Waste-To-Energy Technology Options

Timothy McDonald, P.E., MBA

Technology Development Dept

10/23/2007

Overview

- Waste Options
- Project Considerations & Constraints
- Conversion Product Options
- Energy Technologies
- Recommendations

Waste Options

- Landfill Methane
- Wastewater treatment plant Methane
- Non-recylicable MSW and green waste
- CAFO manure
- Agricultural crop waste
- Forest fuel thinning operations

Project Considerations & Constraints

- Project size – individual vs community
- Site, design, permits, product(s)
- Electrical interconnect and pricing
- Permits, water, emissions, traffic
- Wastes cost, hauling, handling, cleaning, storage, drying, chipping,……..
- Operation and maintenance costs & crew
- Output Product Value Optimization Mix

Conversion Product Options

- Refuse Derived Fuel (RFD) Pellets from biomass
- Digester & Landfill biogas / pipeline biomethane
- Biomass Gasification into biogas / pipeline biomethane
- Biomass Pyrolysis into biogas, biochar and biooil
- Biochar derived fertilizer supplement !!
- Biooil refined to plastics, chemicals, fuels, adhesives…
- Biofuels include Methanol, Ethanol, Diesel, Jet-A …

Energy Technologies

- Co-fire pellets, biochar and biooil in electric power plants – highest value alternative
- 9MW-18MW CHP steam turbine using chips, pellets, biogas, biomethane, biooil
- Distributed Generation engines and turbines w/ biogas, biomethane, biooil & biodiesel
- Transportation biofuels – road and farm

Recommendations

- “Community-scale” facility with “Individual” site waste prep for hauling and conversion
- Co-op business entity & multi-collaboration
- Technology mix driven by Wastes
- Maximize Product & Revenue Options
- Co-Firing at large plants
- Pipeline quality BioMethane
- Pyrolysis products - chemicals, fuels & biochar
- Biochar – Air, Water & CO2