Waste to Energy
City of West Lafayette
Dave Henderson, Utility Director
West Lafayette Facility

- 10.5 MGD Activated Sludge Plant with 2 Mesophilic Anaerobic Digesters (approximately 1 million gallon volume).
- Co-generation process online since May 2009.
- Located near Purdue University.
Combined Heat and Power

- Capstone Microturbines
  - Two 65 kW units installed.
  - Space and gas conditioning capacity for a total of 4 microturbines.
Co-Digestion Feedstock

- Fats, Oil, and Grease (FOG).
- Food Waste from Purdue University Dining Courts.
- Vegetable waste from Purdue’s Agricultural Research.
- Spoiled produce from local Food Bank.
Fats, Oil, & Grease (FOG)

Grease sources are plentiful, however . . .

- PER estimated 3,000 gallons/day available from haulers.
- Deliveries have decreased.
- Other outlets and uses providing competition.
FOG Receiving Station

20,000 gal Grit Tank

Truck Scale
Residential Service

- Keep cooking oil and grease out of sewers.
- Keep it out of landfills, too!
- Free service to residents.
Another Fuel Source: Food Waste

- Additional digester capacity
- High quality food waste available from Purdue
- Food waste separated at dining halls.
Pilot Project with Purdue University
Food Waste Receiving Station
Food Waste Potential

✿ West Lafayette Sanitation Department picks up 25-30 tons of Municipal Solid Waste each day.

✿ Based on EPA data, 18% of the MSW may be food waste (4.5 - 5.4 tons each day from WL residences).

✿ Our digesters currently receive 1-2 tons each day from Purdue University Dining Courts.
Digester Renovation and CHP Project Overview

- $10.4 million in SRF Loan.
- Provided upgrades to existing digesters, new building to house microturbines, mixing pumps, and control equipment.
- Included FOG receiving station.
COSTS FOR FOOD WASTE STATION

<table>
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<tr>
<th>Item</th>
<th>Cost</th>
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<tbody>
<tr>
<td>Engineering</td>
<td>$18,155</td>
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<tr>
<td>Construction</td>
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<tr>
<td>Grinder</td>
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<td>Platform and Cart Tipper</td>
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<td><strong>Total</strong></td>
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Electricity & Natural Gas: Savings

- Up to 20% of wastewater plant’s electricity needs.
- Generates 679 MWh/year
- 40% reduction in natural gas usage. 24,900 therms/year in heat recovered from microturbines.
Food Waste is Everywhere...

- Schools
- Hotels
- Prisons
- Stadiums
- Military Bases
- Restaurants
- Stadiums
- Universities
- Food Stores

Food Waste: 18%
Municipal Solid Waste: 82%
Better mixing of the receiving tank.

Heavy object trap added to FOG inlet. Better screening ahead of pumps.

Separate receiving tank for Food Waste in the future.

Cleaning the food carts.
What is Next?

- Electric Vehicles using Green Energy.
- Excess biogas produced. Need for a 3rd microturbine is being evaluated.
- Sources of grease, food waste, and other high strength waste are plentiful. May use extra biogas in CNG vehicles.
- Separate waste receiving stations for liquids and solids.
Contact Information

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