Collection and Reuse of Carbon in a Large Urban Sewer System

American Biogas Council Briefing

May 23rd, 2018

Chris Peot, Director of Resource Recovery, DC Water
Anaerobic Digestion / Thermal Hydrolysis
Process Schematic

Gravity Thickeners → DAFTs → Biogas Treatment and CHP

Screening and Pre-Dewatering → Cambi™ THP → Mesophilic Anaerobic Digestion

Lime → Dewatering → Mix → Store & Loadout

Power → Emissions

Steam → Biogas

Final Dewatering → Recycle Processing → Loadout

Class A → Class B
Co-digestion Potential

<table>
<thead>
<tr>
<th>Stream</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
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</thead>
<tbody>
<tr>
<td>Name</td>
<td>Raw sludge</td>
<td>THP sludge feed</td>
<td>Organic Waste</td>
<td>Trim Water</td>
<td>MAD feed</td>
<td>Biogas</td>
<td>DW feed</td>
<td>Liquors</td>
<td>Power output</td>
<td>Biosolids output</td>
</tr>
<tr>
<td>TDSd (tDS [US])</td>
<td>290</td>
<td>284</td>
<td>28</td>
<td>312</td>
<td>133</td>
<td>131</td>
<td></td>
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<tr>
<td>%NDS</td>
<td>5%</td>
<td>17%</td>
<td>14%</td>
<td>10%</td>
<td>4.3%</td>
<td>33%</td>
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<tr>
<td>%VS</td>
<td>75%</td>
<td>75%</td>
<td>80%</td>
<td>75%</td>
<td>48%</td>
<td>48%</td>
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<tr>
<td>Wet m3/hr</td>
<td>242</td>
<td>72</td>
<td>8</td>
<td>130</td>
<td>130</td>
<td>114</td>
<td>16</td>
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<tr>
<td>DS lbs/d</td>
<td>580000</td>
<td>568400</td>
<td>56000</td>
<td>624400</td>
<td>266642</td>
<td>5332</td>
<td>261291</td>
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<td>VS lbs/d</td>
<td>435000</td>
<td>425000</td>
<td>44800</td>
<td>471100</td>
<td>128119</td>
<td>2564</td>
<td>5236</td>
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<td>COD kgs/hr</td>
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<td>1500</td>
<td>15734</td>
<td>5413</td>
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<tr>
<td>Trim Water gpm</td>
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<tr>
<td>Ammonia g/l</td>
<td>3424</td>
<td>3424</td>
<td>204</td>
<td>3628</td>
<td>18486</td>
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<td>Ammonia lbs/d</td>
<td>267</td>
<td>899</td>
<td>462</td>
<td>526</td>
<td>2775</td>
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<tr>
<td>Biogas scf/m</td>
<td>3418</td>
<td>139</td>
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<td>Power output MW</td>
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Capacity
- Pre TH DW: 50%
- Turbines: 82%
- MAD: 70%
- THP: 64%
- DW: 43%

Power Generation 10.05 MW e
Biosolids Out 396 wt ton/d
Liquors
Dewatering
Organic Processing Plant
Pre-THP Dewatering
THP
MAD 2.5 vol/vol
Flare 217 MMBTU
149,710,216 scf/mo
25 gpm
Program Benefits

Reduce biosolids costs by more than 50%

Improve product quality (Class A and more)

Generate 8-10 MW of clean, renewable power

Cut GHG emissions dramatically

Save millions of dollars annually
Agriculture
Community Gardens and Tree Planting

The Washington Youth Garden
Yesterday

That’s right - we’re trying out the highly regulated bio-solids compost from DC Water - and the raised bed we’re using them in is amazingly healthy! — with Anna Benfield.

Kristin Brower, Emily Anne Roberts, Meghan Higginbotham and 23 others

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BLOOM GOOD SOIL, BETTER EARTH.

An exceptional soil amendment

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National Potential for Green Energy

• 7.1 million dry tons/yr of biosolids

• Potential generation of 4.9 billion kwhr/yr
  • enough to power 450,000 average American homes (10,932 kwhr/yr average use).
  • At $0.10/kwhr, this green energy is valued at nearly $500 million/yr.

• $25M – $1B/yr for renewable energy or renewable fuel credits

• 15.7 billion lbs steam at 150 psi for building heat, evaporation towers, etc.
There is no such thing as waste, only wasted resources.

www.bloomsoil.com
www.dcwater.com

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