Integrated MRF and Organics Recycling

Southern California Conversion Technology Conference

July 29th, 2016
Agenda

1. Anaergia Introduction
2. CA Organics Regulations
3. Integrated MRF and Organics Recycling Solutions
4. Organics Recycling Recovery – Key Technologies
   a) Organics Extrusion Press (OREX)
   b) Polisher (Minor contaminant removal)
5. Integrated MRF Facility Design with Organics Recycling
Anaergia Offices

Global Leader in Organics Recycling Infrastructure

1,600 Projects, 380 MW, 29 Patents, 20 Years

Global HQ - Toronto

US HQ - Carlsbad, CA
California Organics Recycling Drivers
Regulatory Framework – Sticks & Carrots for organics recycling infrastructure development
AB 939 – California Leading the Way in Recycling

Recycling Rates Flat since 2008

AB 341 – 75% recycling goal and Mandatory Commercial Recycling
California Organics Regulations

*Everything is driven by Climate Change*

By 2019 – Organics Recycling will require a mixed waste processing solution. SSO becomes uneconomical
Integrated MRF and Organics Recycling Solution
Digestion supported by Calrecycle as ideal solution
Anaheim Sustainability Center

Example of Integrated Organics Solution

- Phase I: 85,000 TPY wet fraction, Phase II: 170,000 TPY food waste digestion
- 4 MW PPA with Anaheim Public Utilities, Organics extracted from MSW
- Digester Site on < 2 acres
Rialto Bioenergy Facility
Example of Integrated Organic Solution

85,000 ton/yr organics
- Organic Fraction of Municipal Solid Waste
- Hauling
- Anaerobic Digestion
- Biogas
- Biogas Conversion
- Electricity
- Renewable Gas Injection
- Vehicle Fuel or Other Use

85,000 ton/yr biosolids
- Wastewater Treatment
- Biosolids
- Hauling
- Digestate Processing
- Digestate
- Urban Fertilizer

Energy Independent Nutrient Recycling

3 MWe export
Food Waste Digestion – London

Integrated within Resource Recovery Park

- **Dagenham, UK (London)**
- **Feedstock:** Municipal Source Separated Organic Waste
- **Capacity:** 30,000 TPY
- **Energy Output:** 1.4 MWe, 2.8 MW Total
Integrated MRF and Organics Recycling
Proven Technologies enabling highest recovery at lowest cost
Organic Waste Processing from MSW
Organics Extrusion Press (OREX)

- Extracts Organics (wet fraction) from MSW under high pressure.
- 90% putrescible organics recovery.
- Does not rely on Source Separated Organics Collection.
- No Water Added!!!
# OREX Commercial Operating Units

<table>
<thead>
<tr>
<th>Description of experience/reference</th>
<th>Country</th>
<th>Capacity</th>
<th>Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sorting and treatment of mixed MSW</td>
<td>Kaiserslautern (Germany)</td>
<td>50,000 Mt/a</td>
<td>2006</td>
</tr>
<tr>
<td>Sorting and treatment of mixed MSW</td>
<td>Alessandria (Italy)</td>
<td>100,000 Mt/a</td>
<td>2007</td>
</tr>
<tr>
<td>Treatment of separately collected bio-waste</td>
<td>Castelceriolo (Italy)</td>
<td>25,000 Mt/a</td>
<td>2008</td>
</tr>
<tr>
<td>Treatment of separately collected bio-waste</td>
<td>Viareggio (Italy)</td>
<td>20,000 Mt/a</td>
<td>2008</td>
</tr>
<tr>
<td>Sorting and treatment of mixed MSW / industrial waste</td>
<td>Premier Waste (UK)</td>
<td>100,000 Mt/a</td>
<td>2008</td>
</tr>
<tr>
<td>Treatment of mixed MSW, RDF production</td>
<td>VamWijster (Netherlands)</td>
<td>200,000 Mt/a</td>
<td>last changes 2009</td>
</tr>
<tr>
<td>Vagron (MBT) anaerobic digestion of organic fraction from MSW</td>
<td>Groningen (Netherlands)</td>
<td>100,000 Mt/a</td>
<td>last changes 2009</td>
</tr>
</tbody>
</table>

*1st OREX Line in North America installed in San Francisco*
Mini OREX Testing in North America

- Anaergia tested at eight sites in North America
- 7 test sites in CA (performed at LACSD in 2016)
- Complements *standard* waste characterization and facilitates MRF equipment design with OREX
Organics Polishing System (OPS)
Two stage plastic film and grit removal system

Removes minor contaminants from wet fraction ensuring compliance with compost standards
OREX Integration in Integrated MRF
Maximizing Recycling and Organics Recovery

1000 Ton Per Day Integrated MRF and Organics Recycling Facility design based on LADPW Whitepaper requirement
Summary

- OREX and Polisher are key technologies within the Integrated MRF Concept enabling maximum organics recycling at the lowest cost.
- All technologies proposed are commercially proven at multiple facilities globally and the basis of several California projects in development.
- Digestion permitting pathway enabled by Calrecyle.
- Complements thermal conversion technologies by following waste hierarchy by processing waste for maximum recovery. Only post recycled residuals provided to thermal conversion facility.
- Integrated MRF and Conversion Technology Solution provides highest greenhouse gas mitigation with proven technologies; however it is dependent on good policy to enable investment.
Thank You

David Schneider
david.schneider@anaergia.com
O: (760) 436-7780 x 130
C: (310) 994-0272
OREX Flexible to Any Level of Contamination

Wet Fraction from MSW or WCW
30-35% TS
30 to 50% recovery from MSW
50 to 70% recovery from WCW (wet commercial waste)

Wet Fraction from SSO
20 – 25% TS
70 to 95% recovery from SSO