Integrating Anaerobic Digestion Into Existing Composting Operation

SERDC – Food Recovery Summit
Charleston, SC – November 18, 2015
Background

- Suburban county of ≈ 430,000 residents (≈ 150,000 households, and 8,000 business), located ≈ 30 miles from Washington, DC

Balls Ford Road Composting Facility

- Began composting leaves and grass on the 30-acre site in 1994 through contracts with operating companies
- Existing permitted capacity of 50k tons per year; presently handling ≈ 30k tons per year
- Simple windrow composting – large piles turned every few weeks with an excavator
PWC’s Driving Forces

Driving Forces Behind Project
• Stagnated recycling rates
  – County recycling rate had hovered around 40% since 2006
• Desire to implement county-wide yard waste composting program
• Regional demand for enhanced food waste processing infrastructure

Path to the Project
• Spring 2009 – Began internal discussions about enhanced organic waste processing opportunities and technologies
• Winter 2011 – Began accepting pre-consumer plant-based food scraps at Balls Ford Road site under pilot program
• Summer 2012 – Began accepting pre-consumer plant-based food scraps under amended Solid Waste Permit
• November 2013 – Issued RFP for organic waste management project
• February 2015 – Executed 20-year contract with Freestate Farms LLC to redevelop existing site for expanded throughput capacity and range of organics processed
Freestate Farms LLC delivers full-cycle sustainable solutions to its local community partners by developing, owning, and operating integrated facilities for advanced composting, anaerobic digestion, renewable energy, and commercial organic greenhouse food production.

Presently developing its first facility through a public-private partnership with Prince William County, Freestate Farms is starting to bring sustainable waste management, baseload renewable energy, nutrient rich compost and natural fertilizer products, and fresh locally-grown organic produce to the Metropolitan DC Region.
The Prince William County Board of Supervisors approved its Development Services Agreement with Freestate in early 2015 for the purpose of granting Freestate the right to develop, own, and operate its proposed organic waste processing and integrated greenhouse facility at the County’s existing composting facility on Balls Ford Road.

The Agreement includes a 20-year term dated from the commencement of new operations, as well as two five-year extension terms (upon mutual agreement).

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<thead>
<tr>
<th>Organic Waste Capacity</th>
<th>Biogas Use</th>
<th>Greenhouse</th>
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<tbody>
<tr>
<td><strong>Phase 1</strong></td>
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<td>Process ≈ 45,000 tons per year of source-separated food waste via anaerobic digestion, and ≈ 40,000 tons per year of yard and wood waste via aerated composting and traditional mulching</td>
<td>Use a 1 MW combined heat and power (CHP) generator to provide electricity and heat for the facility’s elements, with excess electricity sold to the grid</td>
<td>Approx. 1.25 acres of controlled environment agriculture (CEA), with CO₂ injection for increased yields</td>
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<td><strong>Phase 2</strong></td>
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<tr>
<td>Process ≈ 90,000 tons per year of source-separated food waste via anaerobic digestion (with depackaging capabilities), and ≈ 80,000 tons per year of yard and wood waste via aerated composting and traditional mulching</td>
<td>Either (a) clean biogas to pipeline quality for injection into the natural gas grid or (b) clean and compress biogas for use in local trucks, cars, and buses</td>
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Balls Ford Road Site – Present

Traditional Windrows (turned every few weeks)

Citizen Convenience Center

Commercial Yard Waste Receiving Pad: Grinding and Screening

Resident Brush Receiving Pad: Grinding
Freestate Site Layout – Phase 2

- Commercial Organic Greenhouse
- AD System
- Aerated Static Pile Bunkers and Mass Bed Composting
The foundational strategic element of the Freestate Farms system is advanced composting, and we have chosen to partner with Engineered Compost Systems of Seattle, Washington for our initial project in Prince William County.

ECS’s in-house engineering and design expertise has been well proven at the 30+ sites across the U.S. where its systems are presently in operation, with many more under construction and development.

ECS’s systems include intelligent process control and reliable environmental protections in the production of top quality compost products that conform to health and safety regulations and also meet the U.S. Composting Council’s Seal of Testing Assurance (STA) Standards.
The core strategic element of the Freestate Farms system is the anaerobic digester, and we have chosen to partner with *quasar energy group* of Cleveland, Ohio for our initial project in Prince William County.

Capitalizing on its proven digester design, in-house engineering, and construction capabilities, *quasar* has successfully constructed 13 facilities presently operating in the United States, with numerous other facilities in different stages of development and construction.

*quasar* specializes in scalable and replicable continuously stirred tank reactor anaerobic digester systems that are designed to meet applicable environmental regulations.
Thank you

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