are commonly built in areas where there is a large farming community and/or food waste producer in close proximity to a town. The farm or food processor has a short term storage located near their facility. A vacuum truck picks up waste from the short term storage and transports it to the digester. After digesting, the manure is returned to the farm’s long term storage structure. The long term storage structures are often located farther away from the farm, more central to the farm land. Transportation costs are minimized when the vacuum truck picks up raw manure directly after delivering digested manure.

What would it cost my farm to participate?

A farm would need to build a small, short term storage to hold raw manure for a truck to collect from. The goal is to provide funding through programs such as AEM to cost share the building of short term storage structures. The farm would also need to have long term storage in place to hold digested material (either an existing storage or a new structure).

Which farms could participate in such a project?

The 3 limiting factors include: bedding source, storage, and distance from the digester. Manure from sand bedded facilities can not be used in current digester technology. The feasibility study will determine the distance from the digester that is economical to haul manure.

What about biosecurity?

Studies have shown that anaerobic digesters reduce the viability of weed seeds and disease-producing organisms. After undergoing the digestion process, up to 99% of pathogens are destroyed.