Sustainability - Energy Recovery & Recycling

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Overview

• Recycling
• Balcones Fuel Technology
• Waste Stream is Changing
• Why Energy Recovery
• Project w/ ACC and Blue River Resources
• What Can You do In Your States
EPA’s Hierarchy

Source Reduction and Reuse

Recycling / Composting

Energy Recovery

Landfill Disposal

Desirability

Most

Least
Our Principles

- Waste is the residual from expanded recycling efforts.
- Recycling Code = squeeze the most value from each ton of material.
- Waste itself has a hierarchy of value
- “Value” is determined by “cost” required to convert to something useful.
Garbology 101

- Best - post industrial waste, TDF
- Better - post residential MRF residue
- Good - ag-waste, sludge, bio-solids
- Challenging - MSW, haz-waste

- Moisture, ash, BTU value, contamination, location, disposal options and costs
Fuel Technology

• Division of Balcones Resources
• Operate 3 Recycling Plants and 2 shredding plants
  • Dallas, Austin, and Little Rock
• Largest Independent Waste Paper Supplier in Southwest
• Balcones does NOT own a Landfill
- Kimberly-Clark “Vision 2000”
- KC Manufacturing Plants to be “landfill free”
- Balcones handles all to the post-industrial waste from 4 production facilities (diapers, baby-wipes and fem care)
- KC formed the basis for our Alternative fuel business
Fuel Customer?

- Paper mills consume huge amounts of bio-mass
- A fuel cube is identical to a wood chip in size and configuration
- Handled with existing boiler feed systems
- BTU value 2.5+ times the value of wood
• A large mill can consume 120 truckloads of wood per day
• Natural gas used as a supplement - especially when the wood is wet.
BALCONES FUEL TECHNOLOGY
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Today

- Kimberly-Clark
- 3M
- PepsiCo/Frito-Lay
- Toyota
- Wal-Mart
- Proctor & Gamble

Non-Recyclable Industrial Co-Products

Zero Waste – Zero Landfill Initiatives
Our Changing Waste Stream

Greenhouse gas

- Steel Can: 4377
- Plastic Canister: 3310
- Plastic Brick: 1051
What to do with Multi-Layer, Multi-Polymer Pouch?

- Rapid Market Growth
- Huge environmental impact versus glass jars:
  - Landfill volume - 95%
  - GHG - 93%
  - Energy Usage - 87%
- Yet, multi-layer, flexible packaging means “very difficult” to recycle economically
Energy Value Comparison

- Natural Gas
- Crude Oil
- Non-Recycled Plastics
- Petroleum Coke
- Balcones Engineered Fuel
- U.S. Coal
- U.S. Coal

Energy Values:

- Natural Gas: 20,000
- Crude Oil: 18,000
- Non-Recycled Plastics: 16,000
- Petroleum Coke: 14,000
- Balcones Engineered Fuel: 12,000
- U.S. Coal: 10,000
- U.S. Coal: 10,000
Lots of Energy in our Waste

- If 100% of landfilled MSW was recovered for energy could power 16.4 million homes a year.
- Put another way if all waste was recovered - enough power to meet 5% of total U.S. energy consumption.
Value of High BTU Plastics

- The equivalent of 807 Trillion BTUs of energy
- If converted to fuel could power 6 million cars for a year
- Enough to supply energy to 5.2 million households.
Partnered with ACC; Blue River Resources, Colgate Paper Stock, and TXI Cement.

Sourced 80 tons of landfill bound MRF residue.

Produced 130 tons of Balcones Engineered Fuel:
  • 60 / 40 Plastics to Paper
  • 60 / 40 MRF Residue to Post-Industrial Feedstock

Met Fuel Spec for use in Kiln

Independent test showed heating value of 12,500 BTUs/lb

Replaced coal - 1 ton/hour for 24 hrs, 2 tons/hr for 48 hours.
Findings & Results

• Independent Analysis provided by University of Texas Researchers - Webber Energy Group
• Our engineered fuel is more energy dense than most forms of coal and petroleum coke.
• Using engineered fuel at kiln significantly offsets the production/transportation energy used.
• Emissions are reduced over the lifecycle compared to alternatives like coal
  • SO2 Emissions by 19% - 44%
  • CO2 Emission by 1.5%
• Over its life cycle, just capturing 5% of MRF residue for energy could result in CO2 reductions equivalent to removing 1 million cars from the road.
Where Are We Headed

Current Opportunities

• Co-fire with coal in power boilers and kilns.
• Designing MRFs to produce fuel.
• Working with ACC and others to maximize recycling and recovery.

Future Opportunities

• Gasification technology
• Pyrolysis - i.e. Plastics to Oil/Fuels
• Fuel Cubes as an intermediate step to higher value fuels and chemicals.
Recommendations

• Adopt a “resource management” approach.
  • Based on an advanced EPA hierarchy
• Broaden the definition of ‘Renewable’ and ‘Clean’
  • To include all MSW and emerging conversion technologies
• Level the Playing Field
  • Support development and use of ALL renewable options
• Simplify Permitting Process - Encourage Innovation
  • Define high energy MSW as a ‘fuel’ not a ‘waste’
• Recognize energy recovery as ‘diversion’ not disposal.
• Include Energy Recovery in future state energy planning
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