

**Emerging Technologies:
Overview and Peek Into the Future**

Presented by:
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Virginia Recycling Association and
SWANA Old Dominion Chapter

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- Chris has 30 years of experience (9 years in the governmental regulatory sector)
- Waste management experience both regulated and regulatory sides ranging from field investigations (design, environmental, operations, groundwater, surface water) and planning to final design, permitting, procurement, construction management, and operations.
- Has worked in Virginia, Maryland, Ohio, California, Nevada, Louisiana, Utah, Texas, Caribbean Islands, Western Pacific Islands, and Guam on solid waste management projects.
- Provides senior level project management, development/review to improve deliverables, quality control, and project execution across a range services offered by our team.

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Gershman, Brickner & Bratton, Inc.

Innovative, Sustainable Solutions for Solid Waste Management

GBB Vision

*A **world** where discarded materials are used as resources rather than wasted*



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We All Know Recycling is Challenging Now

Challenges facing Virginia's Recyclables Market:

- Pressure on MRF operators and waste haulers to increase quality of recyclables
- Downward pressure on commodity prices
- Oversupply of regional recyclables markets
- Higher prices in Municipal Recycling Contracts

But there are Opportunities as well



May 28, 2020

The Honorable Ralph Northam
Governor of the Commonwealth of Virginia
1111 E Broad Street
Richmond, VA 23219

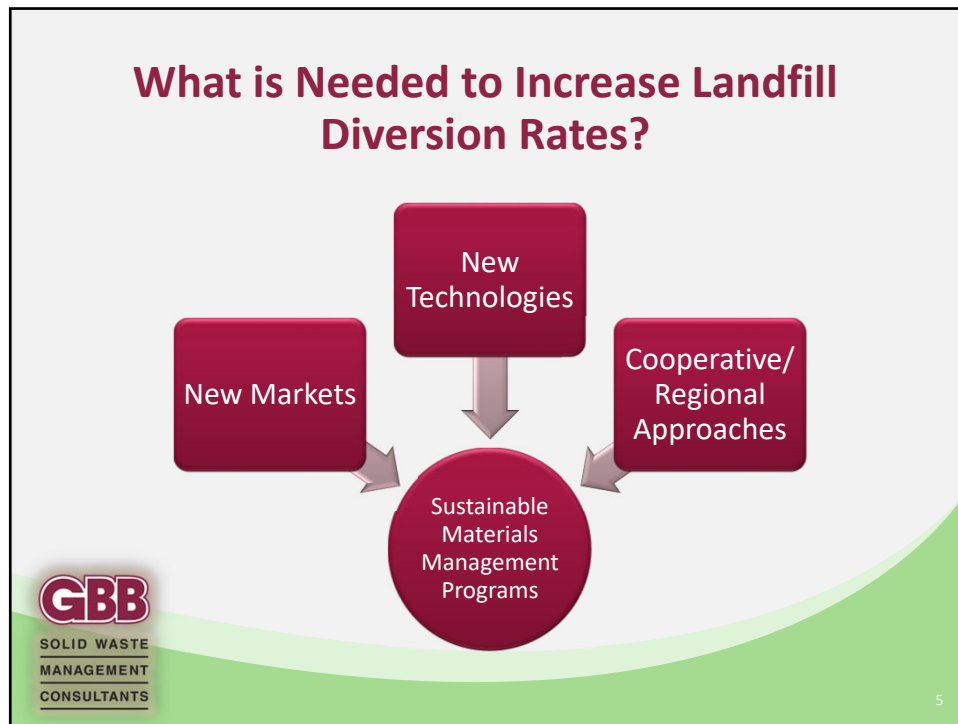
Dear Governor Northam:

I am the current Chair of the Board of Directors of the Southeastern Public Service Authority of Virginia (SPSA), the political subdivision charged by the Code of Virginia to manage the safe and environmentally sound disposal of waste for the cities of Chesapeake, Franklin, Norfolk, Portsmouth, Suffolk, and Virginia Beach, and the counties of Isle of Wight and Southampton. I am writing to inform and to seek your guidance in a matter of great environmental and economic importance to the region.

Source: City of Chesapeake with permission.



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A New Class of Waste Conversion Facilities Started Commercial Operation in 2019/2020

| | |
|-------------------------------|--|
| Entsorga West Virginia | <ul style="list-style-type: none">• This facility began commercial operations in May 2019 in Martinsburg, WV. It is located on a closed landfill site and produces a solid fuel for a local cement manufacturing facility. |
| RePower South | <ul style="list-style-type: none">• This facility is in Monks Corner, SC and began operations in 2019. Two facilities create renewable fuel products for use as a coal substitute. |
| WIWMD | <ul style="list-style-type: none">• This facility is located in Layton, Utah. In June 2020, they began operation of a new facility processing up to 100,000 tons per year of MSW |

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Conversion Technology Overview: Mechanical-Biological Treatment

- Mechanical-Biological Treatment Technology (MBT) encompasses a **broad array of technologies which use mechanical and biological processes** which essentially includes a 'curing' process to stabilize organic material, prior to processing for recovery of recyclables and creation of an Engineered Fuel, or other potential material products for sale.
- MBT facilities are **widely adopted in the European Union** where they recover recyclables and produce **Solid Recovered Fuel (SRF)** (ie – Engineered Fuel in the US terminology) which may be used as a substitute for coal.
- Large industrial firms, such as cement manufacturers and power producers utilize SRF as a component of their corporate sustainability plans.



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Conversion Technology Overview: Entsorga West Virginia - Martinsburg, WV

Facility

- **Processing Capacity Max:**
~ 500 TPD of MSW
- **Recoveries:** Metals
- **Product:** Engineered Fuel (EF)

Economics

- **Investment:** \$50 million
- **Tipping fees:** ~ \$50 per ton



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Conversion Technology Overview: RePower South - Moncks Corner, SC

Facility

- **Processing Capacity Max:** ~ 600 TPD of Mixed Waste
- **Recoveries:** Traditional Recyclables (Plastics, Metals, OCCs)
- **Product:** ReEngineered Feedstock Fuel (ReEF)

Economics

- **Investment:** ~ \$55 million project
- **Tipping fees:** \$38 per ton



Sources: Investor Webinar - "RePower South Berkeley LLC Berkeley County, South Carolina MRRF Facility"

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Conversion Technology Overview: Wasatch Integrated Waste Management District Layton, UT

Facility

- **Processing Capacity:** ~ 280 TPD of Mixed Waste (1 Shift) – 100 TPD Single Stream Recyclables (1 Day)
- **Recoveries:** Traditional Recyclables (Plastics, Metals, OCCs)

Economics

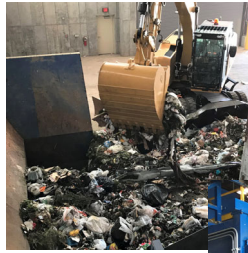
- **Investment:** ~ \$20 million project
- **Tipping fees:** \$32 per ton



<https://www.wasatchintegrated.org/>

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Conversion Technology Overview: Wasatch Integrated Waste Management Division Layton, UT

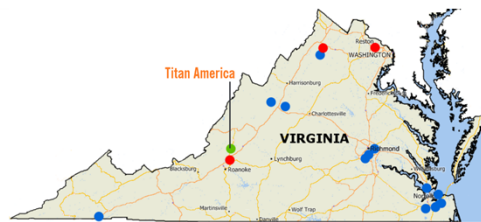


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Conversion Technology Overview: Cement Kilns in Virginia



| | Virginia | | National |
|---|-------------|------------------|----------------|
| | Cement | Cement & Related | Cement |
| Employees | 168 | 4,774 | 13,190 |
| Payroll (\$) | 13,673,804 | 220,517,149 | 848,203,728 |
| Contribution to State Taxes Revenues (\$) | 2,228,716 | 63,389,425 | 181,191,344 |
| Economic Contribution (\$) | 276,065,571 | 2,684,025,602 | 19,293,119,956 |



- Offices - 3
 - Plants - 1
 - Terminals - 12
- A red dot indicates the location of a cement sales office or headquarters.
 - A green dot indicates the location of a plant producing portland cement.
 - A blue dot indicates the location of cement distribution terminals and silos.



Graphic adopted from Portland Cement Association

Source: www.cement.org/docs/default-source/ga-pdfs/cement-industry-by-state-2015/florida.pdf?sfvrsn=2&sfvrsn=2

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Recovered Material End Market Examples: Georgia-Pacific (GP), LLC Toledo, OR (start up 2021)

Process

- Juno Technology

Application

- Recycling technology at GP mill that recovers fibers mixed waste to make paper-based products.

GP Paper Mills in Virginia:

- Big Island – Container Board
- Gladys Brookneal - OSB
- Emporia – Plywood
- Ridgeway Martinsville - Corrugated

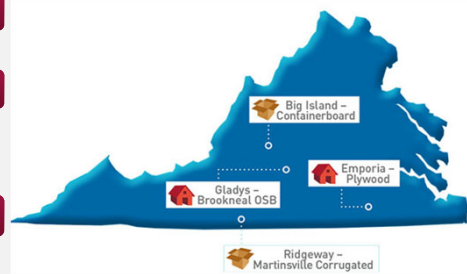


Image courtesy of Georgia Pacific (GP)



Source: GP to install new recycling technology at Oregon mill. July 11, 2018. Recycling Today. Retrieved from: www.recyclingtoday.com/article/georgia-pacific-mixed-paper-mill-opens-recycling-oregon/

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Recovered Material End Market Examples: AeroAggregates - Eddystone, PA

Feedstock

- MRF glass

Process

- Ultra-Lightweight Foamed Glass Aggregates (ULF)

Application

- Foaming waste glass used for durable construction material



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Recovered Material End Market Examples: Continuous Material Recovery, LLC – Philadelphia, PA

Feedstock

- Mixed paper
- Non recyclable plastics

Process

- Continuous EVERBOARD™ Roof Cover Board

Application

- Building materials created from recovered mixed paper and plastic



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A Regional Approach: Sustainable Business Parks

Known by several names:

- Resource Recovery Parks,
- Eco-Industrial Parks (Eco Parks)
- In academic circles: Industrial Symbiosis or Industrial Ecosystem

Key Characteristics:

- Business plan that creates a campus where companies/industries are next to solid waste processing facilities
- Facilities use each other's byproducts as inputs



Image courtesy of Kent County Department of Public Works



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KEY Points

- Emerging and Advancing Tech generating greater diversion from landfills, greater material recovery for end market users
- New Markets for the recovered material need to be sought out and strategically developed
- Achieving these goals are realized through taking advantage of economies of scale and acting through Regional Cooperation



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Thank you!



1980-2020

*40 years
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