Agenda

Section

1. Anaergia Overview
2. Anaergia Digester Reference Facilities
3. Organic Waste Recovery & Conversion to Energy
4. Anaerobic Digestion Technology
5. Anaheim Energy Food Waste to Energy Project
Anaergia’s Global Footprint

1,600 Projects
360 MW
29 Patents
20 Years
C$47.5 Million Growth Equity Commitment

- Macquarie Capital ("Macquarie Capital")
- Tandem Expansion Fund ("Tandem")
- Export Development Canada ("EDC")
- Global H2O Investments ("Global H2O")

Sample of Anaergia Reference Facilities

> 1,600 references globally
Municipal Organic Waste

Glenfarg, Scotland
Substrate: Municipal Organic Waste
Capacity: 19,800 TPY
Energy Output: 800 kWe, 1.6 MW Total
Municipal & Industrial Organics Streams

Kloh, Germany

Substrate: Source Separated Organics, Grease, Potatoes, Swine Manure

Capacity: 18,000 TPY

Energy Output: 1.0 MWe, 2.4 MW Total
Under Construction: Municipal Organic Waste

Dagenham, UK
Substrate: Municipal Source Separated Organic Waste
Capacity: 49,000 TPY
Energy Output: 1.4 MWe, 2.8 MW Total
New Projects

- VVWRA – Omnviore Digester Retrofit and CHP
- Maui Integrated Waste Conversion Project – recycling, digestion of OFMSW, solid engineered fuel (>85% diversion)
- Anaheim Energy – OFMSW digestion – 4.5 MW PPA with Anaheim Public Utilities
- Bridgeport Digester – 2 digesters at WWTP (one sludge, and one food waste)
- Rialto Bioenergy Facility – regional biosolids/digestate drying – Phase II will add digestion of OFMSW
Organic Fraction Separation & Cleaning

Preprocessing Capabilities for Source Separated Organics (SSO) and Mixed Solid Waste (MSW) Organics Management
MSW – 30 to 65% wet fraction separation
SSO - typically > 80% wet fraction separation
OEP Organics Recovery

Kaiserslautern, Germany 3500H

Ventspils, Latvia 2000H

In Construction OEP 500

Anaergia
OEP Organics Extrusion with Hydraulic Press

1. Feed Phase (low Pressure)

2. Compression Phase (High Pressure)

3. Expulsion Phase (low Pressure)
High calorific fraction
- High calorific value
- 60-70% DM
- 20-70% of input into the press depending on waste and preprocessing
- Suitable for thermal utilization with energy production with further processing

Organic for digestion
- High specific biogas production
- Low fibre level
- Very low contaminant level
- 25 – 35 % DM
- 85 – 95 % VS
OREX Flexible To High Levels of Contamination

<table>
<thead>
<tr>
<th>Wet Fraction from MSW or WCW</th>
<th>Wet Fraction from SSO</th>
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<tbody>
<tr>
<td>30-35% TS</td>
<td>20 – 25% TS</td>
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Digestate and Compost with Impurities

- Poor acceptability of compost, is still a waste and not a resource
- OEP eliminates this problem, reduces O&M cost in wet digestion, increases revenue through compost sales
Organics Polishing System
(Improving Digestion and Digestate Quality)
Organics Polishing System (OPS) Cleaning Process

- Cyclone separator for small plastics and grit settling tank
- Optimal Separation Efficiency @ 12 to 15% TS feed

<table>
<thead>
<tr>
<th>Contaminants</th>
<th>Glass, sand, stone</th>
<th>Plastic, textile, cardboard</th>
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<tbody>
<tr>
<td>Slurry Feed from VM Press</td>
<td>0.5 to 1% of TS</td>
<td>0.5 to 1% of TS</td>
</tr>
<tr>
<td>Slurry Output to Digesters</td>
<td>0.1% of TS</td>
<td>0.1 – 0.2% of TS</td>
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</table>

- Slurry collected in bottom pan and pumped to mixed storage tank
- Intermittent digester feed with PD pump
<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>100,000 t/a</td>
<td>Since 2006, last changes 2012</td>
</tr>
<tr>
<td>Sorting and treatment of mixed MSW</td>
<td>Alessandria (Italy)</td>
<td>100,000 t/a</td>
<td>2007</td>
</tr>
<tr>
<td>Treatment of separately collected bio-waste</td>
<td>Castelceriolo (Italy)</td>
<td>25,000 t/a</td>
<td>2008</td>
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<tr>
<td>Treatment of separately collected bio-waste</td>
<td>Viareggio (Italy)</td>
<td>20,000 t/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 t/a</td>
<td>2008</td>
</tr>
<tr>
<td>Treatment of mixed MSW, RDF production</td>
<td>VamWijster (Netherland)</td>
<td>200,000 t/a</td>
<td>last changes 2009</td>
</tr>
<tr>
<td>Vagron (MBT) anaerobic digestion of organic fraction from MSW</td>
<td>Groningen (Netherland)</td>
<td>100,000 t/a</td>
<td>last changes 2009</td>
</tr>
</tbody>
</table>
WCW pre-treatment with limited recycling

- Dedicated commercial routes to restaurants, markets, commercial kitchens
- Single or multiple 30 ton/hr trains
- Ideally located in existing transfer stations
- Operate 6 days/week, 14 hr/day of run time
- Tip floor, manual presorting for rejects and large recyclables, bag opener, coarse screening optional to increase OEP throughput, ferrous metal recycling, dry fraction to landfill or solid engineered fuel
- Typical: to landfill 40%, recycled 6%, to AD 54%

Wet fraction is 50 to 60% of raw WCW as tipped depending on composition

- 30% TS, 87%VS/TS, BMP: 760 NL/kg VS biogas 62% CH4
- Typical SoCal WCW power generation with wet fraction

<table>
<thead>
<tr>
<th>Scenario</th>
<th>Electrical Production (kWe/h)</th>
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<tr>
<td>WCW (limited recycling)</td>
<td></td>
</tr>
<tr>
<td>420 TPD (1 TRAIN)</td>
<td>3,800</td>
</tr>
<tr>
<td>840 TPD (2 TRAINS)</td>
<td>7,600</td>
</tr>
<tr>
<td>1,260 TPD (3 TRAINS)</td>
<td>11,400</td>
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</table>
Front End MSW Installation
Latvia 50,000 tpy capacity
Anaerobic Digestion Technologies

Converting Wet Fraction of Organics Extrusion Press to Energy
Hydraulic Mixers
Hydraulic Power Unit
Service Box
Digestate Two Stage Dewatering
Mini OEP Testing in CA, Canada, and NYC

• Anaergia tested a small scale press that is used to determine organics recovery rates of a variety of waste streams and the digestion/contaminant characteristics of the organic fraction.

• Tested at 3 transfer stations in CA and recently at two sites in Canada and New York City *(New Yorkers call it the “Garlic Press”)*

• General results of the tests indicate that with material fed in the 2 to 10” range had the following results.
  • Single Family Residential – 30 to 35% separation to organic fraction
  • Multifamily Residential – 35 to 55% separation to organic fraction
  • Wet Commercial Waste – 50 to 70% separation to organic fraction
  • Source Separated Organics – 70 to 95% separation to organic fraction
Mini OEP Testing in CA - Continued

• Wet Organic Fraction Characteristics
  • Total Solids in the 25 to 35% range (sludge consistency)
  • VS/TS average of 89%; all samples greater than 80% - highly digestable
  • Plastic, grit, and metal contamination < 1% for greater than 2 mm
    • Organics Polishing System will further reduce these contaminants by up to 90%.
  • Metals concentration far below Class A biosolids
Test Press – Experience at Shoreway

OEP Test Press – Test Scale

Waste to be Sampled

Anaergia and Shoreway Sampled Waste Streams for two weeks in early October 2013
Waste Testing – September 2013

5 Ton Load

Tested Sample

Bulky Items

Dry Fraction

Organic Fraction
Digestate Management for LA/OC Projects

Rialto Bioenergy Facility

- Biosolids drying
- Digestate drying
Summary

- Anaergia offers a key technology for diverting organics from MSW – regardless of contamination
- Focused on complete lifecycle for organics diversion - digestion through digestate management
- All technologies in the process are operating at commercial scale – mitigating technology risk
- Potential for bolt on technologies being commercialized today – Pyrolysis of biosolids (Encina WWTP)