Different Solutions for Different Situations

Norma McDonald – NERC Conference, April 2014
• Reference plants in 14 different countries, treating source-separated and mixed-household waste, industrial and commercial waste organics, as well as energy crops.
• “Senior” plant has demonstrated 99.59349% in-service, active digestion time over the last 20 years!
• Managed/advised >150 plants we did not build
A Tale of Three Cities – Treatment of organics streams

• Different Cities have Different Needs

• Each Approach increases Landfill Diversion

• All Approaches produce Renewable Energy and Enhance Compost Production
## A Tale of Three Cities – Treatment of organics streams

<table>
<thead>
<tr>
<th></th>
<th>HENGELO</th>
<th>MIRANDELA</th>
<th>WIJSTER</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Serves</strong></td>
<td>Serves city of 83,000</td>
<td>Small mountain villages</td>
<td>Rural area, regional facility</td>
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<tr>
<td><strong>WASTE TIPPED</strong></td>
<td>BIOWASTE 124,000 tpa</td>
<td>MIXED WASTE 60,600 tpa</td>
<td>RESIDUAL WASTE 825,000 tpa</td>
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<tr>
<td><strong>TONS DIGESTED</strong></td>
<td>55,000 tpa</td>
<td>11,000 tpa</td>
<td>62,800 tpa</td>
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<tr>
<td><strong>ENERGY USE</strong></td>
<td>ELECTRICAL GENERATION</td>
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<td>BIOMETHANE TO PIPELINE</td>
</tr>
<tr>
<td><strong>DIGESTATE USE</strong></td>
<td>PARTIAL STREAM DIGESTION – COMBINED WITH YARD WASTE</td>
<td>DEWATERING AND COMPOST PRODUCTION</td>
<td>MITIGATE BTU FLUCTUATIONS IN RDF INCINERATION</td>
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</table>
Biovaste treatment plant Hengelo, NL
Biowaste treatment plant Hengelo, NL

- Digester Capacity = 55,000 tpa
  - 44,000t biowaste
  - 5,500t expired products
  - 5,500t liquid waste products
- Minimal pretreatment, No digestate dewatering
- Digestate is mixed with fraction 2.4 to 6.3 inches
- Gas engines: 2 x 1.2MW
- Heat of engines for used for industrial purposes >5km
- Start-up: 2011 –
  https://www.youtube.com/watch?v=GmPzSE__JKA
Organic Fraction of MSW – Mirandela, Portugal
Organic Fraction of MSW – Mirandela, Portugal

- Mixed Waste Pretreatment: 60,600 tpa
- OFMSW to DRANCO Digester: 11,000 tpa
- Digestate is dewatered and aerobically cured
- Electrical Production 350kW
- Heat of engines for used for AD
- Started-up: May 2013
Organic Fraction of MSW – Mirandela, Portugal

05/10/2013

05/10/2013
Organic Fraction of MSW – Mirandela, Portugal
Residual Waste – Wijster, The Netherlands
Residual Waste – Wijster, The Netherlands

- **Capacity:**
  - Gate: 825,000 tpy
  - Incineration: 625,000 tpy
  - Recycling: 137,200 tpy
  - Digestion: 62,800 tpy (OFMSW)

- **Digester volume:** 3,960 m³

- **Start-up:** 2012

- Maximum recycling of paper, glass & plastics leaves behind a wetter organic fraction => to digestion
• Wetter digestate is used to compensate for industrial waste with a high BTU-value (often too high for mixed waste incinerators) => improvement of incineration efficiency

• Biogas production
  - Upgrading: production of biomethane & feeding of green gas into public gas grid
  - Increase in efficiency of methane conversion improves carbon footprint

- Movie: https://www.youtube.com/watch?v=1ObVjzI7B10
A Tale of Three Cities – Treatment of organics streams

- Different Cities have Different Needs
  - Small vs. Large Volumes
  - Feasibility of Source Separated Collection
  - Beyond SSOW – do even more with what’s left

- Each Approach increases Landfill Diversion

- All Approaches produce Renewable Energy and Enhance Compost Production
A Tale of Three Cities – Treatment of organics streams

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- Each Approach increases Landfill Diversion
  - An effective SSOW increases participation rates and benefit to community
  - Small amount of OFMSW from Small total waste stream
  - Portion converted to biogas is not in the landfill

- All Approaches produce Renewable Energy and Enhance Compost Production
A Tale of Three Cities – Treatment of organics streams

- Different Cities have Different Needs

- Each Approach increases Landfill Diversion

- All Approaches produce Renewable Energy and Enhance Compost Production
  - Hengelo and Mirandela – electricity
  - Hengelo – substantial waste heat to community
  - Wijster - contributes to natural gas independency for community
Thank you!

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