



Technical Education and Analysis for Community Hauling and Anaerobic Digesters **TEACH AD** Project Profile

Green Era Renewable Energy & Urban Agriculture Campus

BACKGROUND

“What if the next biogas projects built in US, were built with the community in mind?” With this question, Jason Feldman, CEO of Green Era Sustainability, opened the 2023 Biogas Americas Conference in Chicago, IL. And this question contains the vision that led Jason and Co-Founder Erika Allen, to imagine the Green Era Campus. The story of Green Era is a unique one because it did not start as a biogas project. Over 15 years ago, Jason met Erika Allen and became involved in urban agriculture, helping disadvantage communities in Chicago: these communities, specifically those of color, were and continue to be disproportionately affected by pollution, unemployment, and lack of access to healthy food. These issues led Green Era to partner with Urban Growers Collective, headed by Erika Allen and Co-Founder Laurell Sims, a black and woman-led non-profit that grows food to support underserved communities. But there was a problem: to expand urban agriculture, lots of nutrient-rich soil was needed. Jason and his team and partners researched solutions and they found that the best way to create nutrient-rich material is with an anaerobic digester. Green Era, Urban Growers Collective, and other community partners have transformed a 9-acre brownfield on Chicago’s south side into a vibrant hub for organic recycling, renewable energy, local food production and jobs. The Green Era Campus is the only community-based digester project of its kind, uplifting the south side of Chicago, and creating a blueprint for a green economy and a sustainable future. This project will create more than 300 new jobs and provide workforce training to help rebuild the local economy. This facility will create clean renewable natural gas and offset approximately over 40,000 tons of CO2 per year. The soil created will increase fresh food accessibility for over 2,000 people per year. So, *“What if the next biogas projects built in US, were built with the community in mind?”*

THE PROCESS: HOW IT WORKS

The facility has been designed to receive and treat 80,000-tons per year of food waste. Two forms of food-based waste will be received by the facility: non-pumpable solid food waste and pumpable commercial food waste from various sources in the Chicago metro-area. A digester tank is where the actual “in-vessel” anaerobic digestion process will occur. A smaller supporting equalization/holding tank, will serve as a storage of “conditioned feedstock” prior to being pumped to the digester tank. Most processes will be performed inside the processing building where the various forms of food-based waste will be delivered, screened, and combined to form a homogenized slurry. A separation mill will be used to pulp the organic waste fraction and remove

HIGHLIGHTS

LOCATION: Chicago, Illinois

SECTOR: Community Digester

FEEDSTOCK PROCESSED: Food-Based Waste: 80,000 tons/yr.

FOOD WASTE: Solid food waste from food processors (dairies, bakeries, potato chip plants, etc.), grocery stores, and restaurants including packaged food waste. Source-separated bagged kitchen waste from neighborhood curbside collection programs. Pumpable commercial food waste including wash/rinse water from cleaning tanks and trailers, whey, liquid ice cream mix, end of batch soups, sauces and syrups, and separated and thickened scum and solids from plant wash water. Fats, oils, and grease (FOG) collected from grease traps at restaurants and food processors.

DIGESTER TYPE: Complete Mix

BIOGAS YIELD: 190,000,000 SCF/year

BIOGAS USE: Pipeline Injection

DIGESTATE PRODUCTION: 35 tons/day (25% TS)

DIGESTATE USE: On-site urban farming operations, off-site regional composters/agricultural entities

IMPLEMENTATION COST: \$32M



The Green Era Campus in construction

contaminants (i.e., non-digestible packaging). From the separation mill, the pulped feedstock will be augured into a grit separation hopper to allow for the settling of stones, sand, glass, and organic calcium (shells and bones). The pulped feedstock will continue into the equalization tank before being transferred into the digester tank. Biogas (consisting primarily of methane) will be produced by the bacteria during the anaerobic digestion process and piped to the upgrading equipment where methane gas is separated from diluent gases such as carbon dioxide and trace “contaminants” such as hydrogen sulfide and volatile organic compounds. The upgraded biomethane is then able to be injected into the natural gas distribution piping.

NUTRIENT-RICH MATERIAL GENERATION

The anaerobic digestion process converts a portion of the organic matter in the feedstock to biogas. What’s left behind is a nutrient rich solution called digestate analogous to compost tea. The digestate is high in nitrogen and phosphorous, making it useful for land application as fertilizer for crops, compost, soil amendment, or bedding material. As such, the digestate can be sold to farms interested in land-applying this material. Its organic content is useful in restoring lands where topsoil has been removed, such as mining sites and deforested lands. Smaller-scale applications include compost, home and garden fertilizer, landscaping mulch, and even as eco-friendly decomposable planters. At the Green Era facility, digestate and any non-digestible solids that were not removed by the separation mills or grit hopper (e.g., pieces of paper or plastic packaging) are transferred from the digester tank for screening and dewatering. The dewatered digestate creates a “cake” that is approximately 20 to 25% total solids. “Finished product” cake solids will be used by the Urban Growers Collective for their urban farming operations and can be directly loaded via collection conveyors onto trucks for off-site shipment and use by other regional composters or agricultural entities. All water removed during the dewatering process will be discharged to the municipal combined sewer system. This liquid fraction of the digestate is also rich in nutrients and can potentially be used for land application as fertilizer. Nutrient recovery technologies are also being explored to produce more concentrated fertilizer products. When compared to biosolids and manure-derived digestates, food waste digestate has not received the same attention, due to lower volumes of this material. Research is showing promising results in regard to plant growth when food waste digestate is used as fertilizer¹²³. This organic product can replace the use of mineral fertilizers and avoid the emission of pollutants associated with their production.

MORE THAN AN ANAEROBIC DIGESTER

In addition to the anaerobic digester, the Green Era Campus will include other facilities: the already mentioned **Urban Farm** (7-acre) will grow 125+ varieties of produce per year, train young farmers, and support new food businesses and entrepreneurs. An onsite **Community Education Center** will offer workshops and trainings across a variety of topics led by community practitioners to educate and engage participants both virtually and in-person. It will include a teaching kitchen, classrooms, and operational space for both Green Era and Urban Growers Collective. A **Retail Store and Nursery** will serve as a destination for learning, gathering, and food access for an estimated 2,000 people per year, selling affordable fresh produce and plants grown on the campus urban farm. The campus will host weekly community events in the **Event Plaza and Amphitheater** that will include over an acre of outdoor community space through the **Edible Forest and Walking Trail** and **Community Garden Plots**, providing a place for neighbors to grow food while connecting with other community members.

¹[Digestate Biofertilizers Support Similar or Higher Tomato Yields and Quality Than Mineral Fertilizer in a Subsurface Drip Fertigation System](#); ²[Integrating anaerobic co-digestion of dairy manure and food waste with cultivation of edible mushrooms for nutrient recovery](#); ³[Vashon Bioenergy Farm: Trials Feeding the Food System](#)



"The Project will establish Chicago as a hub for the growing sustainable/green economy and spur economic development by transforming a costly local waste burden into a local asset, creating a new industry and green jobs." Erika Allen, Co-Founder of Green Era

FOR MORE INFORMATION

Marcello Pibiri
Energy Resources Center-University of Illinois Chicago (UIC)
1309 South Halsted Street (MC 156) Chicago, Illinois 60607
Tel: (312) 355-3823
Email: mpibir2@uic.edu
TEACH AD Website: <https://erc.uic.edu/bioenergy/teachad/>

Green Era Renewable Energy & Urban Agriculture Campus
650 West 83rd St., Chicago, IL 60620
Email: info@greenerachicago.com
Web: <https://www.greenerachicago.org/>