Organics Recycling from MSW with Co-Digestion at WWTPs

July 11th, 2018
California Has The Largest Organics Opportunity, and it’s in MSW
Integrated Solid Waste Systems on Four Continents

**Goa, India**
Processes 36,000 TPY of MSW using OREX and a digester to produce electricity, biogas, and refuse derived fuel (RDF) achieving a 94% recovery.
Operational: March 2016

**San Francisco, CA**
Processes 36,000 TPY of MSW using OREX at Recology
Operational in April, 2017

**Cardiff, UK**
Processes 42,000 TPY of SSO food waste using OREX
Operational: December 2016

**Cape Town, South Africa**
Processes 140,000 TPY of MSW using OREX to produce wet fraction for AD and bio-methane.
Operational: March 2017

**Singapore**
Processes 35,000 TPY of SSO with 25% contamination using OREX and a digester and generating 2MW of power.
Operational: November 2016

**Limassol, Cyprus**
Processes 140,000 TPY of MSW using OREX and a suite of Anaergia technologies to produce biogas, recyclables, and RDF to achieve 89% recovery
Operational: September 2017
Key Considerations

(1) Process waste with any contamination level

- SSO
- COMMERCIAL
- RESIDENTIAL

10 - 30% Contamination  30 - 50% Contamination  50 - 70% Contamination

(2) Minimize cost with ability to recover organics with or without separate collection

(3) Minimize cost by using existing infrastructure at wastewater treatment plants or building large facilities with economies of scale

(4) Produce a clean product that meets regulatory standards

Contamination <0.5% dry basis, >4 mm
Organic Extrusion (OREX) Press

- Process MSW, Commercial Waste, or SSO with any contamination level
- Reduces contamination by filtering organics through plug, doesn’t create more contamination with hammering
- Produce clean organic stream suitable for new or existing digesters or compost
OREX Line

MSW

Pre-Processing → OREX → Organics Polishing System → Polished Organics

Wastewater

50 ton/hr

30-35% TS

12-24% TS

Compost

New Plant

Anaerobic Digestion

Wastewater Treatment Plant
Contaminants are Removed from Recovered Organics

- **HHW**
  - Pre-sort
  - Screen

- **Batteries**
  - Pre-sort
  - Magnet
  - OREX

- **Plastic Film**
  - Dynamic Cyclone

- **Glass and Grit**
  - Hydrocyclone

Anaergia
Clean Organic AD Feedstock from MSW

Organics Extraction

(1) OREX

MSW → Wet → Dry fraction

Organics Polishing

(2a) DYNAMIC CYCLONE

Wet fraction → Floatable Film

(2b) HYDROCLYCONNE

Floatable Film → Grit

Anaerobic Digestion

(3) DIGESTERS

Grit → Clean Digestate

MSW → Wet Fraction → Polished Wet Fraction
Wet Fraction Polishing
## Organics Extracted by OREX System Meet Regulatory Standards and Are Suitable for Low Cost Offloading at Anaerobic Digesters

<table>
<thead>
<tr>
<th></th>
<th>OREX Wet Fraction (&gt; 2 mm, % dry basis)</th>
<th>Polished Wet Fraction (&gt; 2 mm, % dry basis)</th>
<th>Calrecycle Standard (&gt; 4 mm, % dry basis)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rigid Plastic</td>
<td>0.41</td>
<td>0.05</td>
<td></td>
</tr>
<tr>
<td>Film Plastic</td>
<td>1.58</td>
<td>0.08</td>
<td>&lt;0.1</td>
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<tr>
<td>Metal</td>
<td>0.47</td>
<td>0.06</td>
<td></td>
</tr>
<tr>
<td>Glass</td>
<td>0.23</td>
<td>0.03</td>
<td></td>
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<tr>
<td><strong>Total</strong></td>
<td><strong>2.69</strong></td>
<td><strong>0.21</strong></td>
<td><strong>&lt;0.5</strong></td>
</tr>
</tbody>
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Contaminated organics result in higher disposal cost, risk of rejected loads, and non-reusable fertilizer product.
Flexible to Produce Cake or Slurry

30% Solids

20% Solids

14% Solids
Delta Diablo Wastewater Treatment Plant in Antioch, CA

Organics from MSW (Anaergia OREX) (114 tpd)

Anaerobic Digestion (Anaergia mixers, thickener)

Gas Conditioning

Cogeneration

Power Sales 2.5 MW

Primary/Secondary Sludges

Sidestream Ammonia Recovery (Anaergia)

Biosolids Beneficial Use

Liquid Fertilizer

Existing Delta Diablo WWTP in Antioch, CA

- Lower cost by leveraging existing infrastructure
- WWTP commits to 20 year offtake at fixed price
- Benefits returns to community and common ratepayers
Delta Diablo Wastewater Treatment Plant Retrofit
OREX Processing MSW in San Francisco
Organics Extracted from MSW in San Francisco
Organics Recovered by OREX From San Francisco Delivered to Anaerobic Digesters at Wastewater Treatment Plant in Oakland
Thank you

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