



***The Waste Management Industry's  
Goals and Plans for Driving the  
Future of Waste-to-Energy***

**Presented via  
Infocast 4<sup>th</sup> Annual Waste to Energy  
Development Summit**


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**By**  
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**With research support from Elizabeth Rice and Neil Daniel**



**Outline**

- Introduction
- *What role does waste to energy play in the future plans of the industry?*
- *What business models will support these plans?*
- *What project development activities can be expected in the next two years?*
- *What kind of relationships are trying to be established and how will they be structured?*
- *What support for emerging technologies can be expected?*
- Thanks!



2

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# Introduction

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## Intro - GBB Overview



- Headquartered in Fairfax, VA
- Established in 1980 as an objective adviser to governments, institutions, and businesses
- 30+ years implementing innovative solutions for waste and recycling industry
- Dedicated and focused exclusively to solid waste management
- Owner's representative and feasibility reports for financings
- "Change Agents" to produce better services and facilities


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## **GBB Recent Waste Conversion Technologies and Renewable Energy**

- Reviews addressing economic feasibility, technology effectiveness, environmental issues, and procurements for retrofits or new facilities:
  - City of Allentown, PA
  - City of Annapolis, MD
  - City of Plano, TX
  - County of Maui, HI
  - Marion County, OR
  - New Hanover County, NC
  - Orange County, NC
  - Prince William County, VA
  - Rhode Island Resource Recovery Corporation
  - Solid Waste Authority of Palm Beach County, FL
- Due diligence reviews and business planning for private companies considering purchasing technologies or investing in projects
- Waste characterization and sourcing; processing conceptual design and cost estimating
- Independent feasibility consultant




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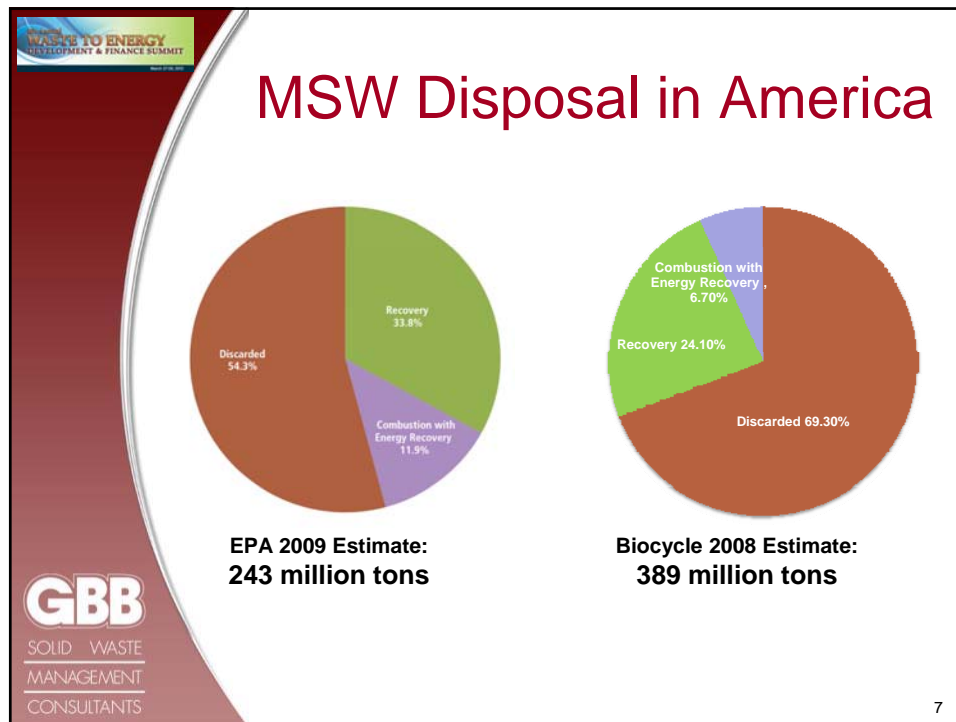


## ***WHAT ROLE DOES WASTE TO ENERGY PLAY IN THE FUTURE PLANS OF THE INDUSTRY?***



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- ## Economic Factors
- Landfill disposal abundant and generally less expensive than WTE in the U.S.
    - *In Europe, landfilling unprocessed waste banned and/or taxed heavily*
  - Recyclables worth a lot
  - Energy revenues need to be high to compete with landfilling
    - Power alone not enough
      - Cogeneration and or combined heat and power applications help
      - MSW not always a renewable fuel
    - Liquid fuel products have much higher value
  - Making collection more efficient can create funds for more recycling and waste conversion
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**Opinion: Trends for the Future**

- Many conversion projects advancing
- Will need 4-6 years to learn what works and their economics
- Continuation of public sector taking “Low Risk” attitude until “proven”
- Demand for more recyclables expected to continue at attractive pricing
- More mixed waste processing systems [again]
  - Many conversion technologies require MSW pre-processing... for feedstock sizing and inerts removal
  - Electric utilities may become a player for RDF
- ‘Environmentalists’ and ‘Zero Waste’ proponents will continue to fight WTE and Waste Conversion Technologies calling them all “incineration”




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***WHAT BUSINESS MODELS  
WILL SUPPORT THESE  
PLANS?***



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**592 (and counting) Companies Offering Technology and/or Development Services**

- 31 Aerobic Composting
- 110 Anaerobic Digestion
- 36 Ethanol Fermentation
- 175 Gasification
- 47 Plasma Gasification
- 52 Pyrolysis
- 63 WTE: mass burn, modular, dedicated boilers, and RDF
- 78 Others (agglomeration, autoclave, depolymerization, thermal cracking, steam reforming, hydrolysis)

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Source: Gershman, Brickner & Bratton, Inc., September 2011

11



***WHAT PROJECT DEVELOPMENT ACTIVITIES CAN BE EXPECTED IN THE NEXT TWO YEARS?***

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## Locations Advancing “Proven” Technologies

- Example of Mass burn WTE expansions
  - Completed:
    - Hillsborough County, FL - Covanta
    - Lee County, FL - Covanta
    - Olmsted County, MN – Olmsted County
  - Under construction: Honolulu, HI – Covanta
- Example of Locations advancing new facilities with ‘proven’ technologies:
  - Baltimore, MD – Energy Answers
  - Frederick County, MD (NMWDA) - Wheelabrator
  - Durham York (Ontario CN) - Covanta
  - City of Los Angeles, CA – Green Conversion Systems
  - Palm Beach County, FL (SWAPBC) – B&W
  - Puerto Rico – Energy Answers
  - U.S. Virgin Islands – Alpine Energy



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

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



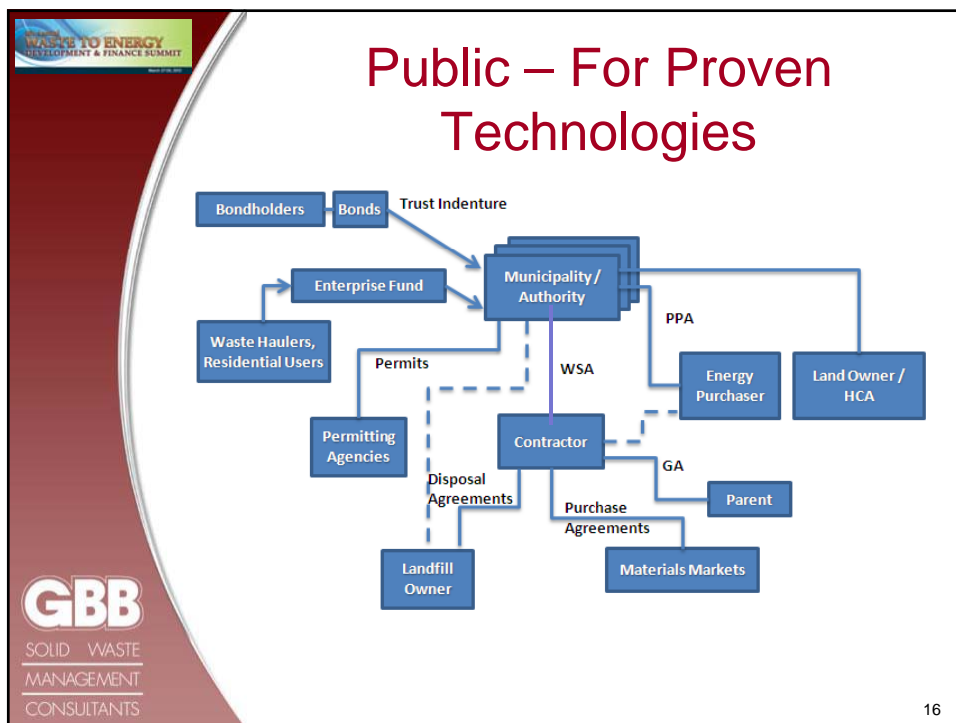
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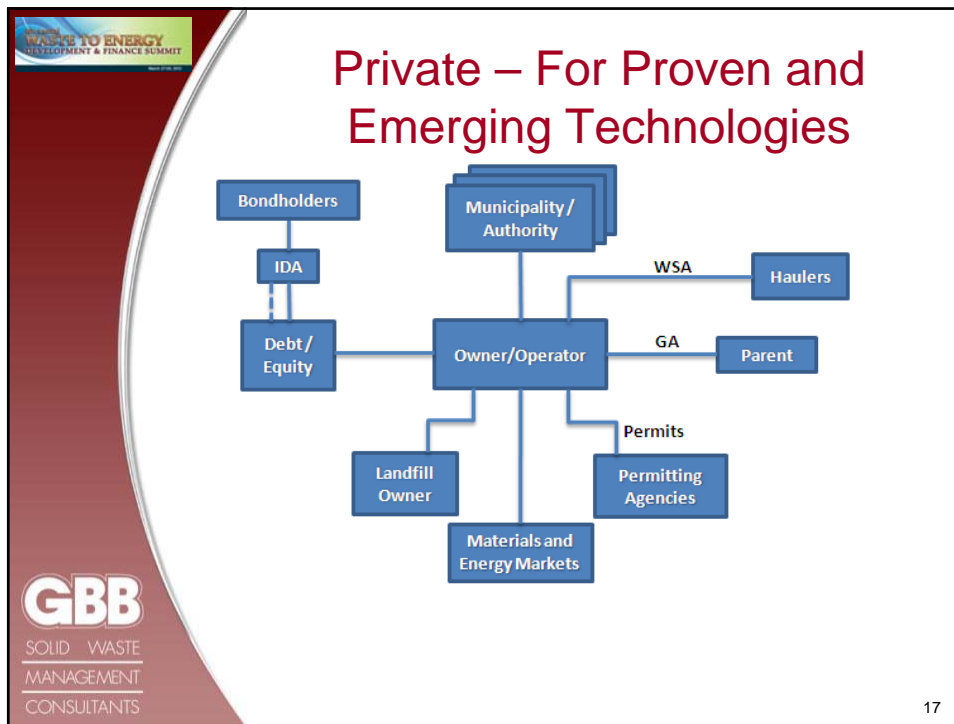
**WHAT KIND OF RELATIONSHIPS ARE TRYING TO BE ESTABLISHED AND HOW WILL THEY BE STRUCTURED?**

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**Risks Assignment**

Risk Elements	Private Ownership
<b>Construction</b>	
Capital costs overruns	Contractor
Additional capital investment to achieve required operating performance	Contractor
Additional facility requirements due to new state or federal legislation	Owner
Delays in project completion which lead to delays in revenue flow and adverse effect of inflation	Contractor
<b>Operations</b>	
Facility technical failure	Contractor
Excessive facility downtime	Contractor
Underestimation of facility O&M requirements (labor, materials, etc.)	Contractor
Insufficient solid waste stream	Municipalities
Significant changes in the solid waste composition	Owner/Contractor
Changes in state and federal legislation which affect facility operations	Owner
Inadequate facility management	Contractor
Underestimation of residue disposal costs	Contractor

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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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***WHAT SUPPORT FOR  
 EMERGING TECHNOLOGIES  
 CAN BE EXPECTED?***


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## Federal Grants and Loans

- In December 2009, 19 alternative technologies received a total of \$564 million from DOE for pilot, demonstration and commercial Projects
  - \$117 million in appropriations for conversion technologies in Biomass and Biorefinery Systems Research, Development & Demonstration program in 2012, up from \$82 million in 2010
- *Federal Loan Guarantee Programs*
  - U.S. Department of Agriculture (USDA) Renewable Energy loan guarantee programs
  - U.S. Department of Energy (DOE) Renewable Energy loan guarantee programs (In summer 2011, biofuels and biomass technologies received \$240 million!)



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## Additional Revenue Streams – Maybe?


- Green Tags (1MWh = 1 Tag)
  - Renewable Energy Certificate (RECs)
  - Green Certificates or Tradable Renewable Certificates
- White Tags (1MWh = 1 Tag)
  - Energy Efficiency Certificate
  - Represents the value of energy not used (conserved) at facilities
  - Created through the implementation of energy conservation projects - demand-side & Cogeneration
  - Principally electricity, but can be any energy supply
  - Mandated in CT, NV, PA, 9 other states evaluating
- Carbon Credits
  - Emissions off-set programs
  - Cap-and-trade

Source: U.S. Dept. of Energy




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**A Realistic & Ultimate Goal:**

Fully Integrated and Efficient Waste Management System with Significant Diversion (Recycling) and WTE-WCT  
...in a 50-50 partnership!  
*...for more jobs, better environment, and energy independence!*



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23



***Thank you!!***

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24