Food Waste-to-Low Carbon Energy Conference

Encompassing diverse environmental Treatment and Sustainable Practices

Dennis W. Palmer, P.E. Landis Sewerage Authority
Landis Sewerage Authority employs multiple green technology or sustainable practices.

- Liquid Food Processor Waste and FOG Receiving Station.
- All treatment plant grease and scum is utilized onsite.
- Anaerobic Digester to stabilize solids and produce methane.
- Land application of all the treated effluent on site.
- Land application of all the biosolids on our farm for hay, straw and corn production.
- Small Wind Turbine for office building power.
- Solar Farm- Approx. 40 Acres
- Forest Management Plan and Agroforestry Program
- Bob White Quail Restoration.
Receiving Station for Food Processor Waste and FOG or Electricity from Meatballs
Concrete Vault for Wet Well and Pump Room Cast Off Site and Delivered

A new day is dawning for LSA power production.
Interior of Receiving Station-Hot Water Piping and Vaughan Mixer/Chopper Pump
Heat Exchanger- 240,000 btu/hr transferred net to FOG/Liquid Food Processor Waste in the receiving station. Hot water is supplied from the CHP or boilers fired on Methane.
LSA Liquid Food Waste And FOG Station
Head Works Grease & Scum being Delivered
Meat Ball Manufacturer FOG
Free Fuel Going to Waste
Prior to 2008

$
Gas Conditioning

- Gas conditioner
- Flame arrestor
- Gas line from digester
- Glycol to gas heat exchanger/chiller
- Gas blower for pressure boost
- Gas meter
- Flame arrestor
- Gas line from digester
Hot water/glycol & electrical connection to building.

CHP Overall Efficiency = 85%
Thermal 53%
Electrical 32%
Biosolids Farm Operations-Utilization
It is not just energy production, what do you do with the digestate, where do the solids/liquids go?
Biosolids Application
Before and After on Power Line ROW
Farm Crop Production - Removing Carbon from the air with a domestic organic non petroleum based fertilizer

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<tr>
<th>Farm Production</th>
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<tr>
<td></td>
<td>2010</td>
</tr>
<tr>
<td>Hay</td>
<td>741.54</td>
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<tr>
<td>Corn (grain)</td>
<td>199.98</td>
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<tr>
<td>Straw</td>
<td>41.36</td>
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<tr>
<td>Corn (stubble)</td>
<td>82.3</td>
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<tr>
<td>Wheat/Rye (grain)</td>
<td>41.1</td>
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<td>1106.28</td>
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Bad Well Year
LSA has a Forest Management Plan

- Forests need to be managed
- They need to be weeded and thinned.
- At times they need to be replanted
- 150 Acres of Southern Yellow Pine
Forestry-150 acres of Southern Yellow Pine, biosolids application and carbon removal from the air. 5 years of growth on biosolids, a $0.5 million in Timber value in 25 years.

Carbon removal
Future $$
Habitat
Landis SA Site is Energy Neutral-Net Positive Energy Producer

Solar One 4MW DC: Total 5600 Mwh
Solar Two 4MW AC Total 6540 Mwh
Total Solar 1 + 2 = 12,140 Mwh

Wind Turbine for 2014 = 1.322 Mwh
LSA CHP ave. year = 750 Mwh (1,150 Mwh peak year)
Total Onsite Generation = 12,891 Mwh

LSA Electric Bill 2014 = Average 31 Mwh per day X 365 days = 11,315 Mwh

12,891 Produced On Site – 11,315 Used Onsite = +1576 Mwh!!
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