

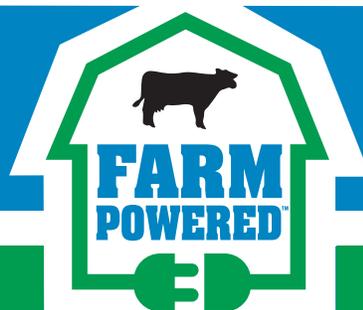


# Vanguard

RENEWABLES



Organics to Energy Lifecycle



# The American farmer is under attack and the food industry faces major challenges.

The American farmer is under extreme pressure to reduce farm greenhouse gas emissions and groundwater contamination from agricultural waste. At the same time, in the United States most of the excess food waste from processors and consumers still ends up in landfills with harmful consequences for the community. The common problem is that both landfills and manure emit methane, a greenhouse gas that is more than 20 times worse for the environment than CO<sub>2</sub>. Vanguard Renewables safely and cleanly combines these two waste streams and processes them using Anaerobic Digestion. We turn organic waste into Farm Powered™ clean renewable energy providing significant sustainability for farms and food processors.

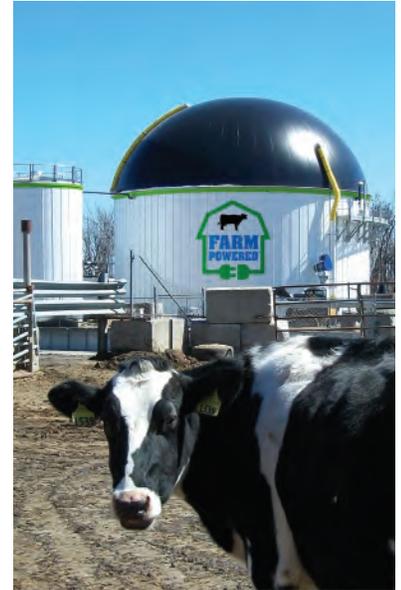
## The Organics to Energy Lifecycle

- Converts the energy potential in manure & food waste into electricity
- Provides low-cost energy, organic fertilizer, and free heat and hot water to the farm
- Bugs digest manure and food waste and create burnable methane for farm-based generators
- Generates electricity for the surrounding community
- Reduces farm odor and groundwater contamination
- Digestate fertilizer by-product increases crop yields

## Low Cost Energy & Farm Powered Waste Solution

Vanguard Renewables is the premier waste-to-energy plant owner/operator in the United States committed to farm-based renewable energy production. Our farm-based anaerobic digesters provide a waste solution that fits in on the farm and offers a proven solution to your manure problem with the upside of higher crop yields.

- Safe, completely enclosed anaerobic digestion process
- Professionally managed on site and with 24/7 monitoring
- Food waste deliveries by tanker truck similar to milk pickups
- Digesters fit in to existing farm landscape
- Happy neighbors get electricity and no farm odor
- Sustains the farm for future generations



We are sixth and seventh generation dairy farmers. **With a fluctuating dairy market, we needed a new approach to sustain our family and the ideal of the American farm.** In 2013, we introduced an anaerobic digester to our farm. It's enabled us to dispose of waste produced in our greater community, create energy and fertilizer for the farm, and provide equivalent energy to Cabot's West Springfield butter production facility.

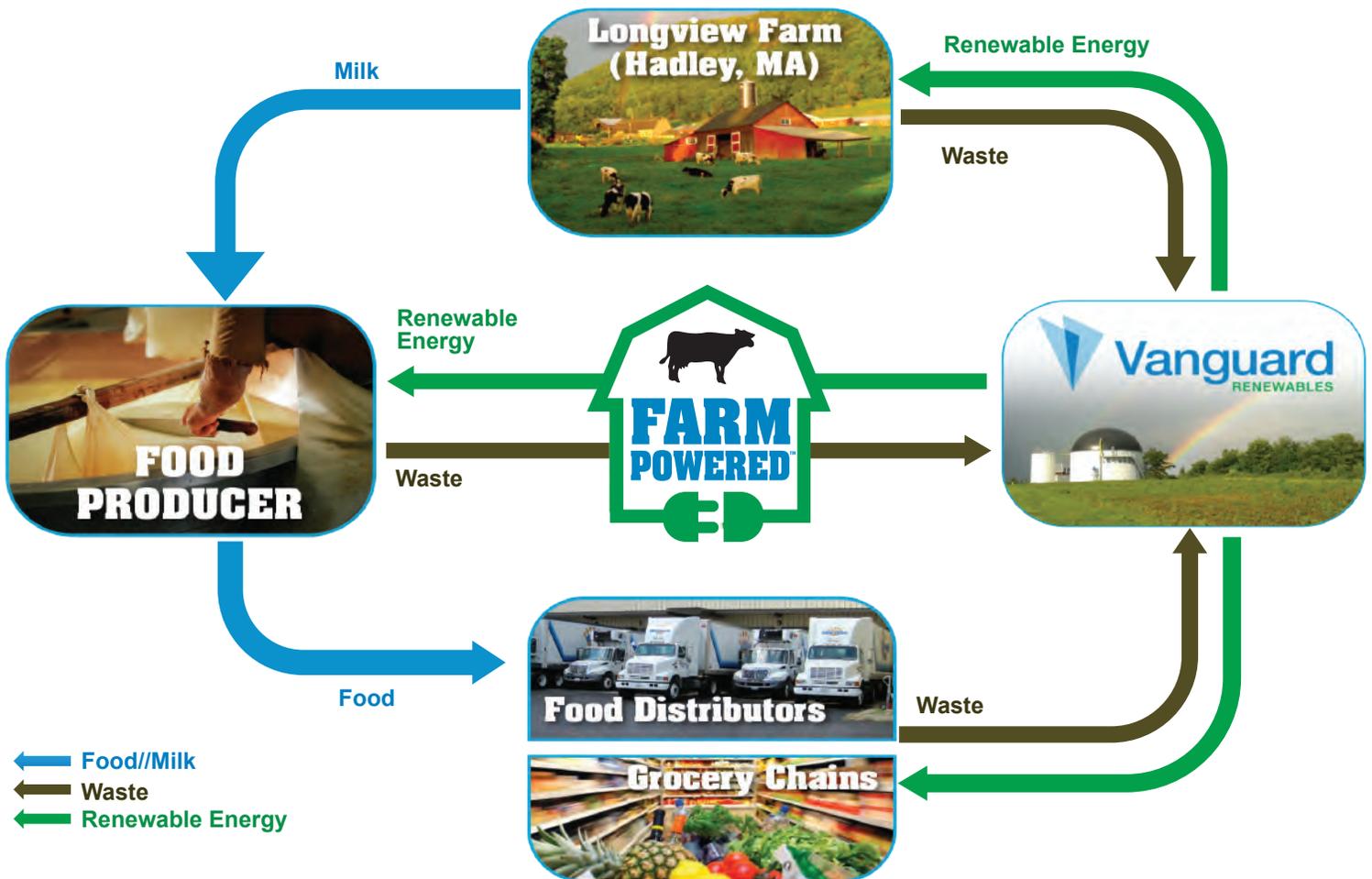
David Barstow, Longview Farm, Hadley, MA



Biogas from our Vanguard Renewables anaerobic digester runs a generator that produces 3.7 million kilowatts a year of electricity – enough power to run our farm and serve about 500 homes per year. **It has made all the difference** by lowering farm operating costs and keeping our neighbors and our cows happy!

Randy Jordan, Jordan Dairy Farm, Rutland, MA

## Energy moves from the farm to the production facility to the retail store and back to the farmer.



### Here's how it works:

#### Feedstock: Farm Waste + Your Organic Foodstock

Non-farm waste is delivered via sealed trucks and combined with manure at the farm.

#### Process: Mixing + Heat

In a sealed biodigester tank at the farm, microorganisms convert sugars, fats, and other compounds into biogas, reducing greenhouse gas emissions by 85%.

#### Output: Electricity + Fertilizer

Biogas generates renewable energy and heat for the farm, and equivalent energy for the surrounding community feedstock providers, and local businesses. The remaining digested material is odor-free, nutrient rich, natural fertilizer proven to increase farm crop yields.

# Leadership for a Secure, Sustainable Future



Our leadership team understands your waste disposal and energy acquisition challenges and costs. With backgrounds in food manufacturing, clean energy, anaerobic digester development and operations, and project construction, the Vanguard team brings their breadth and strength to the business of zero-waste, full-cycle organics reuse.

**“Our team came together to be energy innovators but what we quickly learned was that helping support the American farm was the real motivating force.”**

*John Hanselman, Executive Chairman, Vanguard Renewables*

Farm Powered organics reuse is a safe and clean energy trifecta. It offers an innovation boost to the American farmer, a waste disposal solution for American business, and affordable energy for American communities with an 85% reduction in greenhouse gases.

Based in Wellesley, Massachusetts, Vanguard is focused on placing ADs on farms across North America. The organics to energy lifecycle that is Farm Powered solves the organics waste disposal challenges of American business and the farms, while it generates renewable energy and provides fertilizer to increase local food production and clean water for farm use.



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