



Body Shop:
Building
Strategies

Waste Management:

Treating waste as a renewable resource.

Emily Tuzson, P.E.

Senior Technology Development Manager

Alternative Fuels Team

Siemens Building Technologies

emily.tuzson@siemens.com

Alternative Fuels?



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Why an alternative fuel?



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- Rising energy prices
- Volatile energy prices
- Waste-disposal costs (Zero-Waste)
- Incentives / Clean Energy Mandates
- Environmental protection
 - Fuel side – use less petroleum
 - Waste side – bury less waste

It's the right thing to do

“Alternative” Fuels



Wood

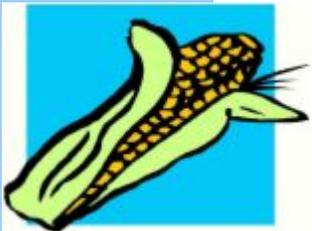
- Less costly than petroleum-based fuels
- Perception as clean fuel
- Many field-proven conversion technologies

Other biomass

- More removed from petroleum markets
- Some biomass from agricultural wastes
- May require more complicated conversion technologies
- Examples: dried distillers grain, rice hulls, poultry litter



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Very Alternative Fuels



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- Industrial Wastes
 - Often petroleum-based
 - Often a true waste, with a disposal cost
 - Often consistent and homogenous
 - Will require more complicated conversion technologies
 - May require extensive emissions controls
 - Examples: Carpet edge trim, auto fluff, tires

- Municipal Wastes
 - Examples: Municipal solid waste (MSW), sewage sludge
 - A true waste, with rising disposal costs
 - MSW will require extensive emissions controls
 - Will require more complicated conversion technologies





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- Traditional Incineration Technologies
 - Examples: Moving-grate combustion, Mass burn, Shred-and-burn
 - Can burn just about anything
 - Can be used for energy recovery
 - Historically poor emissions profile (now much better)
 - Poor public perception regarding emissions
 - Poor public perception regarding recycling / diversion





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- Fixed Bed Gasification Technologies
 - Cleanly converts the fuel into a synthetic gas, then burns the gas
 - Better emissions profile than direct incineration
 - Can be used for energy recovery
 - Undeveloped public perception
 - Fewer commercialized non-coal systems than incineration
 - Requires moderately dry fuels <30% moist

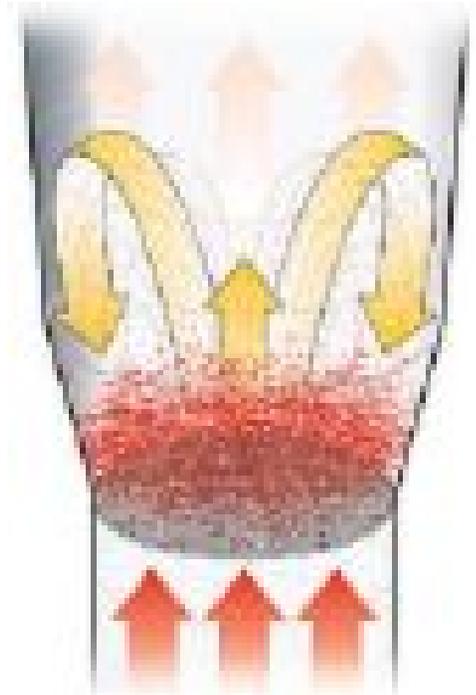




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■ Fluid Bed Incineration

- Burns fuels in a dancing bed of sand
- Better emissions profile than direct incineration
- Can be used for energy recovery
- Is indeed an incineration technology
- Fewer commercialized non-coal systems than incineration
- Can take moist fuels up to 75% moist



■ Plasma Arc Gasification

- Destroys every type of waste, except radiation
- Better emissions profile than direct incineration
- Can be used for energy recovery
- Most expensive of the alternative fuel technologies
- Very few commercialized systems for waste disposal
- Mostly used for very costly / hazardous wastes
- Can take anything at all



Example Project: Shaw Carpets, Dalton, GA



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Example Project: Shaw Carpets, Dalton, GA



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Project Size

- 50,000 + pounds per hour of steam at 125 psig

Carpet

- Use about 4,000 lbs per hour
- 12,000 tons of carpet per year (8 trucks / day)

Wood Flour

- Use about 2,000 lbs per hour
- 6,000 tons of wood dust per year (1 truck / day)

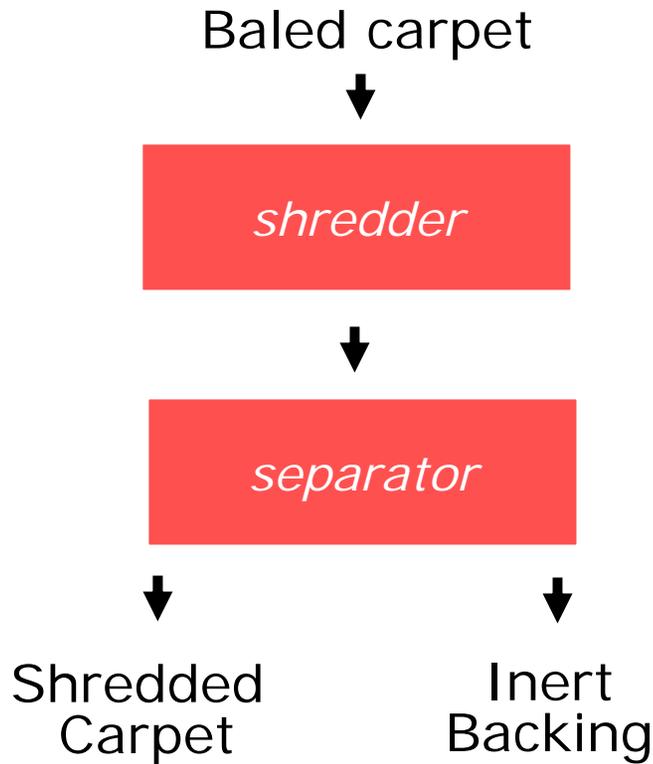
WTE Waste

- About 350 pounds per hour of ash
- About 350 pounds per hour of carpet backing

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Example Project: Shaw Carpets, Dalton, GA



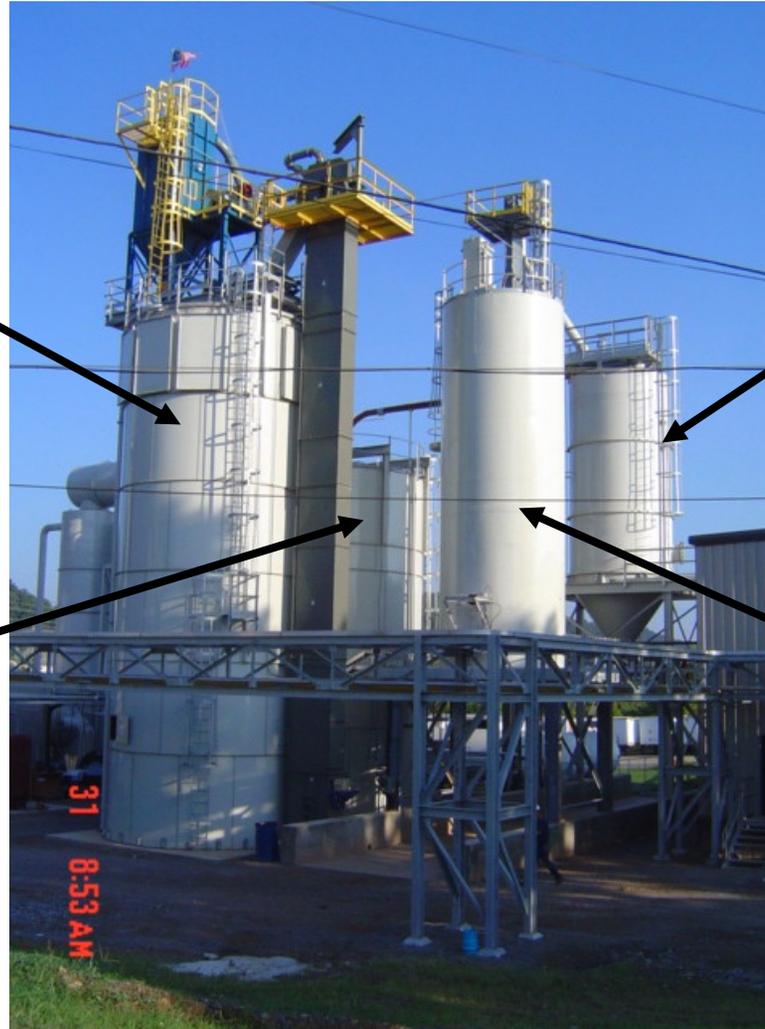
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Wood

Ash

Carpet

Backing



Example Project: Shaw Carpets, Dalton, GA

Synthetic Gas



Shredded
Carpet
+
Wood Flour



Hot
Exhaust
Gases



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Project Economics: Shaw Carpets, Dalton, GA



- Shaw receives \$1 Million positive cash flow annually with no subsidies, incentives, or grants.
- Steam price lower than with natural gas, fuel oil, propane.
- Electric generation typically results in less-favorable economics than steam production.
- Tip fees for waste not necessary for “good” project economics.

Example Project: Dyess Airforce Base

Municipal Solid Waste for City of Abilene & Dyess AFB

35,000 tons per year of MSW will be:

- Sorted in a material recovery facility, where recyclables are recovered
- Non-recyclables (mostly plastics and paper) are shredded
- Shredded materials are gasified in fixed-bed gasifier
- Synthetic gas is cooled, cleaned, combusted, and used to create approximately 5MW of electricity.
- Project is currently under contract, and is under technical development, including fuel testing, emissions testing, etc.





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- Questions?