

FOOD SCRAPS LAW IMPACT ON FARMS AND PROCESSORS

Participation for Dairy Farms with Potential for Anaerobic Digestion

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Introduction

With the introduction of New York State's Food Donation and Food Scrap Recycling Law there is a renewed potential for the profitable development of anaerobic digestion systems on dairy farms where previously the economics were not clear. An estimated influx of 250,000 tons of food waste will be diverted out of landfills and into a hierarchy of waste disposal annually in New York State. Anaerobic digestion (AD) is a perfect opportunity to reclaim the energy and nutrient components and maximize benefits for farms and society by diverting nutrient dense organics out of landfills. These systems can reclaim nutrients, harvest methane which can be converted into renewable energy, and provide additional funds to farms through tipping fees, reduced fertilizer imports and potential nutrient exports.

Qualifications for AD

The addition of an AD system on a dairy farm has been constrained in NYS by the economic cost of the system and the low price of energy produced. Economies of scale dictated that only farms with a large number of cows did a partial budget calculation show a positive result. Dairy farms with a smaller number of cows but with a land base to utilize the nutrients may have an increased incentive to add an AD to their operation. The addition of an AD system to a farm is discouraged by not only costs, but also by labor and specialized operation management – especially with the addition of food waste. Being able to provide these additional resources is essential to the success of an AD system on-farm. Many successful farms can manage biological/mechanical production systems.

Advantages of AD²

There are many benefits of farm-based anaerobic digestion systems that benefit farmers and nonfarmers alike.

- Odor Reduction – Digested manure and food waste effluent can be stored and recycled to the farm's land base with far less odorous emissions; less odor allows a farmer to be more flexible in dealing with how the digestate is stored and recycled to the land base.
- Conservation of Crop Nutrients – The anaerobic digestion process does not consume the co-digestion nutrients nitrogen (N), phosphorus (P), or potassium (K) from the manure or food waste.
- Improvement in Crop Utilization of Manure Nutrients – Effluent from digesters can be stored long-term without significant odor problems allowing farmers to apply nutrients to sensitive field crops in an agronomic, timely fashion reducing the potential for runoff and contamination.
- Generation of Renewable Fuel/Energy – Biogas can be used to generate electricity and hot water and/or dry materials such as corn and cow bedding or used in several other potential alternative uses that can be used on- or off-farm, including liquid fossil fuel replacement. Co-digestion can produce 2-5 times the biogas as manure alone.
- Revenue Potential – Besides reducing on-farm purchased energy costs for electricity and/or heat, the digester may facilitate other enterprises such as digested manure solids sale as compost or bedding, excess electricity sales, or co-digestion of food waste for a tipping fee. There may be increased sources of revenue for the renewable energy in the form of carbon credits.
- Pathogen Reduction – Cornell research has shown a 99.9 percent reduction of indicator organisms.

Digester with Food Waste

Adding specific organic matter to optimize the digestion process is one way of increasing the energy output without increasing the capital costs.

Food wastes typically have high ratios of volatile solids-to-total solids (80 – 90%), which indicate high energy content. The volatile solids are the fraction of total solids that can potentially be converted into biogas. Most volatile solids in food waste are more easily biologically degraded into biogas than the volatile solids in manure. As organic matter derived from raw biological materials, food waste is a category of biomass. Combustion of the carbon from the food waste can be carbon neutral or better as the carbon dioxide released originally came from the atmosphere.

Food waste is generated from the following processes:

- Industrial food processing establishments.
- Farm produce that doesn't meet supermarket specifications.
- Discarded and out of-date foods at supermarkets.
- Foods prepared by restaurants but not served to customers.
- Plate scraps from commercial and residential sources.

Opportunities Once Installed

Many of the opportunities associated with the installation of AD can be found in "Opportunities for Participation" factsheet. A brief summary of the opportunities involved with co-digestion are listed below:

- Tipping fees
- Renewable Energy production
- Nutrient recycling
- Soil health
- Potential to include added manure treatment
- Byproduct export

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References

[1] NYS Environmental Conservation. "Food Donation and Food Scraps Recycling." New York Consolidated Laws, Environmental Conservation Law - ENV Title 22 | NY State Senate, www.nysenate.gov/legislation/laws/ENV/A27T22.

[2] PRO-DAIRY Dairy Environmental Systems Group, 2015. "APPENDIX A" Benefits of Anaerobic Digestion of Dairy Manure. Cornell University.

Constraints to Implementation

There are many considerations that should be made before installing an anaerobic digester or adding food waste to the system. As a farm with potential to install an AD system, labor changes, required holding pits, and other maintenance should be considered before deciding to implement. It requires skilled operation and management to run the biological process, the material handling, and the energy utilization.

Farms should consider the changes to their operation before pursuing the installation of these systems.

Fact sheet "Constraints of Participation" contains details on specific considerations of accepting food waste into an anaerobic digester as part of an on-farm system.

Conclusion

The impact on the total farm system needs to be evaluated a farm contemplates the addition of AD to the dairy farm's manure management system. There will be farms where the addition of an AD will be a benefit. Especially those in need of odor control, that have the technical skills to run a biological system, have interest in tipping fees associated with food waste acceptance, have a use for additional recycled nutrients and have the financial resources available to cover a portion of construction costs.

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