Trenton Renewables

Food Waste Recycling: ↓ Your Waste Management Costs ↑ Your Environmental Sustainability

Audience:	Sustainability Speaker Series (S3)
Presenters:	Andrew Johnston, Business Development Brian Blair, General Manager
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Who We Are	A food waste recycling and renewable energy company located in Trenton, New Jersey
What We Do	We help organizations of all sizes reduce their waste management costs and dramatically improve their environmental sustainability
How We Do It	By combining advanced material handling technologies with a biological process called anaerobic digestion to recycle food waste into premium compost, fertilizer, and renewable power

We built our facility to address barriers to food waste recycling, including cost, flexibility, transparency, and impact

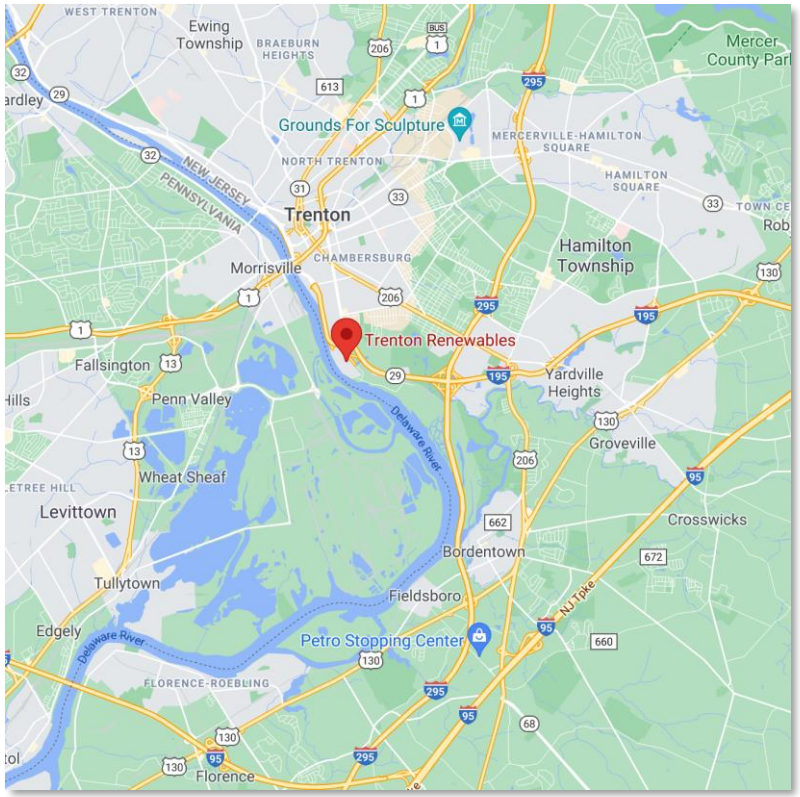
"We'd love to recycle our food waste but existing options…"

Cost too much	- Tip fees and/or transportation costs are too high - Manual unpackaging is necessary to make food waste valuable for a farm
Are inflexible	- Only certain types of food waste are acceptable, e.g., produce and grains - Minimum volumes are required with little acceptable variation
Aren't transparent	- Don't provide visibility into where my material goes, e.g., solid residuals - Actual costs are difficult to understand, e.g., complex billing structures
Aren't aligned with the impact I want to have	- Require too much transportation - Commingle my material with other types of waste - Don't provide visibility into my impact, e.g., carbon offset, energy generated

These market needs dictated the requirements for what we built

- ✓ **Price** to make recycling the least expensive way to manage food waste
- ✓ **Accept everything** from bulk SSO to fully-packaged foods with no minimums
- ✓ **Provide end-to-end visibility** into the process and our customers' impact
- ✓ **Co-locate** every stage of the process at one location dedicated to food waste
- ✓ **Have empathy** for all stakeholders and the broader mission of minimizing waste

Our facility is conveniently located, easy to access, and readily integrated into existing hauling routes



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We combine advanced material handling technologies with anaerobic digestion and cogeneration

Inputs

- 400 tons per day of bulk, packaged, palletized, and pumped food waste

Outputs

- 3.3 MW of Class I renewable power
- Premium compost and fertilizer
- Recaptured plastic and metal

Approach

- Flexible tipping floor for receiving vehicles
- Automated depackaging and material salvage
- Thermophilic (i.e, high temperature) anaerobic digestion
- Cogeneration of renewable power and useful heat

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Our process for food waste recycling has four stages

1. Receive Food Waste
2. Mix and Separate Plastic & Metal
3. Anaerobic Digestion
4. Renewable Power Generation

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Our process for food waste recycling has four stages

1.	Receive Food Waste
2.	Mix and Separate Plastic & Metal
3.	Anaerobic Digestion
4.	Renewable Power Generation

Scale and Receiving Bays

Input(s)	• Source-separated food waste in a truck
Output(s)	• Source-separated food waste in system

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Interior of Tipping Floor

Input(s)	• Source-separated food waste in a truck
Output(s)	• Source-separated food waste in system

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Interior of Tipping Floor, Mixed Grocery

Input(s)	• Source-separated food waste in a truck
Output(s)	• Source-separated food waste in system

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Interior of Tipping Floor, Food in Waxed Cardboard

Input(s)	• Source-separated food waste in a truck
Output(s)	• Source-separated food waste in system

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Receiving Hopper with Produce

Input(s)	• Source-separated food waste in system • Water
Output(s)	• Well-mixed ‘slurry’ of organic material • Separated: plastic, metal, and glass

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Receiving Hopper with Metal Cans

Input(s)	• Source-separated food waste in system • Water
Output(s)	• Well-mixed ‘slurry’ of organic material • Separated: plastic, metal, and glass

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Sortation and Mixing

Input(s)	• Source-separated food waste in system • Water
Output(s)	• Well-mixed ‘slurry’ of organic material • Separated: plastic, metal, and glass

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Recyclable / Upcyclable Plastic

Input(s)	• Source-separated food waste in system • Water
Output(s)	• Well-mixed ‘slurry’ of organic material • Separated: plastic, metal, and glass

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Salvaged Metal

Input(s)	• Source-separated food waste in system • Water
Output(s)	• Well-mixed ‘slurry’ of organic material • Separated: plastic, metal, and glass

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Anaerobic Digesters

Input(s)	• Well-mixed ‘slurry’ of organic material • Helpful bacteria and residual heat
Output(s)	• Biogas, i.e., renewable natural gas • Premium compost and fertilizer

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Gas Storage

Input(s)	• Well-mixed ‘slurry’ of organic material • Helpful bacteria and residual heat
Output(s)	• Biogas, i.e., renewable natural gas • Premium compost and fertilizer

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Solid Nutrients

Input(s)	• Well-mixed ‘slurry’ of organic material • Helpful bacteria and residual heat
Output(s)	• Biogas, i.e., renewable natural gas • Premium compost and fertilizer

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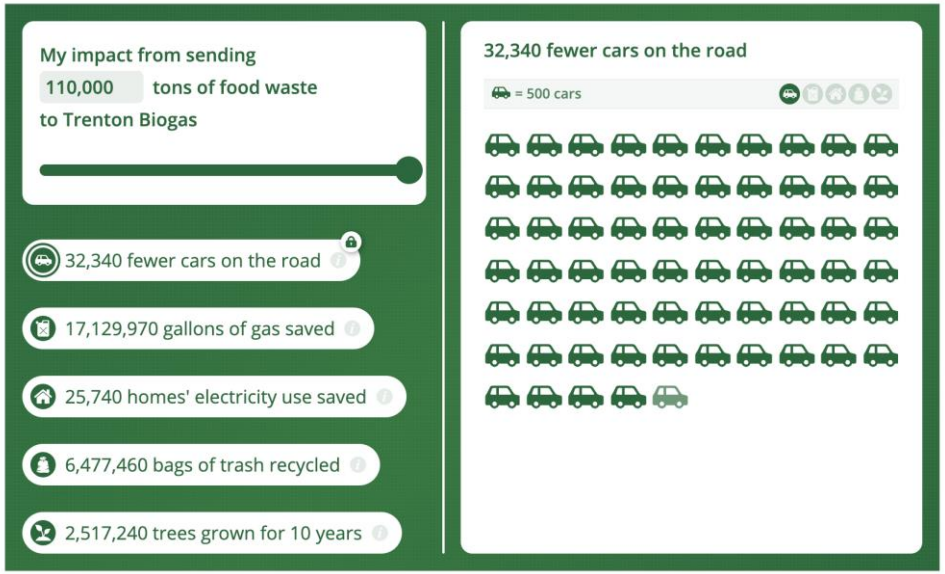
Cogeneration System

Input(s)	• Biogas, i.e., renewable natural gas
Output(s)	• Class I renewable power and useful heat

Our integrated approach helps us have a significant and tangible environmental impact

- Our impact each year includes:
  - 110,000 tons food waste diverted from landfills
  - 480,000 tons reduced CO_2 emissions
  - 225,000 MMBtu renewable biogas produced
  - 29,000 MWh renewable power generated
  - 23,000 tons premium compost produced



- This is equivalent to:
  - Avoiding 32,000 cars' worth of fuel consumption each year[1]
  - Offsetting 26,000 homes' worth of electricity usage each year[1]
  - Planting 2,500,000 trees and letting them grow for 10 years[1]

1. https://www.epa.gov/energy/greenhouse-gas-equivalencies-calculator, accessed June 24 2020.

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We're here to save you money and be more sustainable, even if that just means being an outlet for your food waste

- We can be a one-stop-shop for every part of your food waste recycling program
  - Audit your existing process(es) and costs
  - Develop and help socialize a proposal
  - Help implement new on-site processes (without distracting your team)
  - Transport your food waste to our facility (via our partners)
  - Recycle your food waste into sustainable products
  - Monitor your costs and measure your environmental impact
- Or we can simply be the destination for your food waste

The next step is easy:
reach out to Andrew and we'll schedule a call

- Contact person at Trenton Renewables: Andrew Johnston
  - andrew@trentonrenewables.com
  - M: (847) 525-1218

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