



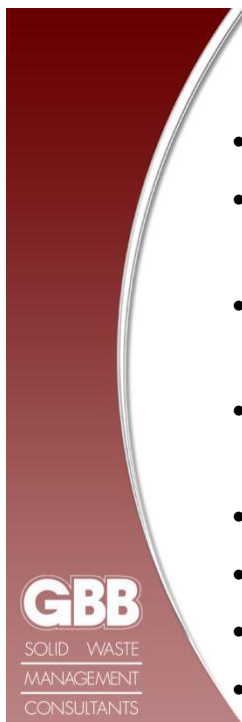
Waste-to-Energy and Conversion Technologies Status Report

**Presented via
Infocast Webinar**

May 10, 2012

By

**Tom Reardon, Vice President
Margaret Eldridge, Senior Project Manager
Gershman, Brickner & Bratton, Inc.**



Agenda

- Introductions
- Solid waste management overview and recycling best practices
- Waste to energy and conversion technologies current status
- Selected alternative technology companies and projects
- Project development overview
- Partnership expectations
- Summary
- Q&A

Introductions



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GBB Overview



- Headquartered in Fairfax, VA
- Established in 1980 as an objective adviser to governments, institutions, and businesses
- 32 years implementing innovative solutions for waste and recycling industry
- Dedicated exclusively to solid waste management; more focused than broad-based firms
- “Change Agents” to produce better services and facilities

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Tom Reardon



- GBB Vice President
- 26 years experience in solid waste business management, project management, cost analysis, cost engineering, and contract administration

Margaret Eldridge



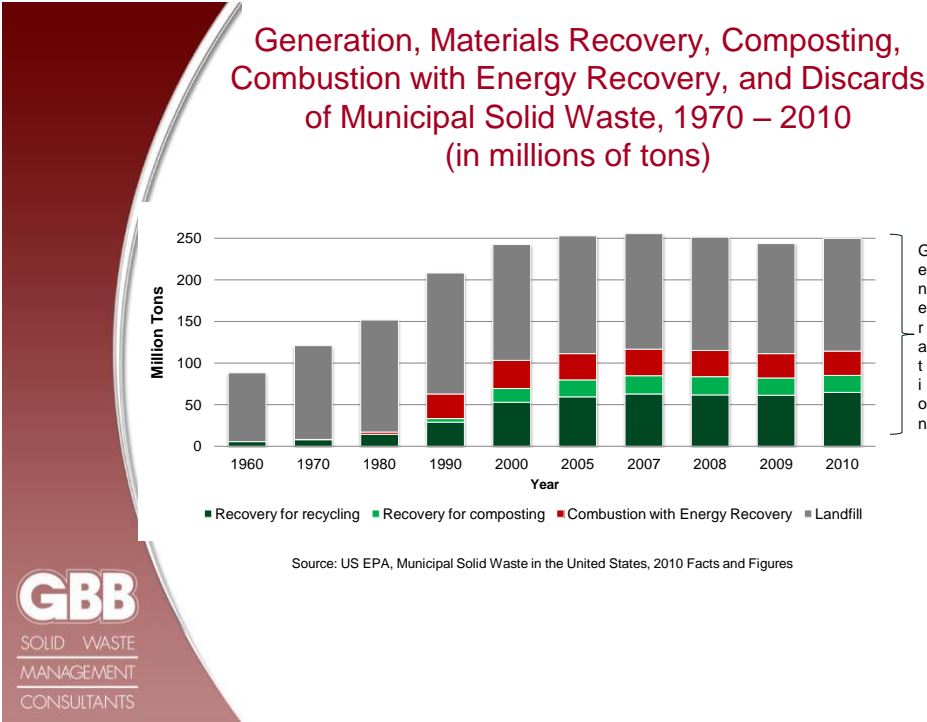
- GBB Senior Project Manager
- 15+ years of experience in recycling, solid waste reduction, and solid waste management

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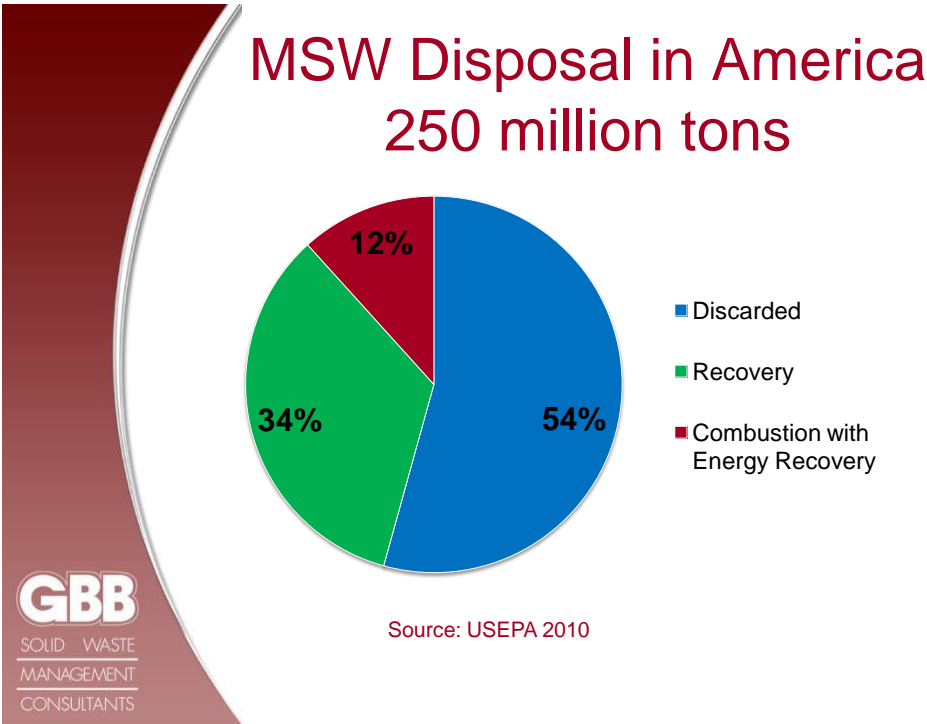


Solid Waste Management Overview and Recycling Best Practices

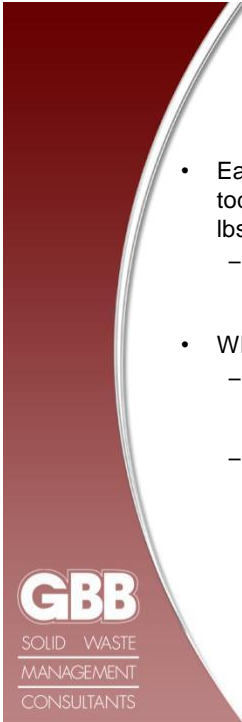
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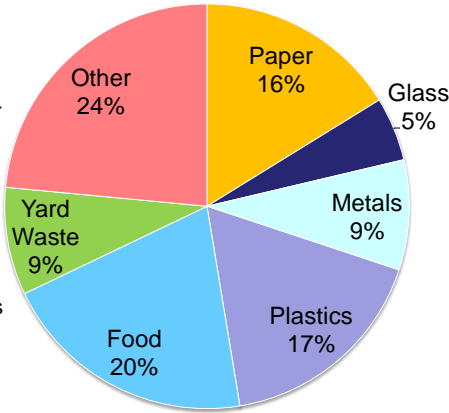


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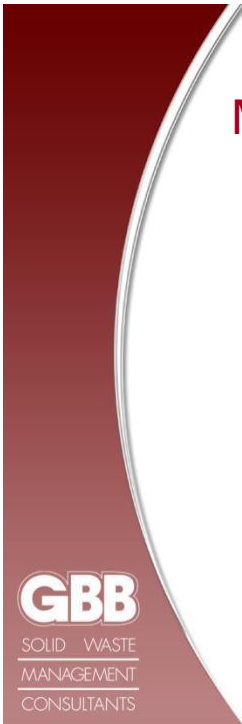
Waste Facts

- Each person in U.S. today generates 1,584 lbs. per year
 - Decreased from 1,643 lbs per person per year in 2008
- What is in our waste?
 - Recyclables
 - Feasible now to recycle up to 50-70%
 - Energy content of remainder: 5,500 BTUs per pound
 - Coal at 9,000 BTUs per pound



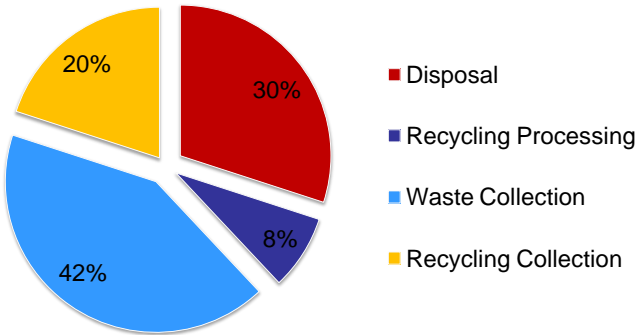
Source: US EPA, 2011

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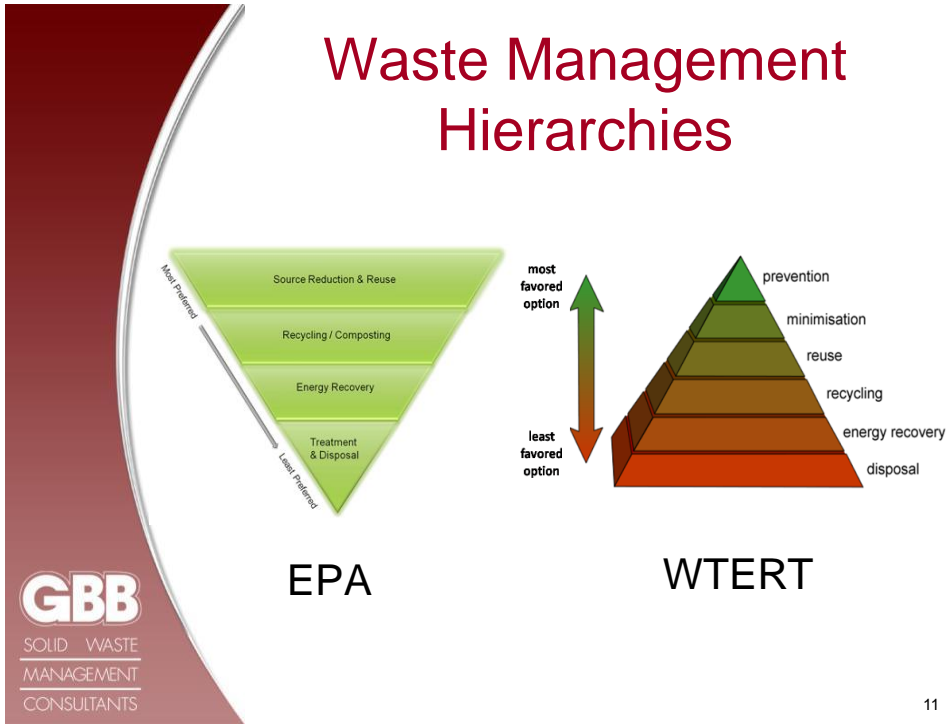


MSW Management System Costs

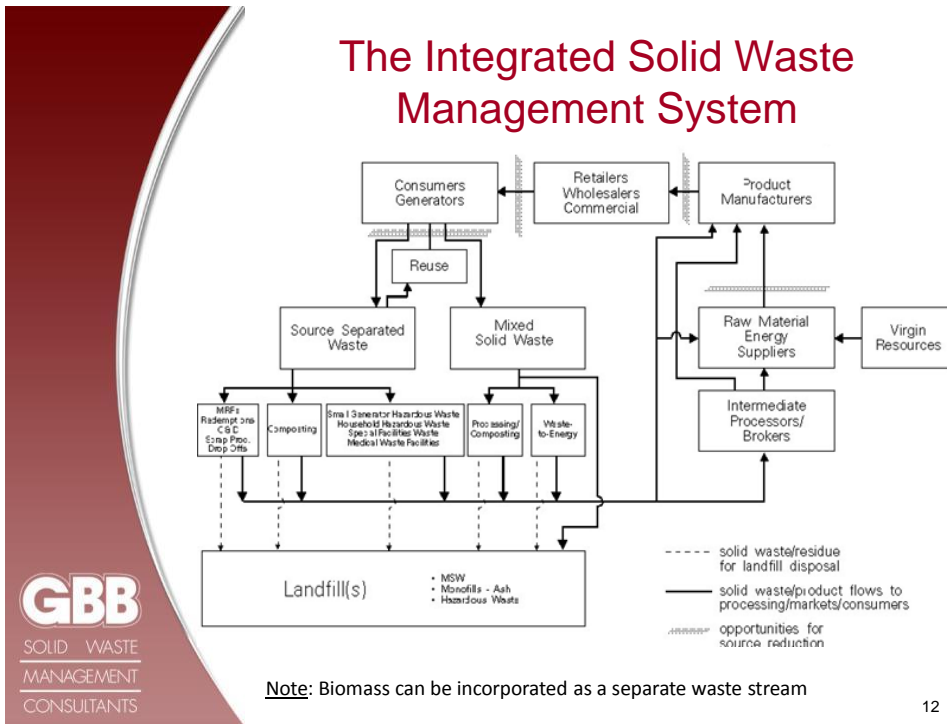
Source: GBB 2012



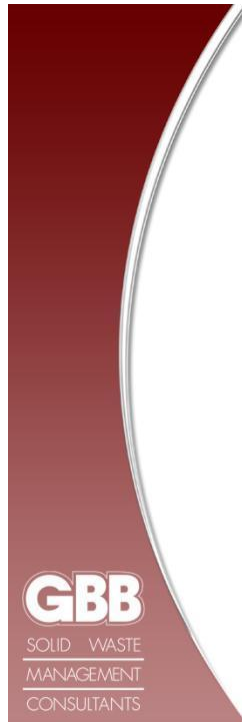
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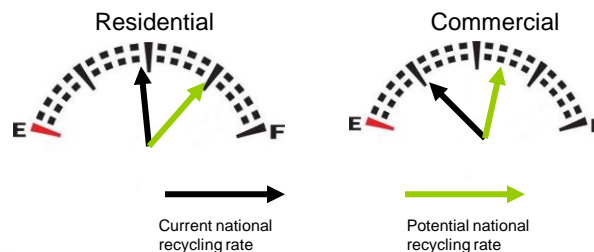
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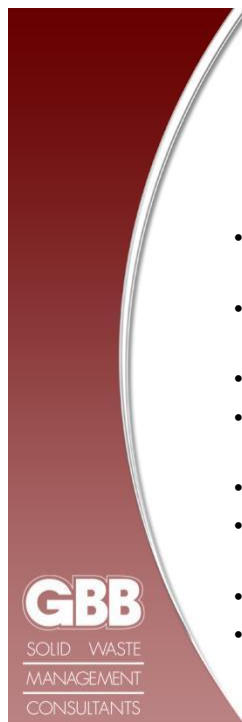
Challenge: Move the Recycling Needle to 50% - 60%

Objectives:

- Increase recycling of all curbside commodities
 - Currently,
 - Plastics 8 - 29%
 - Glass 34.5%
 - Aluminum cans 58%
 - Steel cans 67%
 - Paper 63.5%
- Create jobs and expanded recycling infrastructure



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Best Practices for Moving the Needle to 50%-60%

- Single stream recycling (residential and commercial) of clean/dry paper, containers, foil, all plastics
- Increase separate collection of organics, especially food waste
- Opportunities to recycle HHW, electronics, and appliances
- Efficient collection routing and services for waste, recyclables, bulky waste
- Enterprise funds, PAYT
- Long-term contracting for waste and recycling collection/disposal
- Development of ordinances, including C&D-related
- Incentive programs

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Waste-to-Energy Today



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1 Ton of MSW

- Has ~11 million BTU's
- Equivalent to:
 - 1 barrel of oil
 - ½ ton of coal
 - 11 Deca Therms of natural gas^a
- Can make:
 - 5,500 lbs. of steam
 - 400 to 600 KWHrs of electricity
 - 50 gallons of ethanol



What if half of the waste landfilled went to WTE?

...that's 200,000 tons per day of new capacity needed!

Note: a – 1 “Deca-Therm” = 10 therms or 1 million Btu's



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86 U.S. WTE Plants - \$14 Billion in Assets Generating approx. 2,700 MWs

| Technology | Operating Plants | Daily Design Capacity (TPD) | Annual Capacity ⁽¹⁾ (Million Tons) |
|-------------------------------|------------------|-----------------------------|---|
| Mass Burn | 64 | 71,354 | 22.1 |
| Modular | 7 | 1,342 | 0.4 |
| RDF - Processing & Combustion | 13 | 16,928 | 5.3 |
| RDF – Coal Combustion | 2 | 4,592 | 1.4 |
| Total U.S. Plants | 86 | 94,216 | 29.2 |

(1) Annual Capacity equals daily tons per day (TPD) of design capacity multiplied by 365 (days/year) multiplied by 85 percent. Eighty-five percent of the design capacity is a typical system guarantee of annual facility throughput.

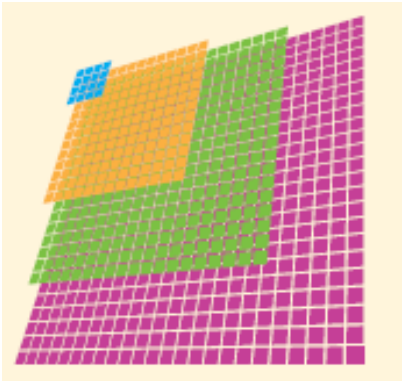
Source: IWSA (now Energy Recovery Council), 2010 Directory



Acreage Comparison of Technology

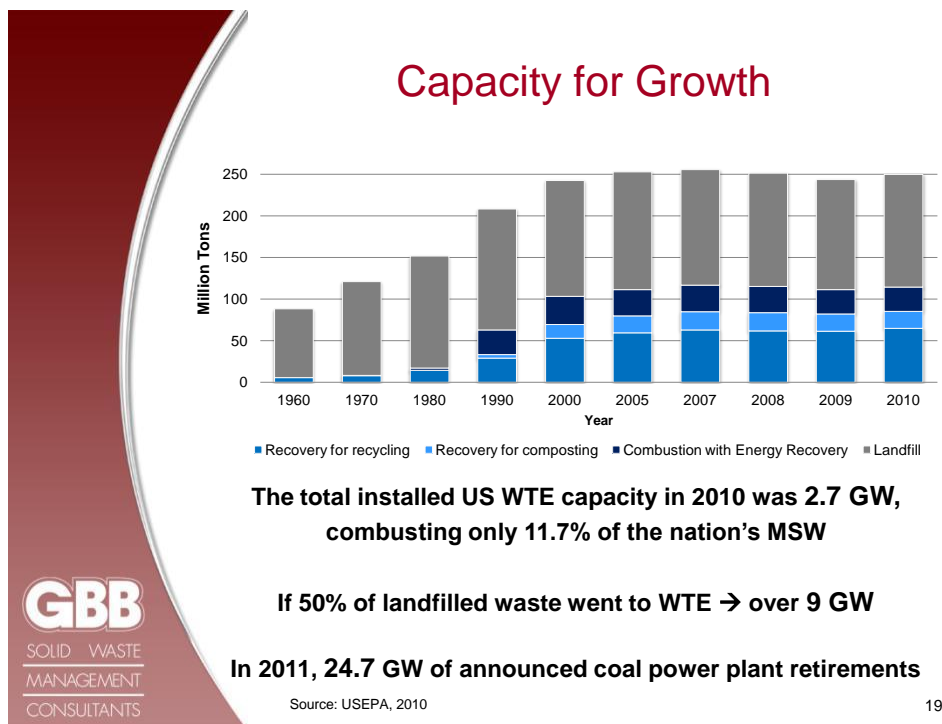
Waste-to-Energy uses less land per megawatt than other renewable energy sources

- WTE facilities require an average of 0.7 acres/MW
- Landfill gas requires 27 acres/MW
- Solar requires 8 acres/MW
- Wind requires 18 acres/MW



Source: Covanta Energy, 2012





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Energy Answers Int'l – Baltimore, MD



- Developing the Fairfield Renewable Energy Power Plant on 90-acre "brownfield" site on the Fairfield Peninsula in Baltimore, MD
- 4,000 tons per day of Processed Refuse Fuel
- RDF preparation offsite; locations under development
- Received all major permits and approvals
- Outputs:
 - 160 MW combined heat and power plant;
 - 350 tons/day of recovered, recyclable metals; and
 - 800 TPD construction-ready aggregate and other building materials
- Schedule
 - Construction scheduled for December 2010 hasn't started yet
 - Power production expected to begin summer 2013
 - Commercial operation late 2013

Source: Energy Answers, Baltimore Sun



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Wheelabrator - Frederick County, MD (NMWDA)



- Owned by the Northeast Maryland Waste Disposal Authority and will serve Frederick and Carroll counties under a long-term service agreement between the Authority and the counties.
- Will have a capacity of up to 1,500 tons per day to co-combust MSW and sewage sludge from the wastewater treatment plant with an electric generating capacity of 55 megawatts; the equivalent of supplying the electrical needs of 60,000 homes.
- 1,600 private sector jobs created during construction and 80 full-time private sector jobs during operation
- The Authority will finance the project's capital cost through the issuance of tax exempt and taxable revenue bonds, total projected size to be \$527 million.
- Currently awaiting Environmental Permit
- Expected to be commissioned in 2015



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Solid Waste Authority of Palm Beach County, FL

GROUNDBREAKING
CEREMONY APRIL 4th,
2012!



Source: Babcock & Wilcox; artist's rendering of proposed facility.

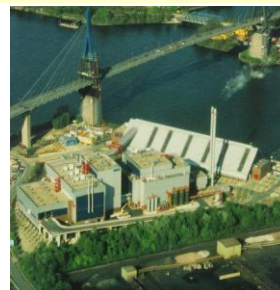
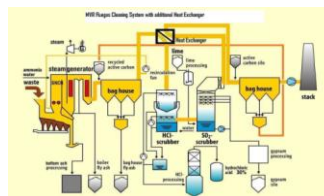
- **Babcock & Wilcox Power Generation Group, Inc. (B&W PGG)**, and its partner, **KBR, Inc.** were selected to build the plant in April 2011.
- B&W PGG to operate and provide maintenance services once the plant is operational
- \$668 million construction price
- 3,000 tons per day of MSW capacity
- 325 full-time construction jobs with more than 900 people to be employed during some phases of construction
- When operational, the new plant is expected to employ 64 permanent, full-time workers

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City of Los Angeles, CA – Green Conversion Systems

- 1,100 TPD post-recycled residential waste
- “Advanced Thermal Recycling”
- MRF recycling @ 29%
- Conversion Technology by Fisia Babcock Environment GmbH
- Reference facility: Hamburg, Germany
- Air emissions to be well below permit limits and real time air emission readings to be public
- Emphasis on aesthetics
- Ash processed for aggregates
- Landfill diversion rate @ 99%



Source: http://www.ecoling.ch/englisch/refmva_eng1.htm

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Alternative WTE Conversion Technologies

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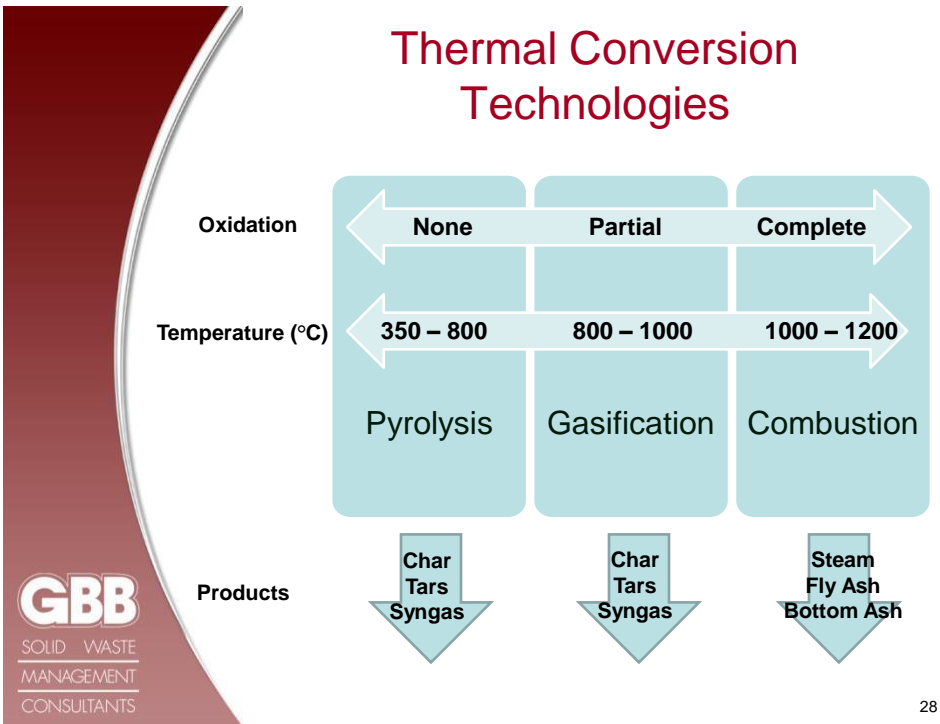
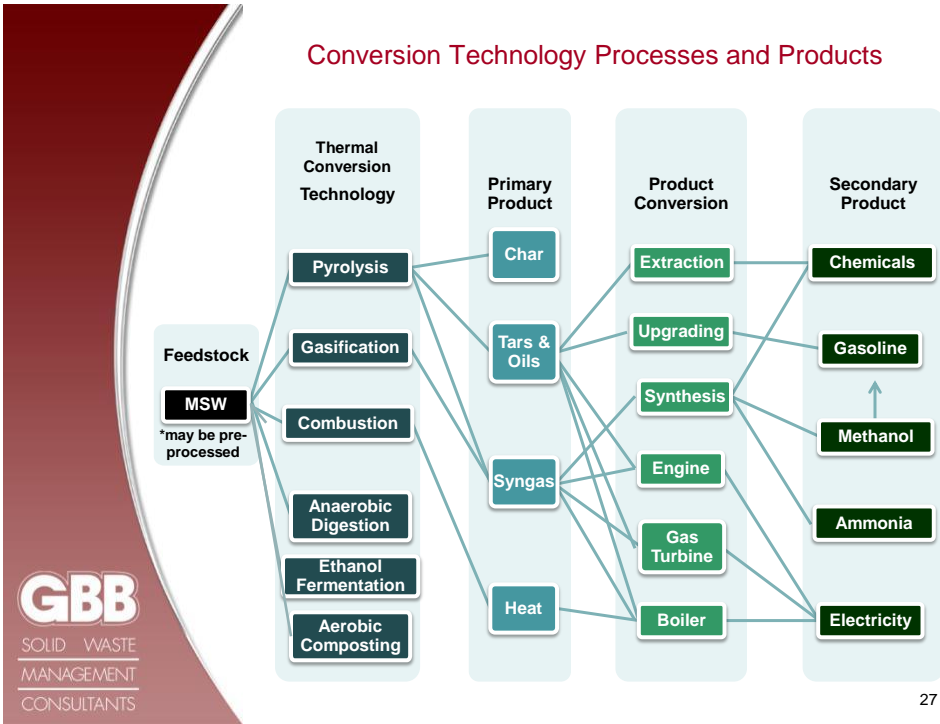


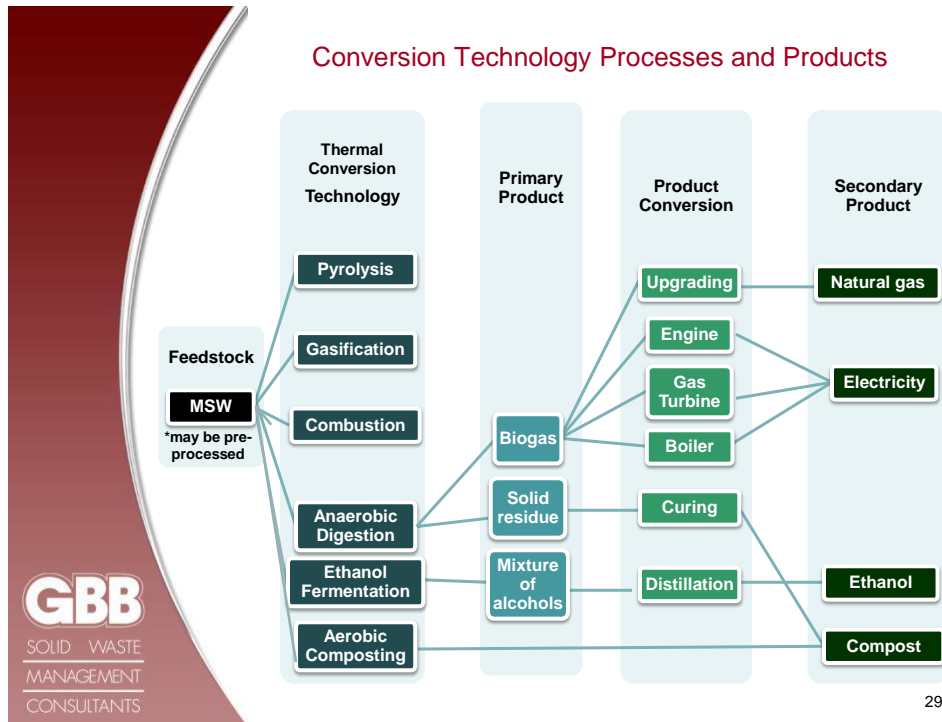
590+ Companies Offering Technology and/or Development Services

- 34 Aerobic Composting
- 109 Anaerobic Digestion
- 37 Ethanol Fermentation
- 169 Gasification
- 45 Plasma Gasification
- 52 Pyrolysis
- 60 WTE: mass burn, modular, dedicated boilers, and RDF
- 81 Others (agglomeration, autoclave, de-polymerization, thermal cracking, steam reforming, hydrolysis)

Source: Gershman, Brickner & Bratton, Inc., April 2012

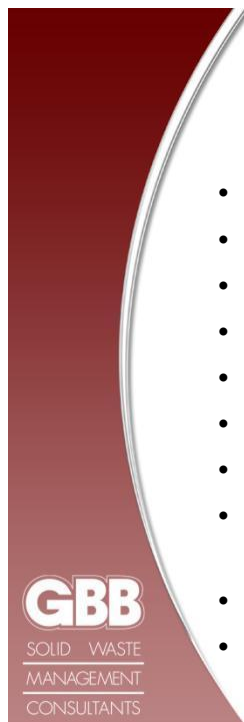
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Issues to Consider in Technology Development

- Performance history and size
- Scaling uncertainties
- Environmental impacts
- Siting and permitting needs
- Cost uncertainties and their \$ coverage
- Product market uncertainties
- Process guarantees
- Financial resources of developer and/or guarantor
- Community acceptance
- Other risks and unknowns



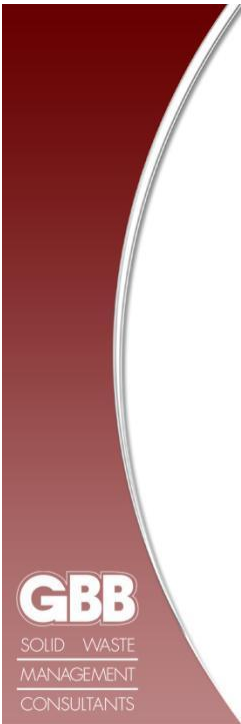
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Some U.S. Locations Currently Investigating/Advancing Waste Conversion Technologies

- Ada County, ID
- Baton Rouge, LA
- City of Allentown, PA
- City of Cleveland, OH
- City of Dallas, TX
- City of Glendale, CA
- City of Plano, TX
- City of San Antonio, TX
- City of Taunton, MA
- Columbia, SC
- County of Maui, HI
- Fulton, MS
- Gallatin County, KY
- Hennepin County, MN
- Lake County, IN
- Los Angeles County, CA
- New York City, NY
- Prince William County, VA
- Salinas Valley, CA
- San Bernardino County, CA
- Santa Barbara County, CA

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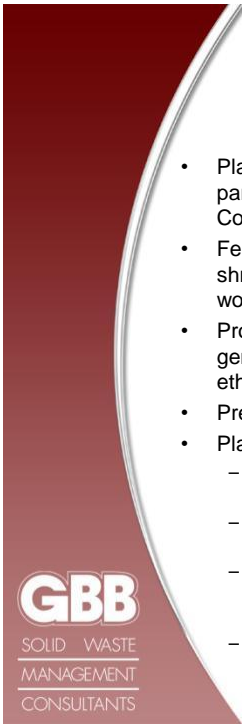
Selected Alternative Technology Companies and Projects

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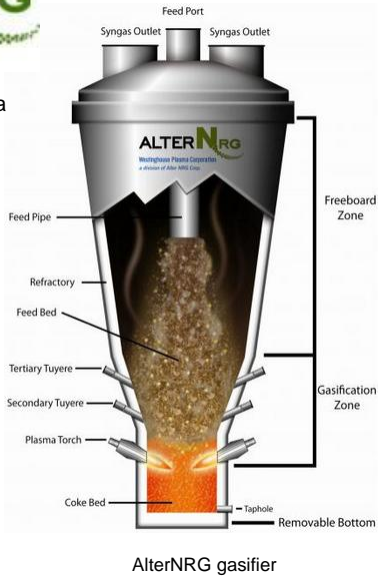


Technologies Processing Mixed MSW

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- Plasma gasification- developed in partnership with Westinghouse Plasma Corp.
- Feedstock: different including auto shredder residue, plastics, biomass, wood waste
- Product; SYNGAS for power generation or further conversion to ethanol
- Preprocessing NOT required
- Plants:
 - Demonstration facility in Madison, PA, 48 TPD
 - Commercial in Japan, Canada, India, and the U.S.
 - Under development in 11 countries through partnerships with Coskata, SMSIL, NRG Energy
 - St. Lucie County, FL terminated Geoplasma project 4/17/12



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BlueFire Ethanol

- Concentrated Acid Hydrolysis Process
- Feedstock: post-recycled MSW, rice and wheat straws, wood waste and other agricultural residues
- Product: ethanol, and other viable alternatives to petroleum derived fuels
- Preprocessing required- shredding and drying of the feedstock





Fulton, MS site prepared for construction, June 2011

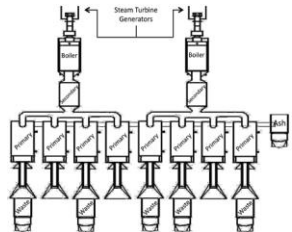
- Plants under development:
 - Lancaster, CA – 3.7 million gallon per year, feedstock post-sorted MSW
 - Mecca, CA – 17 million gallon per year, feedstock post-sorted MSW and wood waste
 - Fulton, MS – 19 million gallon per year, feedstock: woody biomass and mill wastes



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Dynamis Energy, LLC

- Based in Eagle, Idaho
- Designs, builds, owns and/or operates modular gasification plants
- Preprocessing of the feedstock NOT required






Diagram depicts a typical 200-ton per day capacity plant.


PROJECTS

Ada County, Idaho

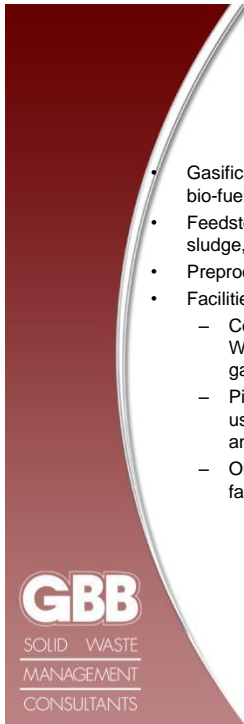
- Agreement signed in 2011 and expansion requested in March 2012 for 408 TPD
- Construction planned to start July 1st, 2012
- Expected to start operating in 2013.

Puerto Rico

- Two plants contracted each with capacity to process 180K TPY MSW
- Construction is expected to start during 2012



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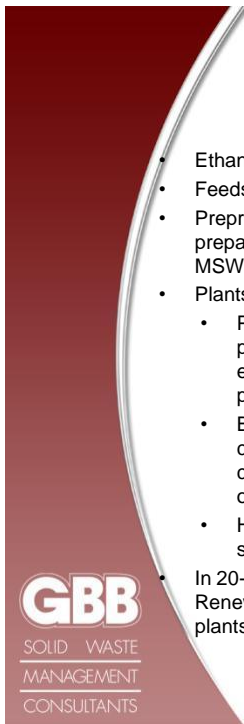


- Gasification followed by catalytic conversion to bio-fuels and chemicals
- Feedstock: MSW, wood chips, treated wood, sludge, petcoke, spent plastics and wheat straw
- Preprocessing- drying, sorting and shredding
- Facilities:
 - Commercial scale demonstration facility in Westbury, CA (since 2009, 1.3 million gallons/year)
 - Pilot plant in Sherbrooke, CA (since 2003, used to test over 25 different solid, slurried, and liquid feedstock)
 - On going projects on full-scale commercial facilities:
 - Edmonton, Alberta- 10 mill gallons per year under construction, start-up 2013
 - Pontotoc, Mississippi & Varennes, Québec, each 10 mill gallons per year under development

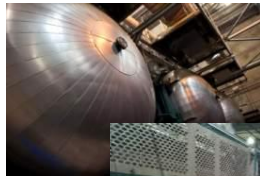


Enerkem's Westbury facility

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- Ethanol fermentation
- Feedstock- MSW
- Preprocessing- separation, cleaning and preparation of the organic fraction of the MSW
- Plants:
 - Pilot plant in Lawrenceville, VA- in partnership with Novozymes robust enzyme catalysts and enzyme recycle process developed
 - Blairstown, IA- 6 mill gallons per year, commenced production at corn ethanol converted, expected to be fully operational in the first half of 2013.
 - Has site control for first commercial-scale biofuel plant in Elkridge, MD
- In 20-year partnership with TMO Renewables, UK, to build fifteen bio-refinery plants across the US in the next five year





Fiberright High-Solids Pulping



TMO Blairstown, Iowa Layout

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Fulcrum BioEnergy


- Gasification followed by alcohol synthesis; InEnTec technology partner
- Feedstock: MSW
- Product: ethanol
- Preprocessing required
 - Sierra BioFuels- First commercial scale plant under construction in City of McCarran, NV
 - 10.5 million gallons ethanol per year
 - Have local and state regulatory permits
 - Have feedstock contracted through Waste Connections and WM
 - Have offtake agreement for full output of plant
 - Estimate completion in 2nd half of 2013

Have secured enough MSW feedstock to produce more than 700 million gallons of biofuels at facilities to be located across the US.



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- Gasification followed by biocatalyst fermentation and distillation
- Feedstock: MSW
- Product: Bioethanol
- Preprocessing- drying of the feedstock

Plants:

- Fayetteville, AR- pilot plant
- Vero Beach, Indian River County, FL - under construction
 - process 150,000 TPA MSW
 - produce 8 million gallons of fuel-grade ethanol and 6 MW (gross) of electric power
 - under construction and expected to be completed in the mid 2012
- Lake County (IN) Solid Waste Management District- under development



Pilot facility in Fayetteville, AR

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- Headquartered in Ottawa, Canada
- Gasification followed by plasma torches to refine the syngas product
- Preprocessing- separation of inert materials
- Plants:
 - Commercial-scale demonstrational, 94 TPD- Train Road, Ottawa, CA
 - R&D, 5TPD, Castellgali, Spain
- Selected by the Salinas Valley Solid Waste Authority (CA) as a viable technology for planned Resource Management Park, Environmental Impact Study currently underway
- Shortlisted in Santa Barbara, CA
- Other plans to build facilities in Canada and China








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Greenwood Energy

- Refuse Derived Fuel technology
- Feedstock: **industrial waste such as non-recyclable paper, label waste, flexible films (packaging), nonwoven fabrics.**
- Product: fuel pellets
- Plants:
 - 3 transfer stations for pretreatment of the waste- Dayton OH, Milwaukee MN, Minneapolis MN
 - Fuel pellet production: Green Bay, Wisconsin






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| Additional Conversion Technologies Processing MSW | | | | | |
|--|-------------------------------|-------------------|------------|--|-------------------------|
| Company | Technology | Product | Status | Featured plants in N. America | No of commercial plants |
|  coskata | Gasification & Fermentation | Ethanol | demo | Under development: Flagship in Boligee, Alabama (55 mill gallons per year) | 1 under construction |
|  Chinook Energy THE END-STAGE RECYCLING COMPANY® | Gasification & metal recovery | SYNGAS and metals | commercial | N/A | >16 |
|  ENTECH RENEWABLE ENERGY SOLUTIONS | Gasification | SYNGAS | commercial | Under development: Costa Rica & Huntington Beach, CA | 145 >20 on MSW |
|  InEnTec | Plasma gasification | SYNGAS | commercial | Commercial: Columbia Ridge, Arlington, OR, Dow Corning, Midland, MI, | 9 |
|  TAYLOR ENERGY | gasification | Electricity | Mock-up | Under construction: Town of Montgomery, NY | |
| THERMOSELECT | Gasification | SYNGAS | commercial | N/A | 9 43 |

Technologies Processing Mixed Non-recyclable Plastics



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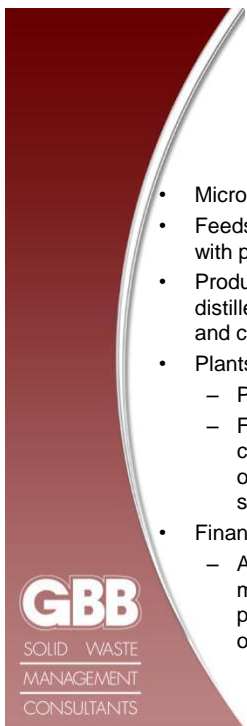
Agilyx



- Pyrolysis process
- Feedstock: #1-7 mixed plastics (can handle a mix of rigid and films, loads up to 70% PVC)
- Product: crude oil, combustible gas
- Plants:
 - Demonstration plant in Tigard, Oregon- 10 TPD capacity
- Financing:
 - Secured over \$22 million in Series B funding, led by Kleiner Perkins Caufield & Byers, and joined by new strategic investors, Waste Management, Inc. and Total Energy Ventures International
 - Has secured over \$25 mill in Series C funding, spearheaded by new lead investor Keating Capital and joined by existing investors



Tigard, OR facility



Climax Global Energy








- Microwave pyrolysis
- Feedstock: mixed plastics shredded and mixed with pulverized carbon
- Products: crude wax like material that can be distilled to transportation fuel, synthetic lubricants and commercial waxes; combustible gas
- Plants:
 - Pilot, R&D: Allendale, SC- capacity 3 TPD
 - First commercial scale plant under construction in Blackville, SC with capacity of 20 TPD, expected to be operating early summer 2012.
- Financing:
 - As of October 2011, CGE has raised \$2.83 million from undisclosed investors in a private placement out of its planned \$6 million offering of equity



Allendale pilot plant

Additional Technologies Processing
Mixed Non-recyclable Plastics

| <u>Company</u> | <u>Technology</u> | <u>Product</u> | <u>Status</u> | <u>Featured plants in N. America</u> | <u>No. of commercial plants</u> |
|--|------------------------|-----------------------------|---------------|--|---------------------------------|
|  COVANTA | Catalytic Pyrolysis | Diesel Fuel | commercial | R&D at SEMASS WTE, Rochester, MA | 5 |
|  environ | Far Infrared Pyrolysis | Crude oil & combustible gas | commercial | Demo: Montgomery County, MD, closed 2011 | N/A |
|  Plastic2Oil | Catalytic Pyrolysis | Crude oil & combustible gas | Pilot | Pilot: Niagara Falls, NY (45TPD) | none |
|  Re Rational energies | Pyrolysis | Synthetic crude | N/A | Under development: Hennepin County, MN Manatee County, FL | none |
|  VORTEX ENERGY | Pyrolysis | Crude oil & combustible gas | Pilot | Pilot: Akron, Ohio | none |

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Technologies Processing
Organic Wastes

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CR&R Inc. – Perris, CA

- Selected as one of four Los Angeles County alternative technology projects
- 150 TPD from CR&R dirty-MRF, post-recycled residual output to DRANCO anaerobic digestion system; convert the biogas generated into biomethane for their truck fleet
- In January 2011, received a \$4.5 million California Energy Commission Alternative and Renewable Fuel and Vehicle Technology Program grant
- Construction is expected to commence in 2012 and be completed in 2014

DRANCO

- Dry anaerobic digestion technology developed in Belgium
- 5 demonstrational and 25 commercial plants worldwide
- Feedstock: organic fraction of the MSW, dewatered sewage sludge, biowaste and other source-separated organic waste streams



Dranco AD plant in Hotaka, Japan

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W2e Organic Power

- Wet anaerobic digestion technology
- Pre-processing required
- Teamed with CIYCOR and Eisenmann
- Plants:
 - Columbia, SC- commercial scale prototype under construction
 - 48,000 tons per year; 3.2 MW
 - Process organics from households and businesses
 - Start-up expected 2012
 - Gastonia, NC & Baton Rouge, LA- commercial scale under development



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Zero Waste Energy LLC





- San Jose signs new contract to boost recycling
- Technology: dry fermentation anaerobic digestion-Kompoferm system
- Products: biogas and compost
- Objective to bring the commercial recycling rate to 80 percent by 2014 from current level of 22 percent
- Will be processing over 270,000 tons per year of waste that would otherwise be disposed in a landfill.
- The plans are being finalized, site preparation has begun, operations planned to begin in July 2012.



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TERRABON

- Advanced bio-refining technology
- Feedstock: food waste, wood biomass, sewage sludge, energy crops
- Products: acetic acid, ketones and alcohols that can be processed into renewable gasoline fuels.
- Plants:
 - Bryan, TX- demonstration plant,
 - Comercial scale plant under development





Bryan, TX- demonstration plant

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entec^{biogas USA} Entec Biogas USA

- Anaerobic digestion technology based in Fussach, Austria, over 25 years of experience
- Feedstock: manure, food residues, municipal sludge, waste water from the food industry, and energy crops.
- More than 120 full scale biogas projects worldwide
- Built the first MSW/food waste digesters in Japan and France
- Currently in final design process for world's largest biogas plant for cow manure in El Paso, Texas
 - Anticipated to start permitting in November, 2011



Malchin, Germany
500,000 MT/yr food waste → 2 MW



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HARVEST^{Power of We™} Harvest Power

- Advanced aerobic composting & Anaerobic digestion- Founded in 2008;
- Have aerobic composting facilities currently processing over 560,000 TPY of organic waste in PA, BC, and CA
- Feedstock: organic waste
- Product: compost, biogas
- Anaerobic digestion plants:
 - London, Ontario (under construction) – 65,000 TPY organic waste
 - Vancouver (under development) - partnership with GICON Bioenergie GmbH to construct digestion facility
- Acquired 100% of Coastal Supply Company, Inc, a Delaware-based soil and mulch manufacturer in September 2011






Aerobic Composting
Fraser Richmond Soil & Fibre Richmond, BC



Anaerobic Digestion
Harvest Bioenergy Centre London, Ontario

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Additional Technologies Processing Organic Waste

| <u>Company</u> | <u>Technology</u> | <u>Product</u> | <u>Status</u> | <u>Featured plants in N. America</u> | <u>No. of commercial plants</u> |
|--|-------------------------------|--------------------|---------------|--|---|
|  ARROWECOLOGY THE WAY TO ZERO WASTE | Dry anaerobic digestion | Biogas and compost | commercial | Commercial- Sidney , AU Pilot- Hidera, Israel | 1 |
|  BEKON Energy Technologies GmbH & Co. KG | Dry anaerobic digestion | Biogas and compost | commercial | N/A | 14 |
|  eci Bio Energy | BTA , wet anaerobic digestion | Biogas and compost | commercial | Toronto, CA Demo: Dufferin Commercial: Newmarket | 17 |

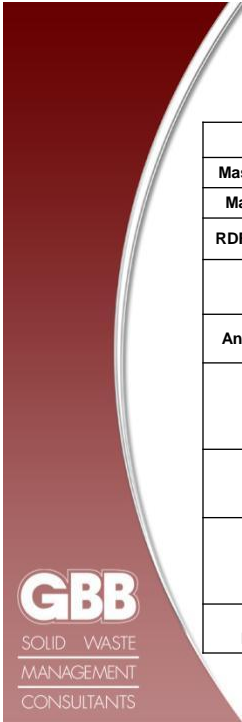
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Project Development Overview

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CONSULTANTS

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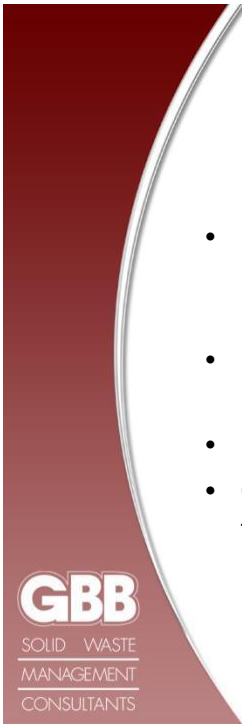


Technologies and Risk

Source: Gershman, Brickner & Bratton, Inc. March 2012

| Alternative | Risks/Liability | Risk Summary |
|------------------------|---|------------------|
| Mass Burn/WaterWall | Proven commercial technology | Very Low |
| Mass Burn/Modular | Proven commercial technology | Low |
| RDF/ Dedicated Boiler | Proven commercial technology | Low |
| RDF/Fluid Bed | Proven technology; limited U.S. commercial experience | Moderate to Low |
| Anaerobic Digestion | Proven technology; limited U.S. commercial experience | Moderate to Low |
| Pyrolysis | Previous failures at scale, uncertain commercial potential; no operating experience with large - scale operations | High |
| Gasification | Limited operating experience at only small scale; subject to scale-up issues | High |
| Mixed-Waste Composting | Previous large failures; No large-scale commercially viable plants in operation; subject to scale-up issues | Moderate to high |
| Chemical Decomposition | Technology under development; not a commercial option at this time | High |

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Factors Holding Back WTE

- Economics
 - Landfill disposal abundant and relatively cheap
 - Energy revenues not high enough
- Inconsistent policies on national and state level
- Not In My Back Yard (NIMBY)
- Create savings through collection efficiencies to fund WTE/Conversion Technologies

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Factors Contributing to Increased Interest in WTE

- National goal for 80% of America's electricity to come from renewable energy sources by 2035
- Federal funding for projects:
 - 2009- alternative technologies received a total of \$564 million from DOE
 - 2011- U.S. Department of Energy (DOE) Renewable Energy loan guarantee programs provided \$240 million biofuels and biomass technologies
 - 2012- \$117 million in appropriations for conversion technologies in Biomass and Biorefinery Systems Research, Development & Demonstration program
 - Federal Loan Guarantee Programs
 - U.S. Department of Agriculture (USDA) Renewable Energy loan guarantee programs
- Opposition in siting new landfills
- Increasing transportation cost



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Increased Demand for RDF

- Many conversion technologies require MSW pre-processing to produce RDF
- Electric utilities may become a player
 - By 2020, 20 percent of demand met through renewable energy and efficiency measures
 - FYI: 10 percent of coal now used equates to ~225 millions tons RDF or ~300 million tons of MSW per year



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Partnership Expectations



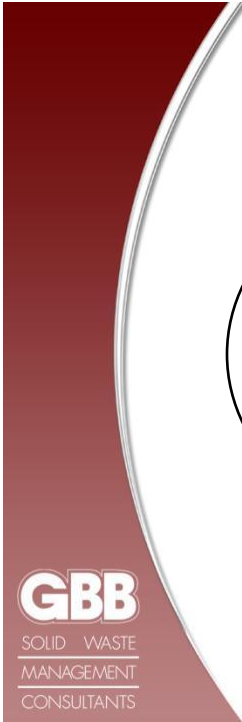
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Financing Facilities

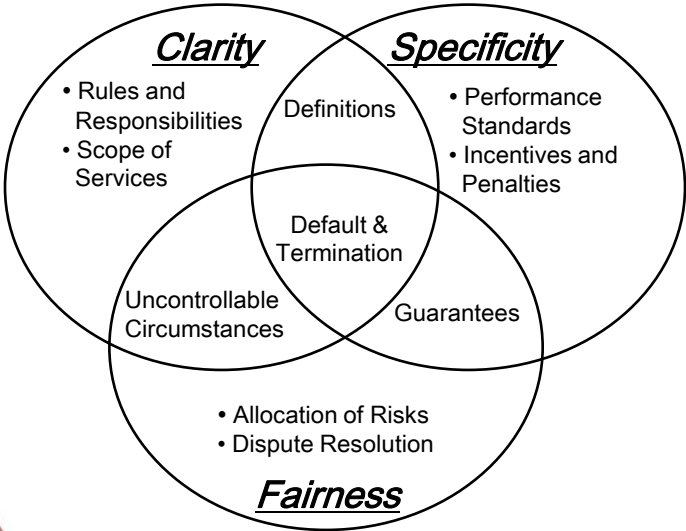
- Municipal or authority owner
- Private ownership
- Revenue bond financing
 - 100% debt
 - Construction and long-term
- Design-build-operate contractor
- Security: service agreement



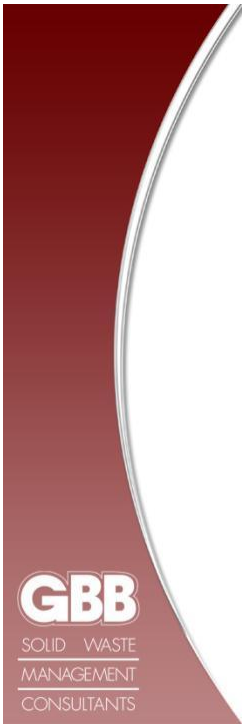
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Application of Agreement Principles



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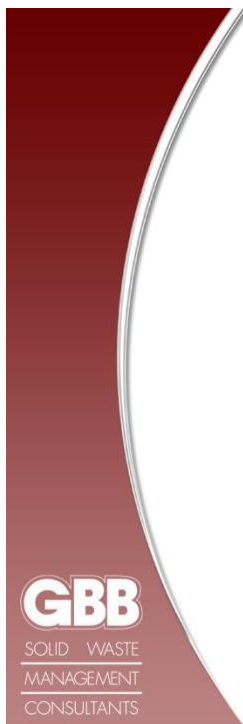


Financing Facilities: Risk Allocation

Principle: Assign risk to whomever can best manage it.

| Private Developer / Owner | Public Users / Communities / Customers |
|---|--|
| Capital Cost Risks | |
| Capital costs overruns | Additional facility requirements due to new state of federal legislation |
| Additional capital investment to achieve required operating performance | |
| Delays in project completion which lead to delays in revenue flow and adverse effect of inflation | |
| Operating Cost Risks | |
| Facility Technical failure | Insufficient solid waste stream |
| Excessive facility downtime | Significant changes in solid waste composition |
| Underestimation of facility O&M requirements (labor, materials, etc.) | Changes in state and federal legislation which affect facility operations |
| Recovered Product/Tip Fee Income Risks | |
| Overestimation of energy recovery efficiency of technology | Changes in legislation which affect energy production and/or use |
| Inability to meet energy market specifications | Overestimation of solid waste quantities |
| | Significant adverse changes in the market financial conditions or local commitment |
| | Downward fluctuation in the price of products |
| | Diversion to other competing facilities |

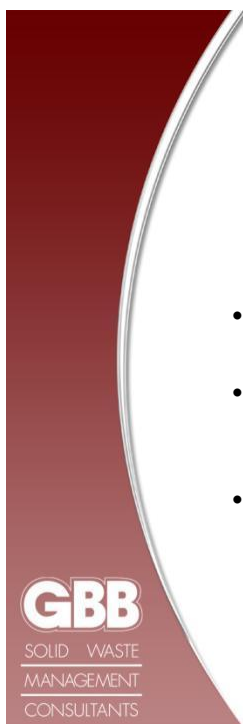
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Financing Facilities: Revenue Streams

- Service/tipping/user fees
 - Operating costs
 - Debt service/ROI
 - Reserves
 - Fixed with set escalation (e. g., CPI)
 - Pass-through costs
- Waste supply
 - Put-or-pay/ minimum put obligation
 - Open market supply
- Off-take contracts
 - Electricity - Steam/hot water/chilled water
 - Biofuels - Materials

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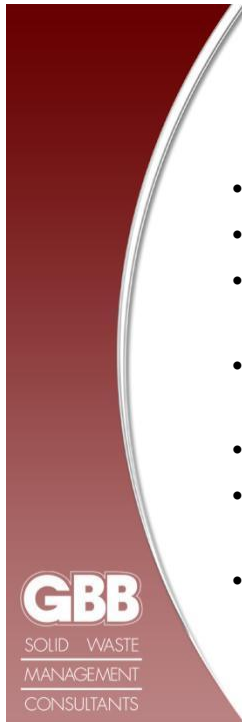


Potential Additional Revenue Streams

- Renewable Energy Certificate (RECs)
- Renewable Identification Number Revenues (RINs)
- Carbon Credits

Source: U.S. Dept. of Energy

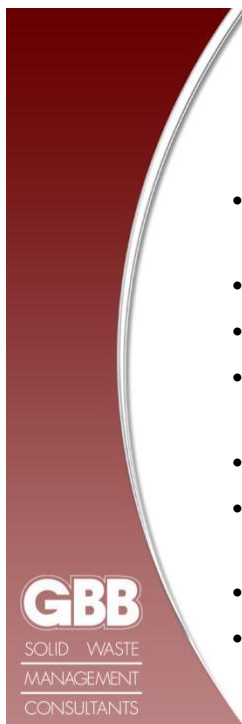
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What Public Sector Looks For

- Opportunity to become 'greener'
- Low risk
- Proven technologies that meet environmental standards
- Contractors with deep and financeable pockets
- Technology performing as expected
- Predictable economics
 - Avoided/marginal cost of disposal
- Community acceptance
(work with community; don't surprise them!)

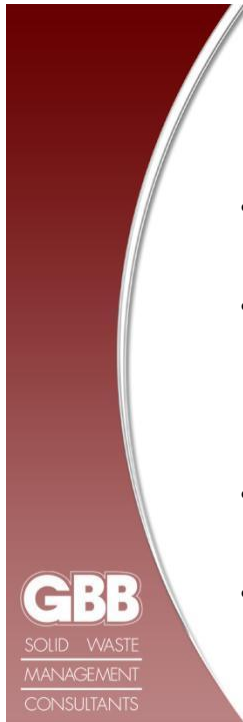
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What Companies Look For

- Limited and high alternative disposal costs
- Enlightened elected officials
- Public sector development resources
- Waste supply and control for non-recycled materials
- Energy/fuel and materials market(s)
- Capital from loans/grants to reduce need for private debt and equity
- Suitable site
- Disposal capacity for ash or residue

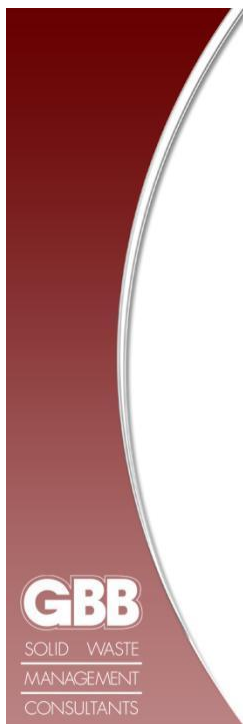
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Benefits of Long Term Partnerships

- Increased recyclables and energy/fuel production
- Contribution to need for renewable energy – an environmentally and energy beneficial integrated waste management system
- Nearby infrastructure with less dependence on landfilling
- Lowering long-term liability associated with continued landfilling

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Summary Points

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Trend for Future

- New technologies will need 2-6 years to learn if they work and their economics
- Added economic benefit of placing value on carbon credits and power from waste as 'renewable energy'
 - Possible impetus for more proven technologies that are now deemed too expensive
- Broader Renewable Fuel Standards from EPA



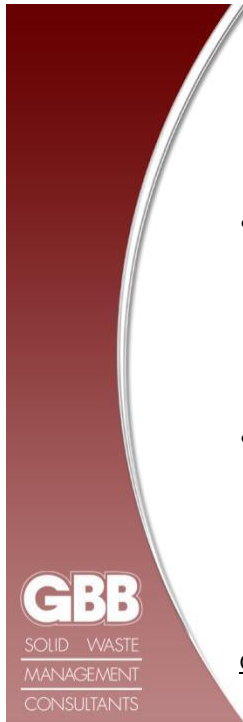
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Trend for Future (Cont'd)

- Low risk assumption by public sector until new technologies proven
- Continued demand for recyclables; industry wants more paper, aluminum, and plastics
- 'Environmentalists' and 'Zero Waste' proponents will continue to fight WTE and alternative technologies calling them all "incineration"



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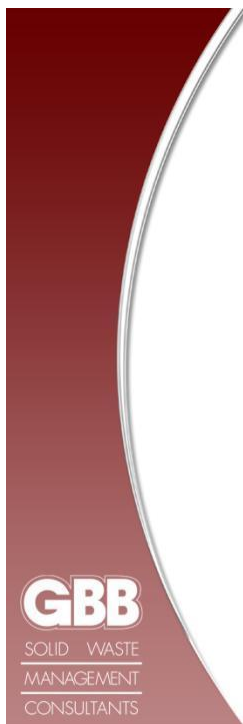


Your Role in WTE/CT

- Get educated
*What happens to your waste?
Understand WTE technologies!*
- Get involved
*Where do you want your trash to go?
Advocate and educate within your
community!*

Quote of the day: A plastic bottle in a landfill does not make energy!

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Questions?

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