Advancing a More Circular Economy and the Reinvention of the Waste-to-Energy Industry through Sustainable Business Park Development

Tom Reardon, Senior Vice President
Jennifer Porter, Senior Project Manager
Gershman, Brickner & Bratton, Inc.

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Gershman, Brickner & Bratton, Inc.
Solid Waste Management Consulting

- 38+ years national consultant
- Focused exclusively on solid waste issues
- Works in partnership with clients to develop innovative, cost-effective approaches that achieve measurable results
- Thinks outside of the box
- Tells it like it is – independent objective advisor
- Significant consulting resources
- Client success stories
GBB’s Wide Range of Relevant Expertise

Focused exclusively on solid waste issues, GBB offers a depth of experience that sets us apart from other consultants and not available from brokerage firms. Some key GBB areas of expertise include:

- Solid Waste Master Plans
- Recycling / Diversion Plans
- Waste Conversion Technologies
- Waste Stream Analysis
- Feasibility Studies
- Stakeholder Outreach
- Materials Recovery Facilities
- Organics
The Circular Economy:

A ZERO WASTE EVOLUTION

Current Model: The Linear Economy

NATURAL RESOURCES  TAKE  MAKE  DISPOSE

WASTE  WASTE  WASTE

Image courtesy of the European Commission
A Circular Economy:

- Is a systemic shift from our current linear model that builds long-term resilience
- Restores and rebuilds economic, environmental and social systems
- Aims to decouple material and resource consumption from economic growth
- Seeks to keep resources within a flow of reuse, regeneration, and recycling
Three principle foundations:

- **Design Out Waste and Pollution**
  - Eliminate negative externalities of economic activity

- **Keep Products and Materials in Use**
  - The Re-Service Economy

- **Regenerate Natural Systems**
  - Favors renewable resources and limitation of finite resource use

The Circular Economy Transition

- **Linear economy**
  - Raw materials
  - Production
  - Use
  - Non-recyclable waste

- **Reuse economy**
  - Raw materials
  - Production
  - Use
  - Recycling
  - Non-recyclable waste

- **Circular economy**
  - Raw materials
  - Production
  - Use
  - Recycling
  - Non-recyclable waste

Image courtesy of the Government of the Netherlands
The Zero Waste Hierarchy

- Reduce and conserve materials
  (refuse, repair, reduce toxins, design out waste, reduce consumption and packaging)
- Encourage cyclical use of resources and shift incentives to stop wasting
- Manufacturers design products for sustainability and take-back
- Reuse
  (retain value & function)
- Recycle
  Inorganics
  Organics
- Regulate disposal
  Traditional Waste-to-Energy (if environmentally permissible)
  Last Resort: Sanitary Landfill
- Unacceptable: Unregulated Disposal

Graphic adapted from Zero Waste Montenegro

The CE: Designing out Waste

Image courtesy of the Great Recovery Project by the Royal Society for the Arts
The big idea of the circular economy:

Waste = “Food”
(for the production cycle)

The Circular Economy:

THE ENVIRONMENTAL & ECONOMIC BENEFITS
What’s the big deal?

Environmental Benefits
- Preserves resources
- Minimizes waste
- Curbs greenhouse gas emissions
- Increases resilience to climate change and resource scarcity

Economic Benefits
- Creates jobs
- Adds economic value
- Better connects materials processors with manufacturers
- Increases local economic resilience

A 2030 Projection for the U.S.

<table>
<thead>
<tr>
<th>2008 Baseline (34% waste diversion)</th>
<th>Current Trajectory (41% waste diversion by 2030)</th>
<th>Green Economy (75% waste diversion by 2030)</th>
</tr>
</thead>
<tbody>
<tr>
<td>• 861,000 jobs</td>
<td>• 1.23 mil jobs</td>
<td>• 2.35 mil jobs</td>
</tr>
<tr>
<td>• 501 million tons GHG emissions annually</td>
<td>• 572 million tons GHG emissions annually</td>
<td>• 405 million tons GHG emissions annually</td>
</tr>
<tr>
<td></td>
<td>• Increase of 71 million tons over 2008 levels, or nearly <strong>15% more</strong></td>
<td>• Decrease of 96 million tons over 2008 levels, or nearly <strong>20% less</strong></td>
</tr>
</tbody>
</table>

Source: www.nrdc.org/sites/default/files/glo_11111401a_0.pdf

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A 2030 Projection for the EU

- **32% Reduction**
  - Materials and resources consumption (or €600 billion annual savings) [$680 billion]
- **48% Reduction**
  - CO2 emissions
- **25% Reduction**
  - Spending on externalities (mitigation of emissions, pollution, congestion) (€500 billion annual savings) [$565 billion]
- **20% Reduction**
  - Spending on food, mobility, and housing (€700 billion annual savings) [$792 billion]
- **€1.8 trillion**
- **€3,000 Increase**
  - Annual benefits / savings [$2.04 trillion]
  - Average household income [$3,395]


The Importance for Local Governments

- 50% of world population lives in cities
  - 70% expected by 2050
- Cities generate 85% of global GDP
  - Consuming 50% of world’s resources to do so
- City resource use expected to double by 2050
- 2012: Global generation of 1.3 billion tons solid waste
  - Cost $205 billion to manage
- 2016: 2.01 billion tons solid waste generated
- 2050: Global waste generation expected to rise 70% to 3.4 billion tons/year

EXAMPLES IN PRACTICE

Kent County Sustainable Business Park (Michigan)
Prince William County Eco-Park (Virginia)
Current Site Plan

Instead of using these 200 acres for future landfill, County developing Sustainable Business Park that:

- Lays the **critical infrastructure** to support a regional circular economy
- Leverages **private sector development**
- **Attracts business** to localize the entire recycling or conversion process
- Preserves **open space**
- Expands **research**
- Generates and uses **renewable energy**
- Begins to **close the loop** in West Michigan

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Kent County SBP Master Plan

1. **Stakeholder Meetings and Facility Tours**
2. **Existing Condition Analysis (Local A&E on team)**
3. **Waste Stream and Market Analysis**
4. **Funding Sources**
5. **Technology Overview & Analysis**
6. **Put out RFI and Evaluate Results of the RFI**
7. **Conceptual Site Development Plan**
8. **Conclusions & Recommendations**
Stakeholder Meetings

**Held November 2017 in Grand Rapids**

**Participants included:**
- Business/economic development
- Haulers
- Regional Manufacturers
- Municipal Officials
- Environmental Groups

**Maintain engagement throughout process**

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Facility Tours

**Team of County representatives visited several advanced waste processing facilities**

**San Jose, California in March 2018**
- California leader in implementation of policies, programs and technologies that promote recovery and recycling of discarded materials and diversion of waste away from disposal in landfills.

**Over a two-and-half day period, the County team visited six material processing facilities**

**Facilities included publicly and privately-owned systems processing:**
- Residential and commercial single stream recyclables
- Mixed MSW
- Yard waste
- Source separated organics
- Construction and demolition waste
- Product reuse center
Facility Locations

Request for Information

Purpose to identify

• Active technology/equipment suppliers
• Project developers
• Technology developers
• Endmarket users

Interested in developing a project and advancing DPW’s economic and environmental goals

• Design
• Build
• Finance
• Own
• Operate

Sought information and qualifications from companies who present innovative

• Waste processing technologies
• Waste conversion technologies
• Other beneficial technologies
## Desired Offerings Matrix

<table>
<thead>
<tr>
<th>Technology Status</th>
<th>Large scale</th>
<th>Medium scale</th>
<th>Small scale</th>
</tr>
</thead>
<tbody>
<tr>
<td>Commercially-Proven</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Commercially-Demonstrated</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Pilot</td>
<td></td>
<td>X</td>
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Kent County: ReImagine Trash

What we throw away in West Michigan:

- 35% Garbage
- 21% Glass
- 15% Paper
- 14% Metal
- 4% Plastic
- 2% Yard Waste

What the trash we throw away is worth:

- Plastic: $20,270,206
- Metal: $15,057,855
- Paper: $11,702,116
- Textiles: $3,156,177
- Yard waste: $1,841,995

Image courtesy of Kent County

Prince William County Eco-Park

Integrating Green energy, STEM education, research & economic opportunity
The Buzz: Eco Park Complex
introductory video

Prince William County Eco-Park

- Explored renewable energy technologies available for use on landfill
- Technical and economic feasibility study
- Developed implementation options
- Solar / wind project procurement
- Waste conversion project procurement
- Procurement of organic waste processing facility
New state-of-the-art organics waste processing facility:
Thomas Smith, Prince William County Solid Waste Division Chief,
at the groundbreaking ceremony in December 2018.

RECOMMENDATIONS FOR INCENTIVIZING A LOCAL CIRCULAR ECONOMY
Develop a plan

Engage all stakeholders

Educate

Perform a waste characterization study

Streamline existing regulations & standards

Identify & incentivize the waste hierarchy

Practice sustainable (and local) purchasing

Regulate private sector production and consumption

Create and leverage partnerships

Invest in infrastructure and technology

Use funding creatively

Pilot new programs
Summary Circular Economy To Do List

Public-Sector Entities

- Name vision and rally others for paradigm shift
- Secure points of influence (facilities or waste flows)
- Know waste stream
- Evaluate appropriate technology for community
- Find site
- Financial Incentives

Technology Developers

- Find partner communities ready for paradigm shift
- Know the biggest problem
- Seek joint proposals with manufacturing/end user partner to solve problem(s)

Thank you!

For more information:

**Tom Reardon**  
GBB Senior Vice President  
(703) 573-5800 / treardon@gbbinc.com

**Jennifer Porter**  
GBB Senior Project Manager  
(347) 979-4992 / jporter@gbbinc.com

www.gbbinc.com