



Leading Edge Techniques and Technology in Recycling

*Presented December 20, 2012,
to the Maryland Recycling Network by*
Harvey W. Gershman, President
Gershman, Brickner & Bratton, Inc.



Welcome!

Our Moderator:
Peter Houstle - MRN Executive Director

Our Presenter:
Harvey W. Gershman
President - Gershman, Brickner & Bratton, Inc.

Mark Your Calendars:
January 17 – Greening of the Health Care Sector:
Hospital Recycling Programs in Action
June 20-21– MRN/SWANA-Mid-Atlantic Annual
Conference

Admin
Post questions in chat box on right hand side of screen
Recording will be posted on MRN website

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About the Maryland Recycling Network

- **We support the 3 R's throughout Maryland**
"sustainable reduction, reuse and recycling of materials otherwise destined for disposal."
- **Why Join?**
 - Networking
 - Knowledge
 - Business
 - Social
 - Personal
- www.marylandrecyclingnetwork.org





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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
- Instrumental in important financial and political turnarounds that produced success stories for:
 - Northeast Maryland Waste Disposal Authority for City of Baltimore, Baltimore County, and Harford County, MD
 - Town of Babylon, NY
 - Alexandria/Arlington (VA) Waste Disposal Trust Fund
 - Metro Nashville, TN
 - City of Ft. Worth, TX
 - Baton Rouge, LA
- Current Federal Court Receiver for solid waste system of Guam (www.guamsolidwastereceiver.org)
- Past Co-President of the Maryland Recyclers Coalition





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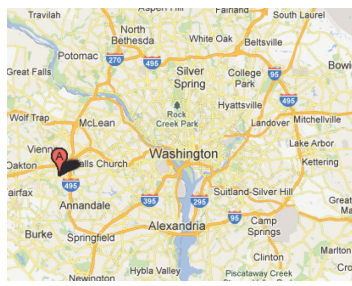


GBB Overview

Established in 1980

Solid Waste and Technology Consultants

Helping Clients Turn Problems into Opportunities


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GBB Clients in Maryland

- Annapolis
- Anne Arundel County
- Attorney General's Office
- Baltimore
- Baltimore County
- Calvert County
- Calvert Trash Service, Inc.
- Caroline County
- Charles County
- Clean Rock Industries
- Columbia County
- CSI Norfolk
- Easton Utilities Commission
- F&E Stokers
- Fort Meade
- Frederick County
- Gaithersburg
- Gatlinburg
- Geosyntec
- Harford County
- Howard County
- Johns Hopkins Medical Center
- Legg Mason Wood Walker, Inc.
- Leimbach Development
- Waste News
- Marriott Corporation



- Maryland Department of the Environment
- Maryland Environmental Service/Lower Shore
- Maryland Environmental Service/Prince George's County
- Maryland Reclamation LLC
- Maryland Recyclers Coalition
- Maryland Recycling Conference
- McCormick and Company
- McGuire, Woods, Battle & Booth
- Mitchell Petersen
- Montgomery County
- Northeast Maryland Waste Disposal Authority (NMWDA)
- Ocean City
- Office Paper Systems, Inc.
- OREG Site Work Services, LLC
- Prince George's County
- Queen Anne's County
- Recycling Inc.
- Reese & Carney, LLP
- Rogers Golden Halprin / NMWDA
- Somerset County


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**RENEWABLE
Energy**
FROM WASTE

INSIDE:
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Fueling Fleets with Plastics.....p. 38

SERVING FUEL AND ENERGY PRODUCERS // SPRING 2012



**A WORKING
MODEL**

Greenwood Energy is producing market-friendly fuel pellets from waste in America's heartland.

www.rewmag.com

Critical Thinking Columns:

The Growing Role of WTE, April 2012


The Whole Truth, Nothing but the Truth, July 2012

That was then....September 2012

...This is now, November 2012




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Today's Outline

- What's going on in the U.S. and Maryland
- What's on the Horizon?
 - Clean and Dirty MRFs
 - Conversion Technologies
 - Mixed MSW
 - Mixed Non-Recyclable Plastics
 - Organics
 - Role of Exports
 - Trends for the future

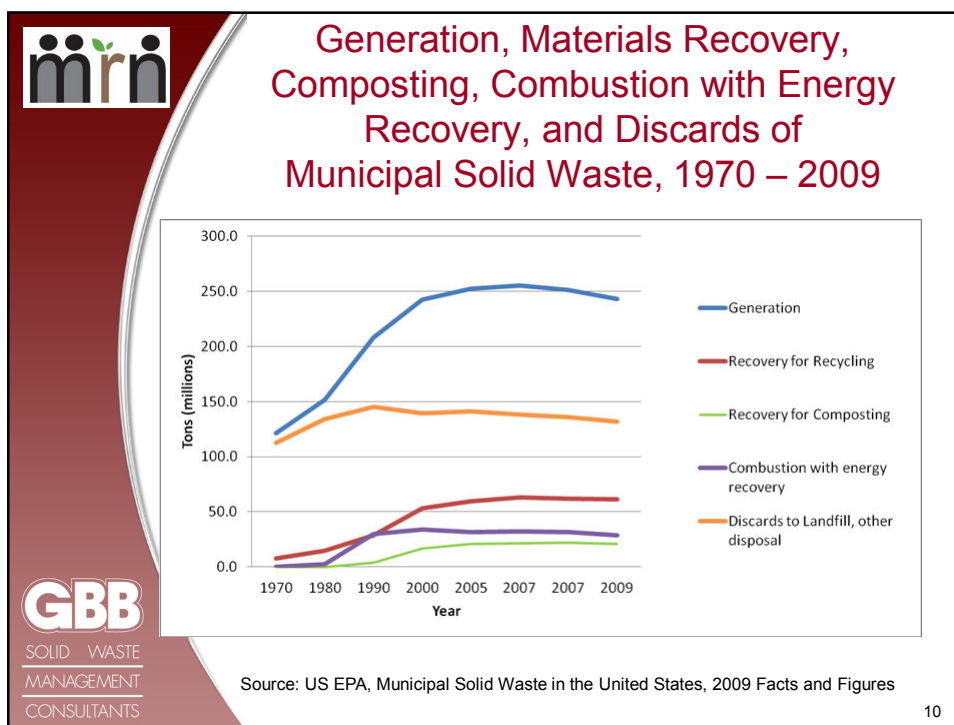


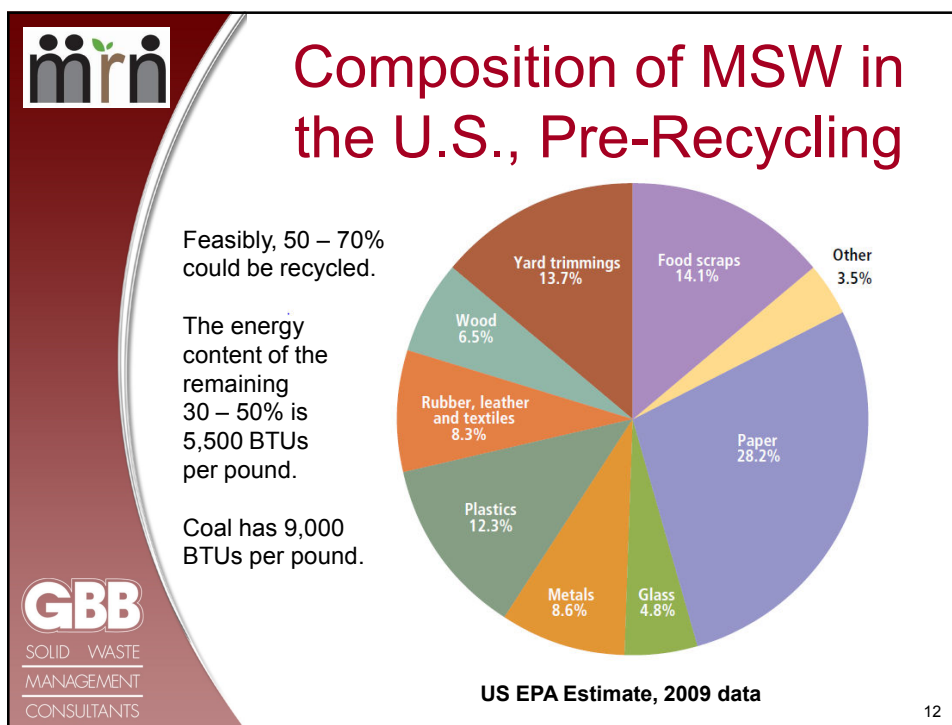
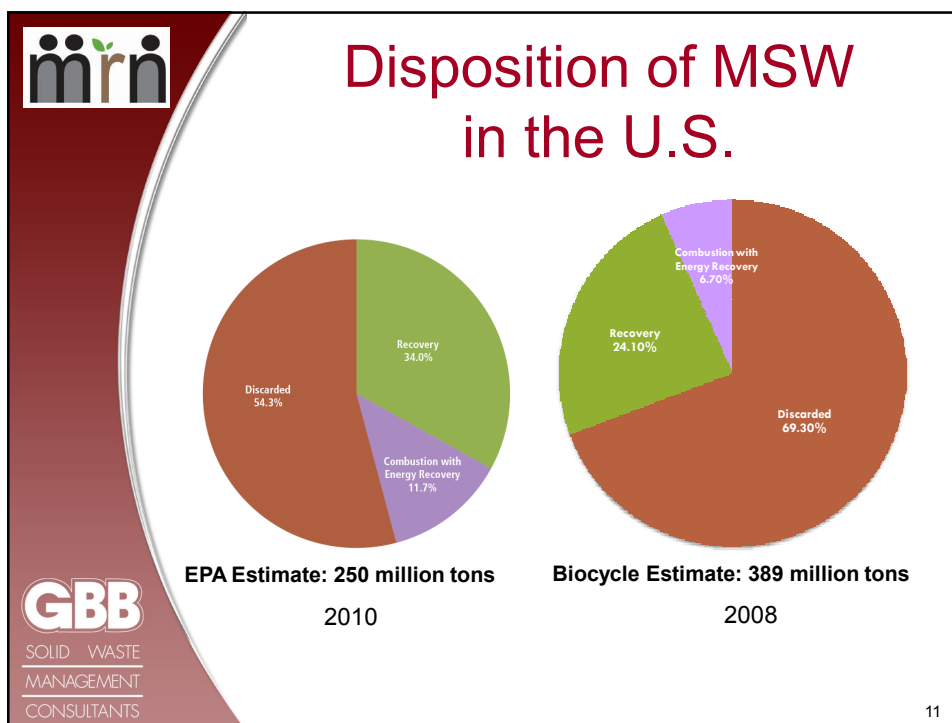
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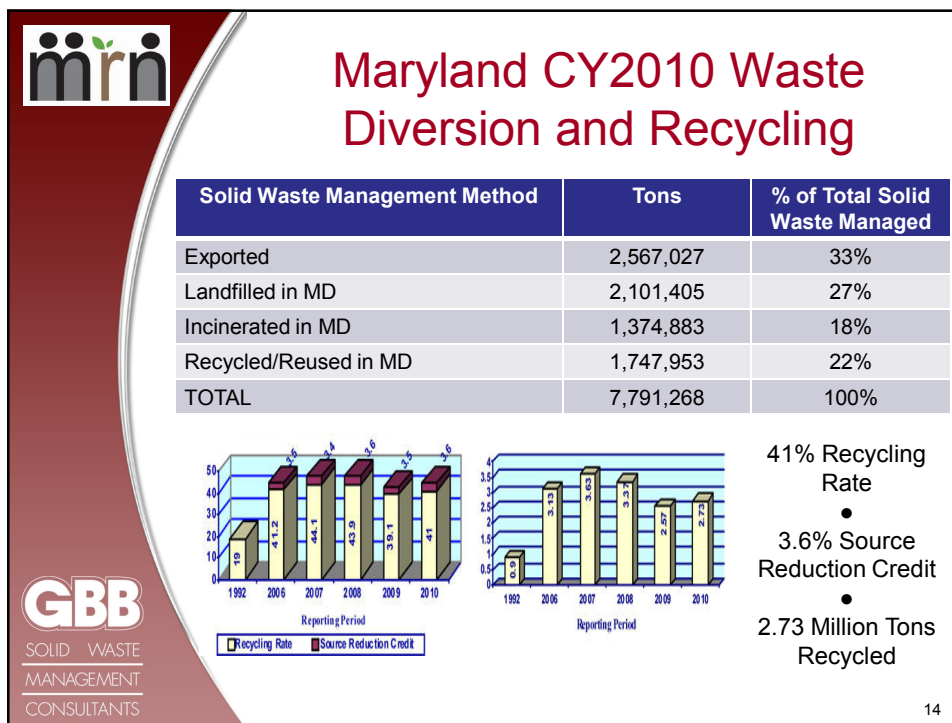
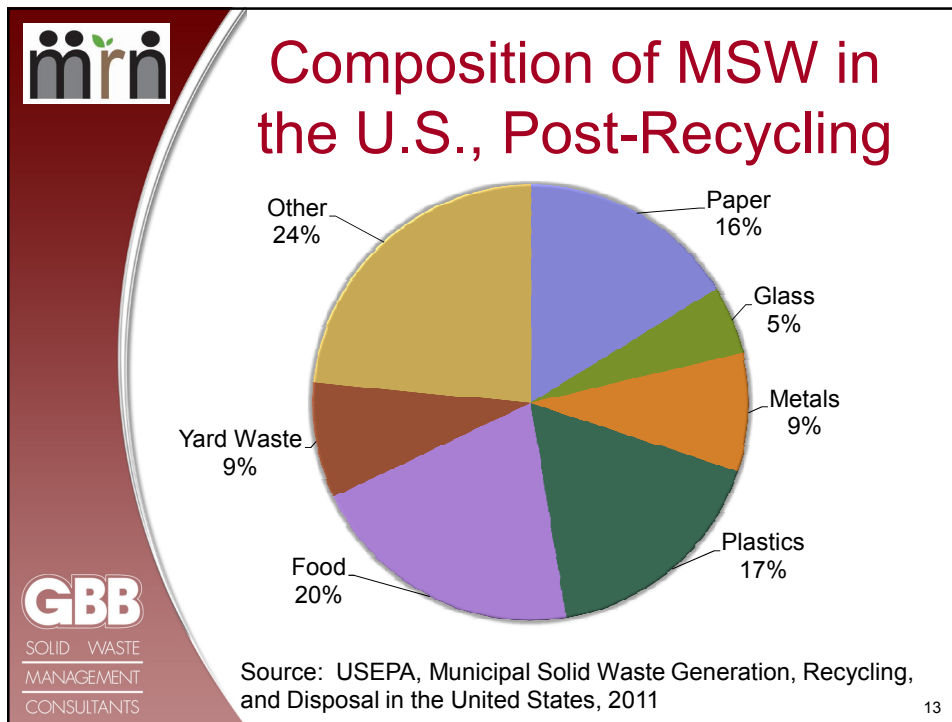
What's going on in the U.S. and in Maryland?

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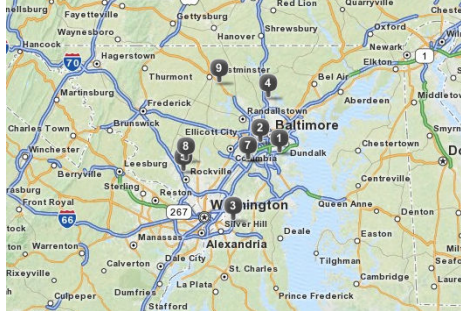








MRFs in Maryland



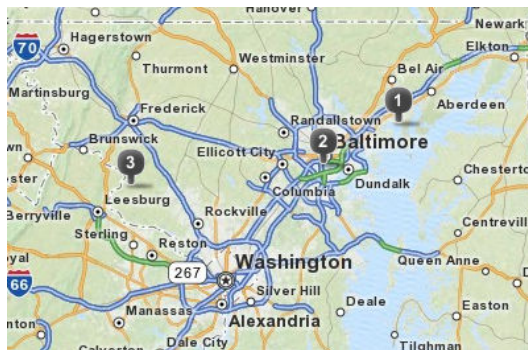
1. BFI Baltimore Processing Center, Baltimore, MD
2. Weyerhaeuser Recycling Services, Baltimore, MD
3. Prince George's County Recycling (Recycle America Alliance), Capital Heights, MD
4. Baltimore County Resource Recovery Facility, Cockeysville, MD
5. Montgomery County Recycling Center, Deerwood, MD
6. Recycle America Alliance-Dry Commercial Waste, Elkridge, MD
7. Recycle America-Single Stream Facility, Elkridge, MD
8. Office Paper Systems, Inc. Fiber MRF, Gaithersburg, MD
9. Carroll County-Northern Landfill Processing Facility, Westminster, MD



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Waste-to-Energy Facilities in Maryland



1. Harford Waste-to-Energy Facility, Joppa, MD
2. Baltimore Refuse Energy Systems Company (BRESKO), Baltimore, MD
3. Montgomery County Resource Recovery Facility, Dickerson, MD



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WTE – What's Coming in Maryland?

- Frederick/Carroll Counties WTE Facility
 - 1,500 TPD
 - MSW from Frederick and Carroll Counties and biosolids from Frederick
 - Through NMWDA; Wheelabrator selected
 - Part of an integrated system with high diversion



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Energy Answers Baltimore, MD




- WTE plant 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 has been delayed due to NIMBY effects in the community

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Renewable Energy at Waste Facilities in Maryland


- NMWDA solar project at Montgomery County Transfer Station
- Howard County New Cut Road Landfill/Worthington Elementary School Solar Energy Project





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What is on the horizon?


Conversion Technologies

Organics

Evolving MRFs

Market Forces





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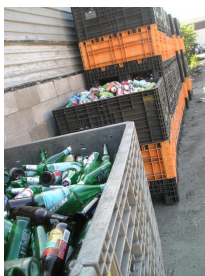
Clean and Dirty MRFs: Separation & Sorting



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Source Separation: Will It Continue?



In the news:
• City of Houston, TX
• City of Portland, OR



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New Materials That Are Going to MRFs

- Plastics
- Plastic bags
- Pouches
- Cartons
- Other composite items
- Rigid plastics
- ...



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Mixed Waste Processing

- Can it *help* recycling, conversion technology, & other waste recovery?
- Can it make waste collection *more efficient* and reduce truck traffic?
- Will it *undo* recycling successes?
- Could mixed-waste processing combined with some states' *permissive regulations* for MRFs let them effectively become transfer stations that aren't inspected?




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What About MRF Residues?

- Will they continue to be a problem?
- Will they find markets?
 - Feedstock for plastics-to-fuels?
- Or will they need to be managed in other processes, as described above?



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Technologies Working Together = Less Waste Landfilled

Mechanical Recycling

Post-consumer source separated recyclables and industrial scrap

Separated at the MRFs and sent to recyclers

New things are made from the recovered materials

Chemical Recycling

MRF residue, mechanically non-recyclable waste (organics, mixed plastics, etc)

Processed at anaerobic digestion, gasification or pyrolysis plants

Fuels and chemicals are produced from the processed materials

Energy Recovery

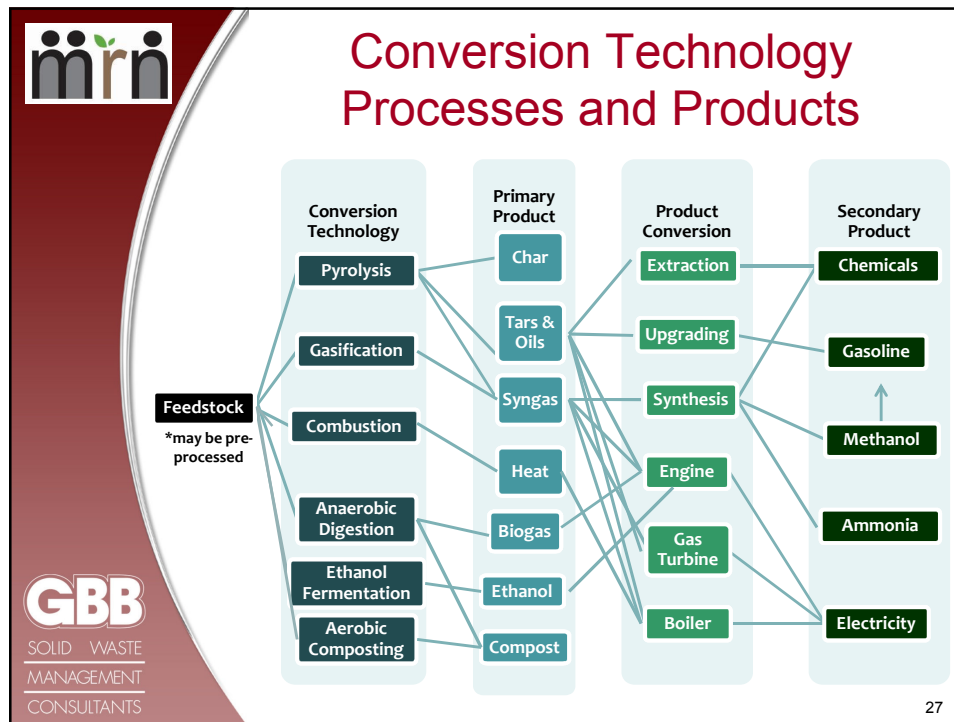
MRF & processing residues, mixed MSW, alternative to disposal

Waste is used as a fuel at Waste-to-Energy plant

Energy is produced from the non-recyclable waste

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Increased Interest in WTE and Conversion Technologies

>591 Technology and/or Project Development Companies Worldwide

150 Commercial or Demonstration Facilities with MSW Worldwide

Contributing factors:

- Renewable energy policy
- Funding
- Local governments desire to be greener
- Waste diversion from landfills
- Local jobs
- Disposal fees increase
- Transportation costs increase

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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 Cleveland, OH
- City of Dallas, TX
- City of Glendale, CA
- City of Los Angeles, CA
- City of Plano, TX
- City of San Antonio, TX
- City of Taunton, MA
- Columbia, SC
- Fulton, MS
- Lake County, IN
- Prince William County, VA
- Salinas Valley, CA
- San Bernardino County, CA
- Storey, NV



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PRINCE WILLIAM COUNTY, VIRGINIA

- Wants to create the Prince William Renewable Energy Park (PWREP) at its landfill (currently receiving 875 TPD MSW)
- Seeking to host a waste conversion technology demonstration facility on the County's landfill or composting sites
- RFP issued to identify qualified technology companies to design, build, finance, own and operate their demonstration
 - Looking for technologies proven at continuous throughputs of 50 to 200 TPD
 - Eligible technologies include pyrolysis, gasification, anaerobic digestion, plasma torch or other conversion method producing a fuel or energy product, such as electricity, syngas, steam, useable heat and/or other industrial outputs
- Issued in June 2012 and proposals received October 17, 2012, and under evaluation.





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Technologies Processing Mixed MSW



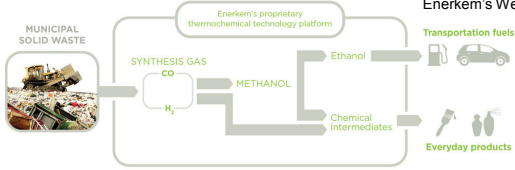

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- Commercial scale demonstration facility in Westbury, CA (since 2009, 1.3 million gallons/year)
- Pilot plant in Sherbrooke, CA (since 2003)
- On going projects on commercial facilities:
 - Edmonton, Alberta- 10 mill gal/year, start-up 2013
 - Pontotoc, Mississippi & Varennes, Québec, each 10 mill gal/year




Enerkem's Westbury facility


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Fiberight High-Solids Pulping

Ethanol fermentation
Feedstock- MSW



- Plants:
 - Demonstration plant in Lawrenceville, VA- opened October 2012
 - Blairstown, IA- 6 mill gal/year, expected to be fully operational in the first half of 2013.
 - Has site control for first commercial-scale biofuel plant in Elkridge, MD
 - 4 plants under development






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TMO Blairstown, Iowa Layout

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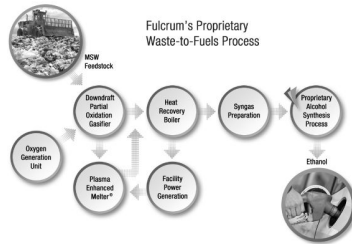





- Sierra BioFuels- commercial plant under construction in City of McCarran, NV
 - 10.5 million gal/year
 - Permitting completed
 - Feedstock and off-take agreements completed
 - USDA \$105 million loan guarantee in August 2012
 - Secured \$175 million for construction as of Nov 2012
 - Construction expected to start in middle of 2013



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InEnTec Technology partner

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- Gasification followed by biocatalyst fermentation and distillation
- MSW to Bioethanol

Indian River BioEnergy Center August 2012

Plants:

- Fayetteville, AR- pilot plant
- Vero Beach, Indian River County, FL- commercial
 - process 150,000 TPA MSW
 - produce 8 million gal/year ethanol and 6 MW (gross) of electric power
- Lake County (IN) Solid Waste Management District- under development

Pilot facility in Fayetteville, AR

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- Gasification followed by plasma torches to refine the syngas product
- Plants:
 - Commercial-scale demonstrational, 94 TPD- Train Road, Ottawa, CA
 - R&D, 5TPD, Castellgali, Spain
- Signed a deal with the City of Ottawa to process 109,500 t/year of the city MSW, December 2012
- Selected by the Salinas Valley Solid Waste Authority (CA) & Shortlisted in Santa Barbara, CA
- Other plans to build facilities in Canada and China

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Additional Gasification Technologies



















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Technologies Processing Mixed Non-Recyclable Plastics









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Technologies Processing Mixed Non-recyclable Plastics


Company	Technology	Product	Status	Featured plants in N. America	No. of commercial plants
	Pyrolysis	Crude oil & combustible gas	commercial	Demo: Tigard, OR, 10 TPD Commercial: Hennepin County, MN Under development: Manatee County, FL	1
	Microwave Pyrolysis	Crude wax & combustible gas	demo	Under construction: Blackville, SC 20 TPD	1 under construction
 <small>ALPHAKAT</small>	Catalytic Pyrolysis	Diesel Fuel	commercial	R&D at SEMASS WTE, Rochester, MA	5
	Far Infrared Pyrolysis	Crude oil & combustible gas	demo	Demo: Montgomery County, MD, closed 2011	N/A
	Catalytic Pyrolysis	Crude oil & combustible gas	Pilot	Pilot: Niagara Falls, NY (45TPD)	none
	Pyrolysis	Crude oil & combustible gas	Pilot	Pilot: Akron, Ohio	none

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Technologies Processing Organics



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CR&R Inc. – Perris, CA



- Selected in Los Angeles County
- 150 TPD from CR&R dirty-MRF,
- DRANCO anaerobic digestion system;
- Convert the biogas generated into biomethane for their truck fleet
- \$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 AD plant in Hotaka, Japan



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EISENMANN

- Wet anaerobic digestion technology
- Product: biogas, compost
- Plants:
 - Partnership with W2e Organic Power
 - *Columbia, SC*- commercial scale prototype under construction
 - 48,000 tons per year; 3.2 MW
 - Start-up expected 2012
 - *Gastonia, NC & Baton Rouge, LA*- under development
 - Chicago, IL- part of “the Plant” project
 - 5,000 tons per year capacity



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Harvest Power

- Anaerobic digestion and composting
- Product; biogas, electricity and compost
- Plants:
 - >10 composting plants
 - Anaerobic plants under construction: London, ON & Richmond, BC

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Quasar Energy Group

quasar's F825 system in Zanesville, Ohio

- Anaerobic digestion
- Product; Compressed natural gas, soil conditioner
- 5 commercial operating plant in Ohio

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Zero Waste Energy LLC



- Kompoferm Dry anaerobic digestion system
- Plants:
 - San Jose, CA- 270,000 TPY, operations beginning April-May, 2013
 - Marina- Monterey, CA- 5,000 TPY SmartFerm system (under development)
 - South San Francisco Scavengers- 9,000 TPY (under development)



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Technologies Processing Organic Waste



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Opinion of Trends for the Future...

- New technologies will need 3-5 years to learn if they work and their economics (permits, financing, construction and initial operating time)
- *Will there be any economic benefit of placing value on carbon credits and power from waste as 'renewable energy'?*
- Continuation of public sector taking "Low Risk" attitude until conversion technologies and companies more proven

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Opinion of Trends for Future (Continued)

- Continued recycling industry demand for more paper, aluminum, and plastics
- More mixed waste processing
 - Added recycling side-benefit
 - Most conversion technologies require pre-processing for feedstock preparation
 - 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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Questions?



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Mark Your Calendar!

- **January 17** – Greening of the Health Care Sector: Hospital Recycling Programs in Action
- **June 20-21**– MRN/SWANA-Mid-Atlantic Annual Conference



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Thank you!!

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