



**Partnerships with Waste Management Businesses**

**Presented at the  
Waste Conversion  
Technology Congress 2011  
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**By**  
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**Fairfax, VA**



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

**Celebrating our 30<sup>th</sup> Anniversary**

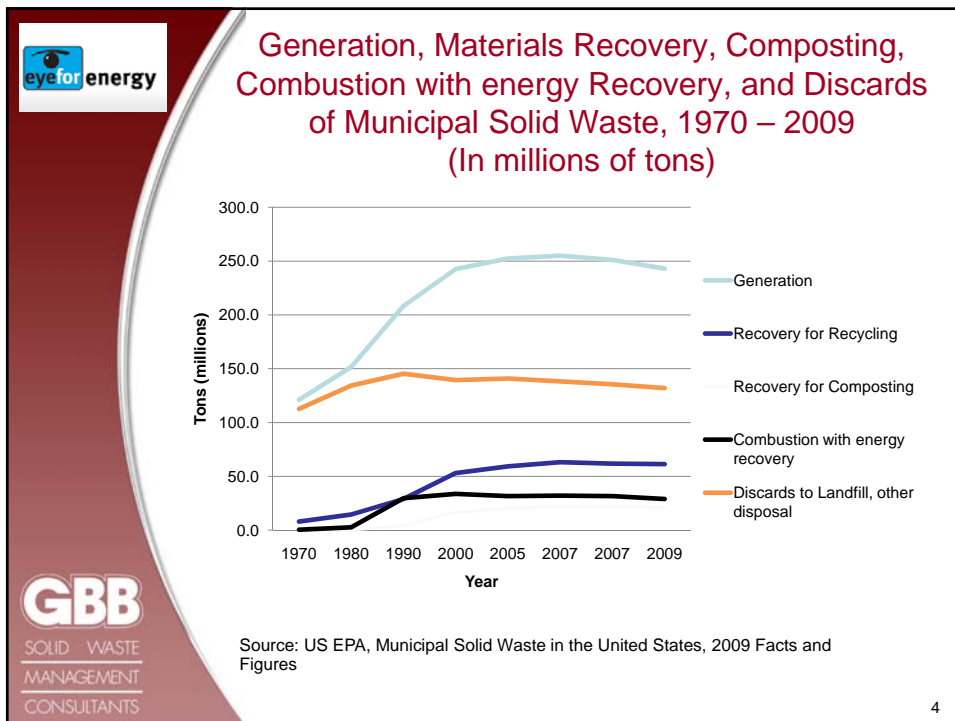




## Evolution of Waste Management 'Recovery' Partnerships Over Time



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## '70s into the '80s


- Early projects publicly owned
- A/E designed and constructed
- Publicly operated
- If energy recovery, steam the primary product
- First public – private partnership, catalyzed by industry
  - Waste Management, Inc. and City of New Orleans
- RCRA passes – 1976
- Federal and private funding to demonstrate materials recovery and pyrolysis technology



Nashville Thermal, 1974




Recovery 1, New Orleans, 1978



Monsanto Baltimore, 1980


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## '80s into the '90s

•Curbside set outs


- Reaction to energy and garbage crises, shifted focus on electricity producing waste-to-energy facilities
- Tax laws for accelerated depreciation, energy tax credits and tax-exempt financing fueled many public-private partnerships for WTE Facilities
- The desire to recycle and fear of air pollution, created impetus for stopping more WTE and created impetus for more recycling
- Many states pass recycling laws



Mobro 1987



BRESCO (Baltimore), 1986



Montgomery County, MD , 1992

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## '90s into 2000

•Value of recyclables

- WTE Facilities stop being implemented
- Carbone decision creates opportunity for remote 'mega' landfills offering very low tipping fees
- Clean Air Act Amendment causes many WTE to close (especially smaller ones) while others are successfully retrofitted to meet more stringent air pollution limits
- Collection and processing efficiencies applied to support sustainable recycling – carts and 'single stream'
- Recycling growth plateaus
- Industry demand for recyclables grows and value increases
- Oneida-Herkimer decision gives flow control for publicly owned facilities





Covanta Alexandria/Arlington  
WTE Facility, 2000



Ontario, CA



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## EPA's Waste Management Policy Changes in 2005

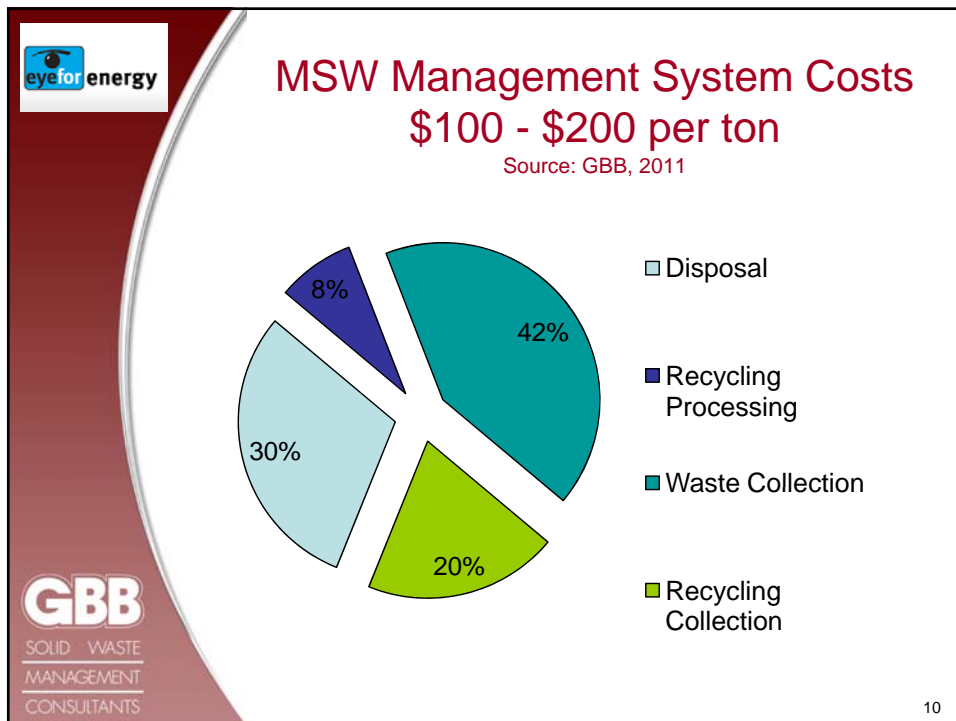
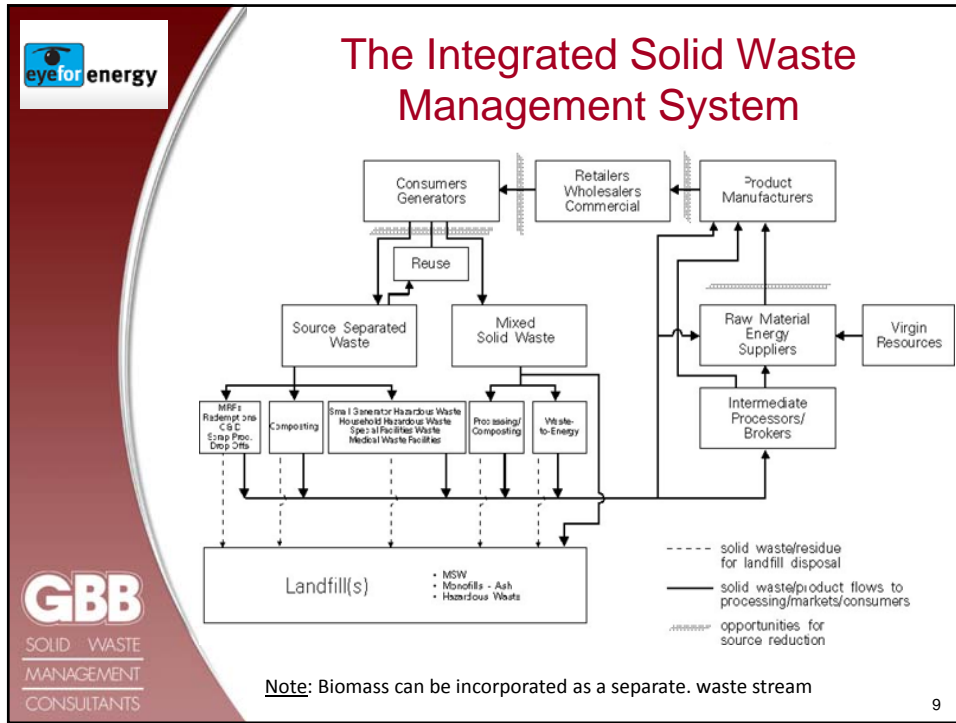
Previous:



- 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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## 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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## Now - 2011







- Several WTE expansions/new projects being undertaken (some 5-7)
- Some 563 (and counting) different companies offering alternative conversion technologies
- Some local governments pursuing proven and/or alternative conversion technologies (some 10-15)
- USDOE and USDA loan/grants supporting several alternative conversion technologies (some 4-6)
- U.S. wants to reduce dependence on foreign oil and reduce greenhouse gases and carbon emissions
- U.S. needs more clean and renewable energy
- Additional Federal legislative incentives 'firmly up in the air'




THE WAY TO ZERO WASTE

for a cleaner world










RECLAIM. RECYCLE. REUSE.



A Waste Management Company

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## Trend for Future

- New technologies will need 4-6 years to learn if they work and their economics
- More mixed waste processing for:
  - Feedstock preparation for many conversion technologies
  - Electric utilities need 20 percent of fuel used to be met with renewable energy efficiency measures by 2020 (10 percent of coal used now equates to 225 million tons RDF per year (more than we could make!))
- 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 too expensive
- Renewable fuel standards from EPA
- 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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## Technology and Developer Offerings

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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, depolymerization, thermal cracking, steam reforming, hydrolysis)

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

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### 58 Conversion Locations Claim to Operate 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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## Risk Factors in Technology Development

- Performance history and size
- Scaling uncertainties
- Environmental impacts
- Siting and permitting needs
- Capital cost uncertainties and resources for covering
- O&M cost uncertainties
- Product market uncertainties
- Process guarantees
- Financial resources of developer/guarantor
- Community acceptance
- Other risks and unknowns

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## Grants and Loans


### Federal

- 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

### States

- California, Mississippi, and Pennsylvania as examples


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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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## Partnership Expectations



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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
- Political Will

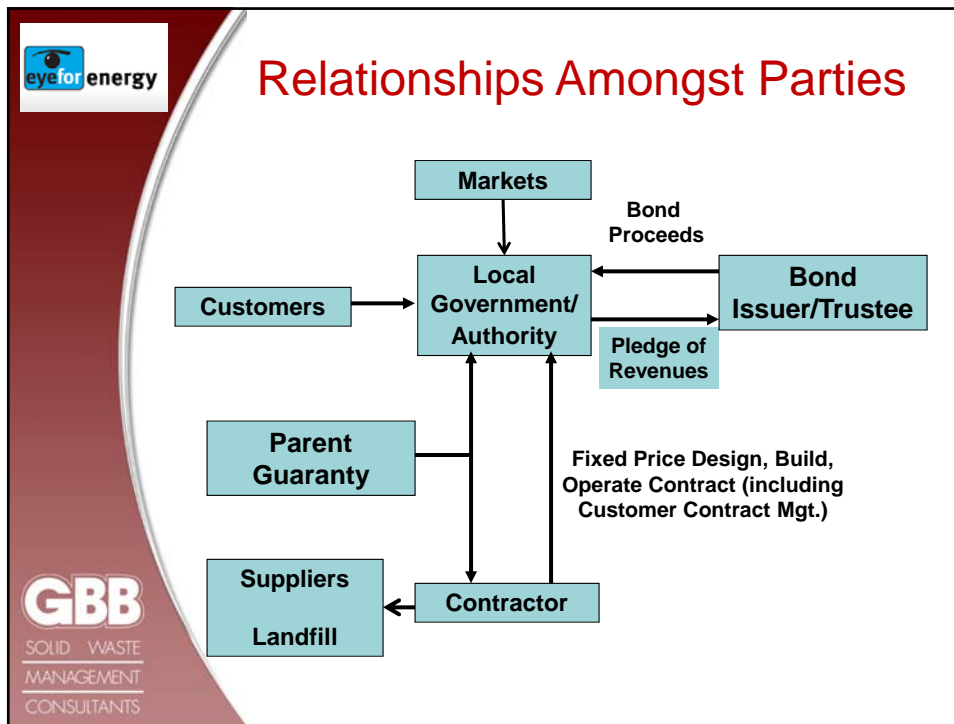
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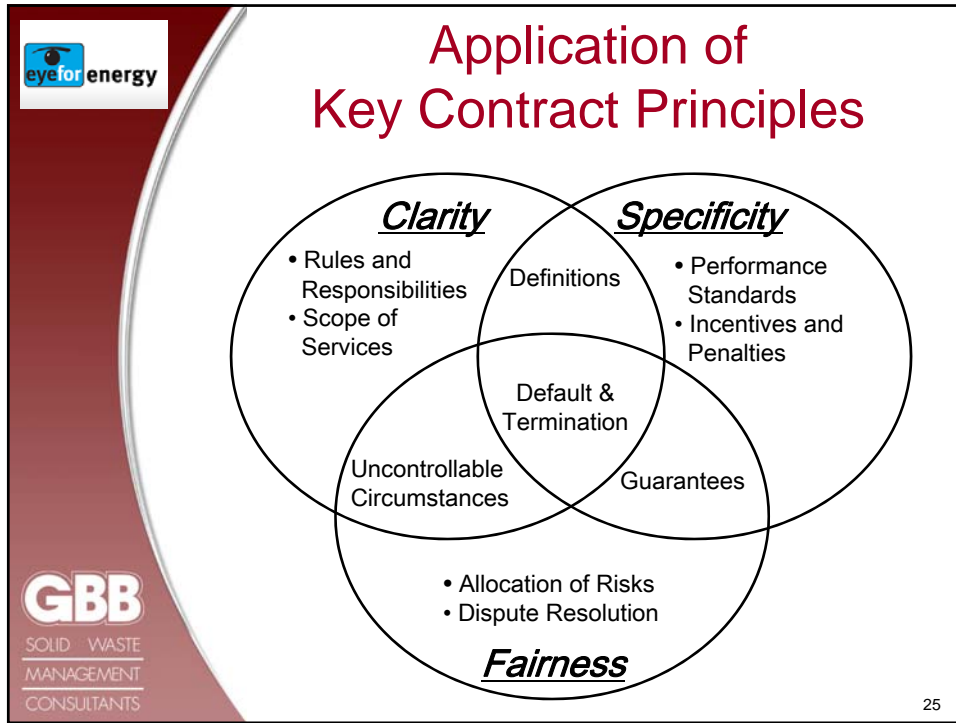
## Financing Facilities: Public Finance

- 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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- The slide, titled "Financing Facilities: Securing Cash Flows", lists the "Rules of the game" for a project service agreement:
- Project service agreement:
    - Rules of the game
      - Roles and responsibilities
      - Scope of services
      - Payment streams
      - Performance requirements/standards
      - Incentives/penalties
      - Risk allocation
- The slide also features logos for "eyefor energy" and "GBB SOLID WASTE MANAGEMENT CONSULTANTS" in the bottom left corner.



**Financing Facilities: Risk Allocation**

Principle: Assign risk to whomever can best manage it.

Private Developer/Owner	Public Users/Communities/Customers
<b>Capital Cost Risks</b>	
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	
<b>Operating Cost Risks</b>	
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
<b>Recovered Product/Tip Fee Income Risks</b>	
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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**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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**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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 **eye for energy**


## 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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## 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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## Some Places Working Toward New Partnerships

- Solid Waste Authority of Palm Beach County, FL
- U.S. Virgin Islands
- Northeast Maryland Waste Disposal Authority: Frederick County and Harford County
- Indian River County, FL
- Lake County, IN
- Los Angeles County, CA (Several locations)
- Three Rivers Solid Waste Management Authority (Pontotoc, MS)
- Salinas Valley Solid Waste Authority (CA)
- City of San Jose, CA
- St. Lucie County, FL
- City of Taunton, MA

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**The Ultimate Goal:**

Fully Integrated and Efficient Waste Management System with Significant Diversion/Recycling and WTE/Conversion  
...in a 50-50 partnership!

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***Thank you!!***

**Harvey Gershman**

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