Waste-to-Energy and Conversion Technologies Status Report

Presented via
Infocast Webinar

June 14, 2011

By
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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
- Partnership expectations
- Summary
- Q&A

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Introductions

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GBB Overview

Celebrating our 30th Anniversary

- 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 exclusively to solid waste management; more focused than broad-based firms
- "Change Agents" to produce better services and facilities

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Harvey Gershman

- GBB Founder and President
- Almost 40 years solid waste management experience as advisor to local governments and solid waste agencies
- Recognized expert on WTE and conversion technologies
- Current Federal court receiver for solid waste system of Guam

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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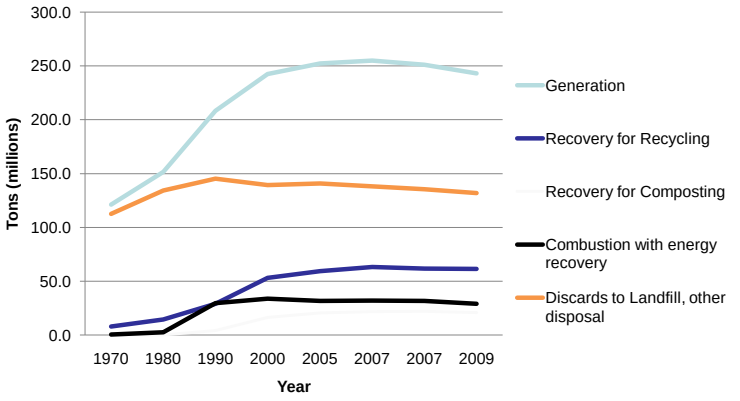
Generation, Materials Recovery, Composting, Combustion with Energy Recovery, and Discards of Municipal Solid Waste, 1970 – 2009 (In millions of tons)



Source: US EPA, Municipal Solid Waste in the United States, 2009 Facts and Figures

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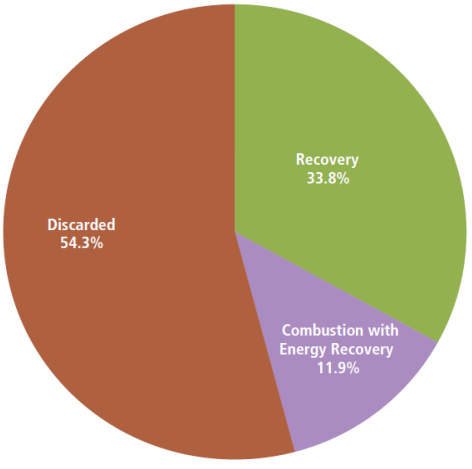
MSW Disposal in America 243 million tons



Source: USEPA 2009

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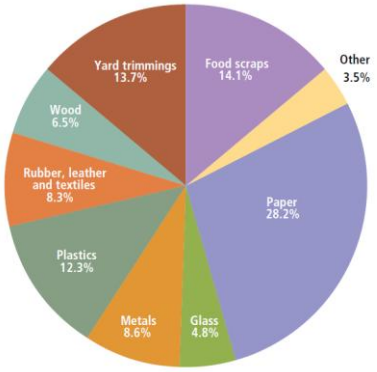
Waste Facts

- 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, 2009 data

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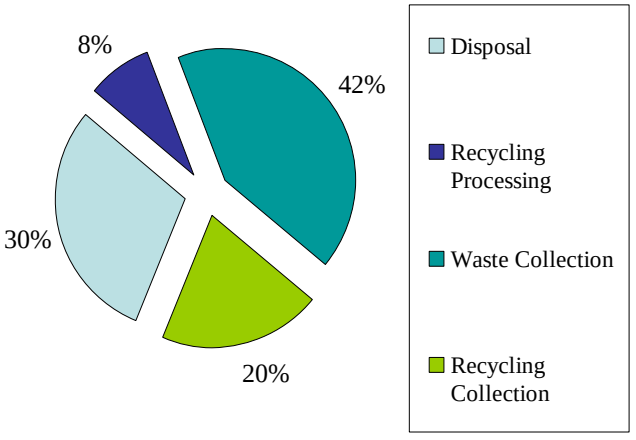
MSW Management System Costs $100 - $200 per ton

Source: GBB, 2011



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EPA's Waste Management Policy Changes in 2005

Previous:

- Source reduction
- Recycling
- Landfilling and incineration

Current:

- Source reduction
- Recycling (35% goal established)
- *Incineration/thermal processing with energy recovery (defined as renewable)*
- Landfilling and incineration (without energy recovery)

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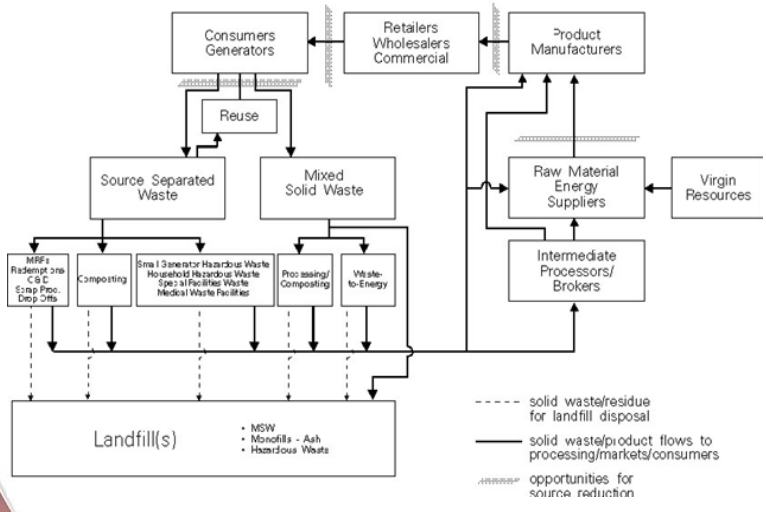
The Integrated Solid Waste Management System



Note: Biomass can be incorporated as a separate. waste stream

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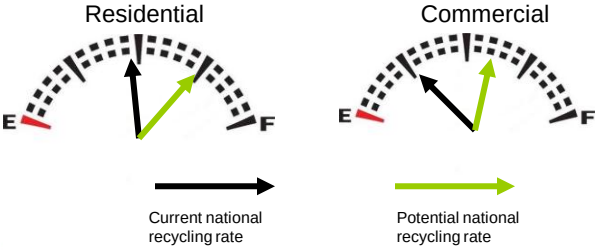
Challenge: Move the Recycling Needle to 50% - 60%

Objectives:

- Increase recycling of all curbside commodities
  - Currently,
    - Plastics 25-27%
    - Glass 34.5%
    - Aluminum cans 54.7%
    - Steel cans 63%
    - Paper 63.4%
- Create jobs and expanded recycling infrastructure



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Moving the Needle

What's needed to increase residential and commercial recycling (incl. multifamily and C&D):

- Change federal policies
  - Add to current energy and environment bills: disposal taxes, investment tax credits for recycling infrastructure
  - Add EPA seminars, technical assistance and grants (as in the 1970s)
- Provide support for local governments
  - Help to enact mandatory recycling ordinances, landfill bans
  - Provide technical assistance
  - Provide money for planning, education, carts, contractor procurement

AMERICAN POWER ACT

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Moving the Needle (con'td)

- Provide incentives for industry
  - Institute tax credits and incentives to purchase equipment, provide services to meet additional demand
  - Provide incentives to keep recycled commodities in the U.S., which creates jobs (i.e., reduce export of recycled materials)

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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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86 U.S. WTE Plants - $14 Billion is 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

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Waste to Energy and Conversion Technologies Current Status

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1 Ton of MSW

- Has 11 million BTUs with 30% moisture
- Equivalent to:
  - 1 barrel of oil
  - ½ ton of coal
  - 11 DT natural gas
- Can make:
  - 5,500 lbs. of steam
  - 400 to 600 KWHrs of electricity
  - 48 gallons of ethanol

What if half of the waste landfilled went to WTE?

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

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Locations Advancing "Proven' Technologies in the U.S.

- Mass burn expansions
  - Completed:
    - Hillsborough County, FL - Covanta
    - Lee County, FL - Covanta
    - Olmsted County, MN – Olmsted County
  - Under construction: Honolulu, HI – Covanta
- Locations advancing new facilities with 'proven' technologies:
  - Baltimore, MD – Energy Answers
  - Frederick County, MD (NMWDA) - Wheelabrator
  - Harford County, MD (NMWDA) - Wheelabrator
  - Palm Beach County, FL (SWAPBC) – B&W
  - Puerto Rico – Energy Answers
  - U.S. Virgin Islands – Alpine Energy/EPI

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Energy Answers – 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 for dedicated boiler and recycling operations
- 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 expected to begin spring 2011
  - Power production expected to begin spring 2013
  - Commercial operation late 2013

Source: Energy Answers

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Energy Answers - Puerto Rico

- Puerto Rico Resource Recovery and Renewable Energy Project I
- 2,100 TPD, 80MW Renewable Energy Power Plant
- Private initiative not requiring a commitment of government financial resources to its construction, operation or long-term performance
- $500 million private investment in renewable energy and solid waste management
- Expected to be in service in the next 3 years
- Site size is approximately 40 acres

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Solid Waste Authority of Palm Beach County, FL

- New Facility - Notice of Award April 2011
  - 3,000 TPD Mass Burn facility
  - 130 MW renewable power; enough for over 86,000 houses
  - $668 million construction price
  - $20.5 million first year O&M cost
  - To use advanced emissions control system

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

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Overcoming Procurement and Contracting "Potential Interruptions"

SWA SOLID WASTE AUTHORITY

GBB Reports for the Solid Waste Authority of Palm Beach County

- "Meeting the Future: Evaluating the Potential of Waste Processing Technologies to Contribute to the Solid Waste Authority's System (A White Paper)" – September 12, 2009
- "Response to the Florida Chapter of the Sierra Club" – May 3, 2011
- See: www.swa.org 'Agendas & Minutes'

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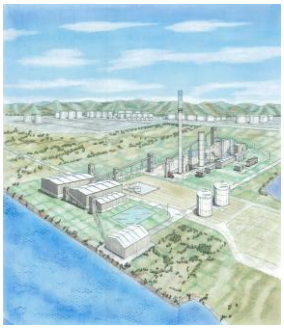
Alpine Energy Group, LLC

St. Croix, US Virgin Islands

- Uses Bouldin WasteAway Refuse Derived Fuel ("RDF") processing and recycling facility that will convert 200 tons-per-day of Municipal Solid Waste ("MSW") into approximately 150 tons-per-day of RDF
  - Annual pelletized RDF consumption expected to be at least 109,500 tons
- 16.5MW (net) power generating facility
  - To use a wide variety of alternative fuels, including biomass, energy crops, rum bottoms, sewage sludge and tire-derived fuel ; no petroleum coke
- Construction start estimated in Summer of 2011
- Public hearing before the St. Croix Coastal Zone Management Commission in late April 2011



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Bouldin Corp. "WastAway" Process

- Processes MSW into RDF; then steam heated and hydrolyzed to make RDF into a "Fluff" product
- First commercial plant in Morrison, TN began operations in 2003
- Commercial plant in Aruba; operational July 2009
- Selected by Alpine for projects in the U.S. Virgin Islands

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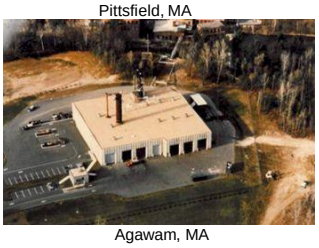
Enercon Systems

Pittsfield, MA



Agawam, MA

Wallingford, CT

- MSW WTE systems - up to 560 TPD (up to 15 MW)
- MSW “step-hearth" combustors- from 5 to 140 TPD
- Gas cleaning systems - baghouses, scrubbers, etc.; dioxin/furan levels well below latest EPA Regulations
- Three operating facilities in U.S. operating since 1980s
- Also engineer and manufacture:
  - Various incinerators, pyrolysis, dampers, special waste-heat boilers, vitrification systems, and industrial drying systems

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Recent Activities Investigating Conversion Technologies in the U.S.

- Some locations that have investigated technology:
  - Broward County, FL
  - City of Los Angeles, CA
  - City of Sacramento, CA
  - King County, WA
  - Los Angeles County, CA
  - New York, NY
  - Tallahassee, FL
- Some locations that are currently investigating technologies:
  - City of Allentown, PA
  - City of Glendale, CA
  - City of Plano, TX
  - City of San Antonio, TX
  - Santa Barbara County, CA
  - San Bernardino County, CA

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563 (and counting) Companies Offering Technology and/or Development Services

- 30 Aerobic Composting
- 106 Anaerobic Digestion
- 34 Ethanol Fermentation
- 170 Gasification
- 47 Plasma Gasification
- 47 Pyrolysis
- 61 WTE: mass burn, modular, dedicated boilers, and RDF
- 68 Others (agglomeration, autoclave, de-polymerization, thermal cracking, steam reforming, hydrolysis)

Source: Gershman, Brickner & Bratton, Inc., September 2010

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58 Conversion Locations Claimed to be Operating Commercially with MSW

- 31 Anaerobic Digestion
- 17 Gasification
- 2 Plasma Gasification
- 6 Pyrolysis
- 2 Other (Agglomeration, autoclave, depolymerization, Thermal Cracking, Steam reforming, hydrolysis)

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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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Grants and Loans

<u>Federal</u>

- In December 2009, 19 alternative technologies received a total of $564 million from DOE for Pilot, Demonstration and Commercial Projects
- *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*

<u>States</u>

- California, Mississippi and Pennsylvania as examples

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Selected Alternative Technology Companies and Projects

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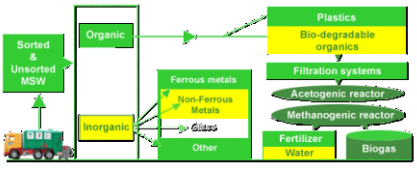
ARROWECOLOGY
THE WAY TO ZERO WASTE

Hidera, Israel Pilot Plant

- 100,000 tons per year of MSW
- 320 TPD on a 6 days per week basis
- Initial separation of recyclables using water slurry
- 23,000 tons of compost product
- 19,000 tons of residue
- Capital cost $70K +/- per daily installed ton



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ArrowBio – Sydney, Australia

WSN Facility – 300 TPD
Jacks Gully Tank Farm
Fall 2008

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CR&R Inc. – Perris, CA

- Selected as one of four by Los Angeles County alternative technology projects
- 150 TPD from CR&R dirty-MRF post-recycled residual output to Arrow Bio 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
- Advancing permit approvals

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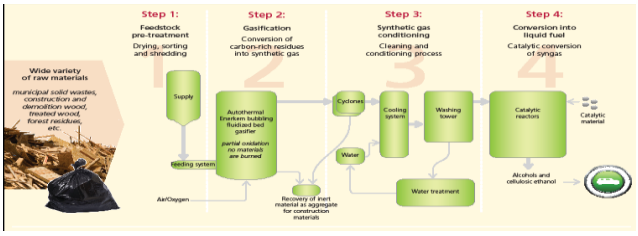
Enerkem

- Gasification and conversion to ethanol biofuel
- Pilot plant in Westbury, Quebec
- Catalyst conversion system proven and operational
- Feedstock flexibility



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Enerkem Edmonton, Alberta

- **Feedstock :** Sorted Municipal Solid Waste
  - 660 TPD to 330 TPD RDF for feedstock
- **Total Capacity :** 10 M gallons per year (initially)
- **Product :** Syngas, Methanol, Ethanol
- **Start date:** 2012
- **Approval:** Environmental permit granted
- Good support during public consultation process
- See: www.edmontonbiofuels.ca

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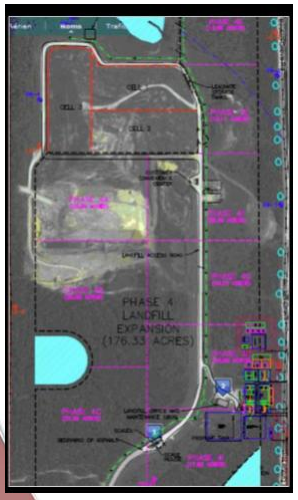
Enerkem – Three Rivers Solid Waste Management Authority (Pontotoc, MS)



- **Feedstock :** Sorted Municipal Solid Waste and wood residues
  - 660 TPD to 330 TPD RDF for feedstock
- **Total Capacity :** 10 M gallons per year (initially)
- **Product :** Syngas, Methanol, Ethanol
- **Start date:** 2012
- LOI signed with the Three Rivers Planning and Development District for MSW feedstock
- Currently in permitting cycle
- Will help recycle and convert 60% of the waste crossing the area's landfill gate
- Awarded $50M funding from U.S. DOE advanced bio-refineries program

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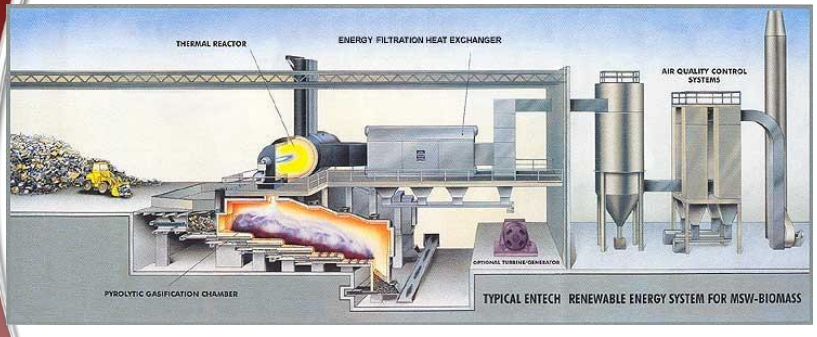
Entech Typical Arrangement Advanced Conversion Technology



ENTECH RENEWABLE ENERGY SOLUTIONS

April 2010: Los Angeles County advances negotiations for a facility at Rainbow Disposal in Huntington Beach, CA

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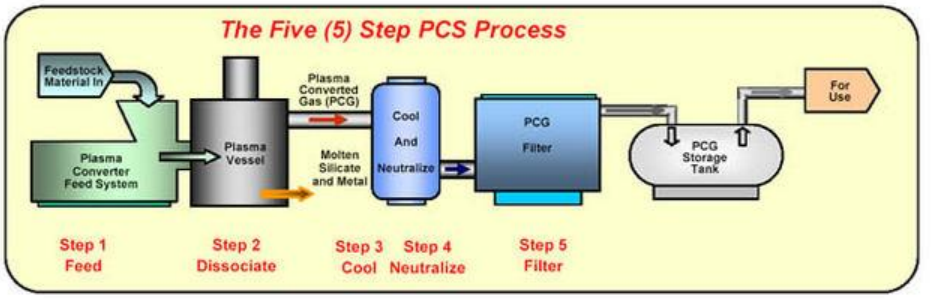
Geoplasma

Jacoby Energy

Plasma Converter System Process



- Generates a SYNGAS for power generation
- Plasma vessel based on Westinghouse (Alter NRG) Plasma furnace

ALTER NRG

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GeoPlasma St. Lucie LLC Renewable Waste-to-Energy Project

- Feedstock (Tons Per Day) : 525 MSW and 75 tires
- Capital cost: $125 million
- 9-acre site at County Landfill
- Energy output type(s): approx. 20 megawatts power and steam offload to Tropicana Products
- Owner: GeoPlasma, Atlanta, GA / Energy Resources Group
- Financing method: Private
- Construction Start: First Quarter 2011, subject to permits and financing
- Florida DEP Air Construction Permit Application obtained September 2010
- Operations Start: Mid 2013

Source: GeoPlasma-St. Lucie, LLC and Energy Resources Group, May 2010

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INEOS New Planet Bio Energy, LLC Indian River County, FL

- Vero Beach, Indian River County, FL
- In Dec. 2009, received $50 million DOE grant
- Feedstock: wood, vegetative residues, and C&D materials into ethanol
- 80-100 gallons of ethanol per dry ton of biomass
- The project ground breaking February 2011
- 150,000 tons annually of waste materials from landfills to produce 8 million gallons of fuel-grade ethanol and 6 megawatts of electric power

INEOS Bio

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Lake County (IN) Solid Waste Management District Waste-to-Ethanol Project

- Powers Energy One of Indiana LLC (developer) to use INEOS technology
- 2,000 TPD facility with multiple lines @ 125 TPD (16 lines)
- Capital cost: $256 million
- Plans include expanding to as 10,000 tons per day
- INEOS guaranteeing 90 gallons ethanol per ton MSW input
- Tipping Fee projected to be $17.25 per ton after 3 cent per gallon ethanol payment to municipalities participating and $2.50 per ton host community fee to the District
- Service agreements needed with most municipalities in Lake County; many executed

Source: Jeffrey Langbehn, Executive Director; June 2010

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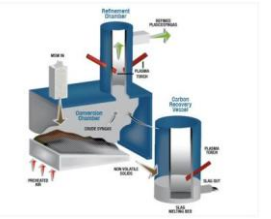
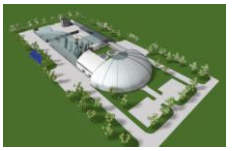
PlascoEnergy GROUP

- Headquartered in Ottawa, Canada
- Shreds/processes post recycled MSW for introduction into conversion chamber
- Produces Syngas for electrical generation
- Two operating facilities
  - 94 ton-per-day capacity plant in Ottawa, Canada
  - 5 ton-per-day research and development facility in Castellgali, Spain
- Shortlisted in Santa Barbara, CA
- Selected by the Salinas Valley Solid Waste Authority (CA)
- Other plans to build facilities in Canada and China





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City of San Jose, CA

REPUBLIC SERVICES

ALLIED WASTE SERVICES

ZeroWaste ENERGY, LLC
Recovery and Energy with Zero Waste

City of San Jose signs new contract to boost recycling

- Negotiating new 15-year contracts with two private waste management companies (Allied Waste Services of North America and Zero Waste Energy)
- Technology: dry fermentation anaerobic digestion
- Objective to bring the commercial recycling rate to 80 percent by 2014 from current level of 22 percent

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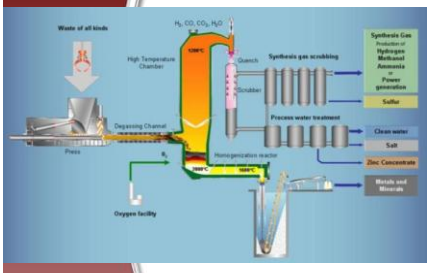
Thermoselect SA - Pyrolysis



- Swiss pyrolysis/gasification technology
- No waste preparation or RDF production required
- Offered in U.S. by Interstate Waste Technologies, the North American licensee
- Seven facilities with this technology in Japan (with variety of fuels)
- Actively marketing system in U.S.
- Qualified for a project with Los Angeles County, CA and Puerto Rico

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City of Taunton, MA
Solid Waste Management Facility

- Awarded through public procurement for non-mass burn incineration technologies
- Design capacity: 1,770 tons per day
- Guaranteed availability: 85.6% or 552,750 tons per year
- Construction cost: $420 million
- Operating costs: $55 million
- Estimated Start-up date: Third Quarter 2013
- Electricity Output (initially): sell net 54 Mw; 733 Kwhr per ton
- Ethanol Output (current): 34 million gallons per year; 61.3 gallons per ton
- Other Outputs (Per Input Ton): approx. 20 percent (Aggregate, Metal , Sulfur, Salt, and Zinc Concentrate)
- Net Service Fee: Approximately $50 per ton
- Owner is IWT Taunton Renewable Energy LLC.
- Financing: debt and equity; to apply for loan under DOE Loan Guarantee Program

Source: Interstate Waste Technologies, May 2010

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IWT INTERSTATE WASTE TECHNOLOGIES

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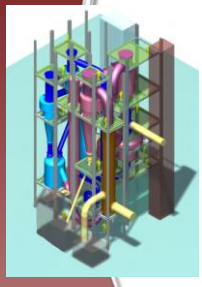
Taylor Biomass Energy LLC
Town of Montgomery, NY



- Expands the Taylor Sorting and Separating Process to accept mixed solid waste ("MSW"), in addition to wood waste, and waste from construction and demolition debris ("C&D") as inputs
- Converts the organic biomass portion of mixed solid waste (MSW) to electric power, through gasification; 20 MW power
- Location: 95 acre site at 350 Neelytown Road, Montgomery, in Orange County, NY
- Plans to expand from 307 TPD of C&D waste and 100 TPD of wood waste to 450 TPD of C&D waste, 100 TPD of wood waste, and 500 TPD of MSW
- Construction started in January 2011
- $145 million construction cost

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Ze-gen
Attleboro (MA) Clean Energy Project

- Proposed $20 million facility to be located within the existing Attleboro Corporate Campus
- The technology will be used to convert approximately 75 tons per day of waste material into synthesis gas
- Obtaining permits and approvals
- Impacted by the Massachusetts incinerator ban policy
- Construction expected to take one year
- Intends to be online in the first quarter of 2012

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Some Others To Watch Also…

Chinook Energy
THE END-STAGE RECYCLING COMPANY®

COVANTA ENERGY
for a cleaner world

Fiberight

R3 ENVIRONMENTAL
RECLAIM. RECYCLE. REUSE.

Wheelabrator Technologies Inc.
A Waste Management Company

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Technologies and Risk

Source: Gershman, Brickner & Bratton, Inc. September 2010

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
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
Anaerobic Digestion	Limited operating experience at 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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Economics Holding Back WTE

- Landfill disposal abundant and relatively cheap
  - *Why don't we tax landfill use more like they do in Europe?*
- Recyclables worth a lot
- Energy revenues not high enough
  - Power alone not enough
    - Cogeneration/CHP applications necessary with power
    - Liquid fuel products have much higher value
- Create funds for higher cost WTE by making collection more efficient

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STATEMENT FROM GOVERNOR MARTIN O'MALLEY ON HIS DECISION TO SIGN SENATE BILL 690

ANNAPOLIS, MD (May 17, 2011) – Governor Martin O'Malley issued this statement today regarding Senate Bill 690 - Renewable Energy Portfolio - Waste-to-Energy and Refuse-Derived Fuel:

"After careful deliberation, I have decided to sign Senate Bill 690. Our State has an aggressive goal of generating 20% of our energy from Tier I renewable sources by 2022 and we intend to achieve that goal through as much in-state energy generation as possible. This will require a diverse fuel mix including onshore and offshore wind, solar, biomass including poultry litter, and now waste-to-energy if we are to realize our 20% goal. …"

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More Mixed Waste Processing In The Future...Again!

- Many conversion technologies require MSW pre-processing
- Electric utilities may become a player
  - 20 percent of demand met through renewable energy and efficiency measures by 2020
  - FYI: 10 percent of coal now used equates to 225 millions tons RDF per year (more than we could make!)

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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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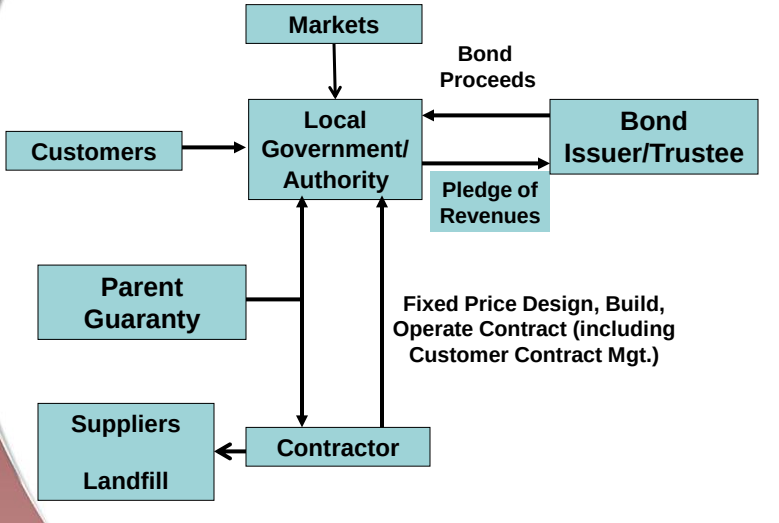
Relationships Amongst Parties



Financing Facilities: Securing Cash Flows

- Project service agreement: Rules of the game
  - Roles and responsibilities
  - Scope of services
  - Payment streams
  - Performance requirements/standards
  - Incentives/penalties
  - Risk allocation

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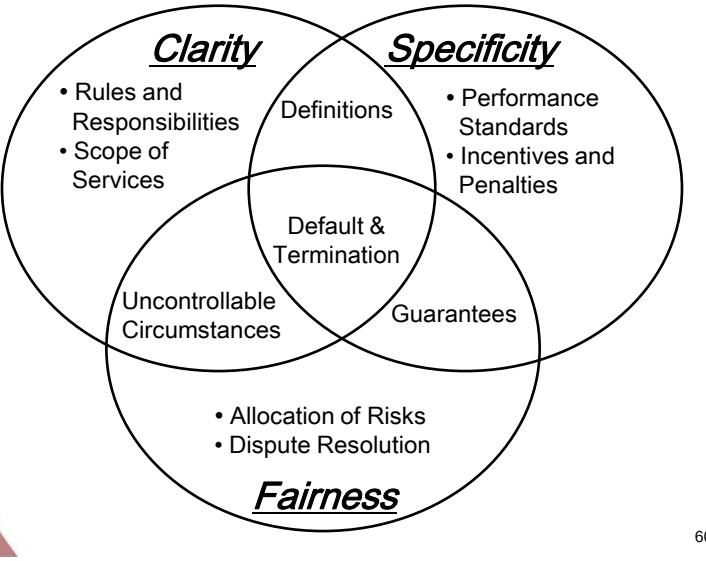
Application of Key Contract Principles



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Financing Facilities: Risk Allocation

Principle: Assign risk to whomever can best manage it.

Private Developer/Owner	Public Users/Communities/Customers
Captital Cost Risks	
Capital costs overruns	Additional facility requirements due to new state or 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	Insuficient solid waste stream
Excessive facility downtime	Significant changes in solid waste composition
Underestimatino 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 of waste to other competing facilities

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Financing Facilities: Payment 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
- Reopeners
  - Force majeure
  - Change in law
- Off-take contracts
  - Electricity - Steam/hot water/chilled water
  - Biofuels - Materials

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Additional Revenue Streams

- 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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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
- Site
  - Permittable
  - Good logistics
  - Public acceptance
- Landfill for ash and by-pass

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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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Some Examples of Excellent Public Private Partnerships

- Agawam, MA
- Alexandria/Arlington, VA
- Babylon, NY
- Baltimore, MD
- Hennepin County, MN
- Lee County, FL
- Marion County, OR
- Montgomery County, MD
- Pinellas County, FL
- Solid Waste Authority of Palm Beach County, FL

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Trend for Future

- New technologies will need 4-6 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
- Renewable fuel standards from EPA and added recycling requirements

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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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Project Building Blocks

- Limited and High Alternative Disposal Costs
- Waste Supply
- Energy and Materials Market(s)
- Site for Facility
  - Good logistics for waste receipt, energy market(s), and residue disposal
  - Can be permitted
  - Accepted by neighbors
- Landfill for ash and by-pass
- Contractor with resources and proven technology or willingness to take technology risk
- Capital
- Financeability
- Compatibility with High Level of Recycling
- Development Team Committed with Resources
- Political Will

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The Ultimate Goal:

Fully Integrated and Efficient Waste Management System with Significant Diversion and WTE …in a 50-50 partnership!

…for more jobs, better environment, and energy independence!

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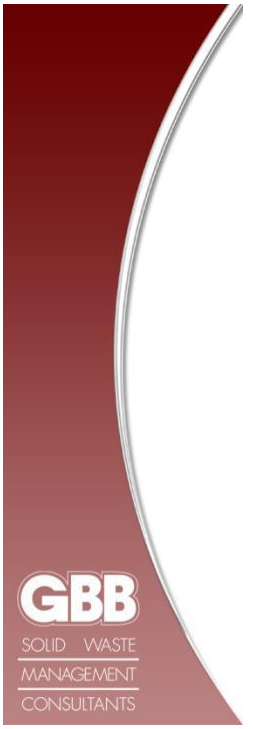

Thank you!!

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