Fighting Organic Waste – City of Edmonton to the Rescue with High-Solids Anaerobic Digestion!

BIOFerm™ Energy Systems
A Company of the Viessmann Group
Michael Brown
22 September 2016
Viessmann Group
The Company

1917
Company foundation of the Viessmann family enterprise

11,600
Employed workforce

$2.5
Billion dollars Viessmann Group turnover

22
Production companies in 11 countries

74
Countries with sale activities and distribution partners

120
Branches world-wide

56
Percent of the turnover derived from export activities

Branches
Distribution partners
## BIOFerm™ Energy Systems, Viessmann Group
North American Anaerobic Digestion & Gas Upgrading

| Expertise | Turnkey anaerobic digestion systems  
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<th>Turnkey gas upgrading systems</th>
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<tr>
<td>Commitment</td>
<td>Industry’s best performance guarantee</td>
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| Experience| 450+ anaerobic digestion  
|           | 900+ PSA installations |
| Reputation| High repeat business |
Clean Energy from Municipal Organic Waste
MSW Waste Streams
Waste Collection Considerations

- Collection
  - Single-Stream
  - Residential Separation
  - Frequency

- Residence Times

- Hauling Distances
MSW Waste Streams
Typical MSW Generation (Before Recycling/Diversion)

- Paper 27.4%
- Food Waste 14.5%
- Yard Waste 13.5%
- Plastics 12.7%
- Metals 8.9%
- Rubber/Textiles 8.7%
- Wood 6.3%
- Glass 4.6%
- Other 3.4%

Photo courtesy of BioCycle.net, information courtesy of 2012 EPA Estimates
**MSW Waste Streams**
Waste Characterization

- Waste Constituents
  - Contamination
  - Physical properties

- Laboratory Testing
  - Total & Volatile Solids
  - Biogas & Methane Potential
MSW Waste Streams
Pre-Processing Considerations

- Goals

- Equipment
  - Debaggers
  - Shredders
  - Magnets
  - Trommels

- End Use
MSW Waste Streams
Anaerobic Digestion - Non-Pumpable Materials
Dry Fermentation Anaerobic Digester
High-Solids Waste Management

- Processes high-solids organics—food waste, yard waste, animal bedding, and more—without need for pumpable waste stream
- Capable of processing 8,000 tons per year and up
- Input material volume reduced by up to 40%
- Expandable design
- Handles large items & contaminated waste streams
- Material remains stationary (no internal moving parts)
- Batch system reloading on ~28-day cycle
- Little to no additional water
MSW Waste Streams
Biogas Generation – Dry Fermentation
Case Study: Anaerobic Digestion in Edmonton, AB
City of Edmonton
Anaerobic Digestion Project Details

- **Partnerships**: City of Edmonton and University of Alberta

- **Capital funding opportunity**: Climate Change Emissions Management Corporation (CCEMC)
City of Edmonton
Consideration for Anaerobic Digestion

- Additional organics processing on small footprint
- Synergistic fit with existing composting operation
- Biogas to electricity generation
- GHG offsets
City of Edmonton
Edmonton Waste Management Centre

Photo courtesy of Google Maps
City of Edmonton
Edmonton Waste Management Centre (EWMC)

Aerial view of the EWMC - Photo courtesy of Google Maps
City of Edmonton
Edmonton Waste Management Centre (EWMC)

- The EWMC is 575 acres (233 hectares)
- Buildings occupy more than 860,000 ft² (80,000 m²)
- More than 4,500 trucks per week
- Average 10,800 US tons of material enter per week

Aerial view of the EWMC - Photo courtesy of Google Maps
City of Edmonton
High Solids Anaerobic Digestion Facility (HSADF) Design

- Process 40,000 tonnes per year of high-solids organic wastes
  - Municipal Solid Waste (Includes Yard Waste)
  - Source Separated Organics
- 8-Fermenters
- 2-Aeration Tunnels

Interior view of BIOFerm™ Dry Fermentation (HSADF) system
City of Edmonton
High Solids Anaerobic Digestion Facility (HSADF) Design

- Pre-AD Processing
  - Municipal Solid Waste
    - 3” Screen Separation
  - Source Separated Organics
    - 4” Screen Separation

- Post-AD Processing
  - Aeration Tunnels
  - Composting
  - Screening
City of Edmonton
High Solids Anaerobic Digestion Facility (HSADF) Design

Conceptual Layout
City of Edmonton
High Solids Anaerobic Digestion Facility (HSADF) Output

50,000 MMBTU/year heat generation

Two (2) 846 kWe CHPs

46,000 tonnes CO₂ reduction

20,000 tonnes compost for sale
City of Edmonton anaerobic digester project update – Where we’re at in the project, timeline discussion
Our Purpose
Redefining “Waste”

At BIOFerm™ we see our role as “re-definers” of waste. We hope to provide the tools for industries to make the most of the resources within their reach—nothing is waste until you waste it.