Conceptual

WASTE MANAGEMENT

April 20, 2017
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AGENDA

- Waste Management Situation
- Project Goals
- Benefits of P3
- Precedents
- Project Formulation
WASTE MANAGEMENT IN PUERTO RICO

Challenges in Waste Management System

- Puerto Rico generates larger waste amounts than comparable world locations.
- Low recycling rate.
- Low or non reduction measures

Landfill dependency

- Low or non compliance on some of the landfills
CURRENT SITUATION

Violations
* Compliance with design criteria like leachate collection systems, run on and run controls
* Compliance with operation requirements

Upcoming landfill closing
* 29 Active landfill sites (SRS), many beyond useful life
* 13 under agreement with EPA, most with closure plans

Uniform policy
* Lack of interagency coordination
* Need of a new Public Policy based in best practices

Lack of accurate information
* Hidden costs of operation/non-compliance
* Costs of not recycling (Avoided cost)
* Hauling real costs
WASTE MANAGEMENT IN PUERTO RICO

- Open Landfill
- Closed Landfill with EPA Consent Orders
- Landfill with EPA Consent Orders
- Landfill with EPA Consent Decree
METRICS AND TRADITIONAL WASTE HIERARCHY

- **Landfill**: 86.23%
- **Diversion**: 4.11%
- **Recycle**: 9.66%
## Priorities for Sustainable Material Management Efforts

<table>
<thead>
<tr>
<th>Category</th>
<th>Description</th>
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<tbody>
<tr>
<td><strong>Refuse</strong></td>
<td>Material and Resource Avoidance</td>
</tr>
<tr>
<td><strong>Source Reduction</strong></td>
<td>Reduce Amount and Toxicity of Materials Used in Manufacture</td>
</tr>
<tr>
<td><strong>Redesign</strong></td>
<td>Design for Reuse, Repair and Recycling</td>
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<tr>
<td><strong>Market Development</strong></td>
<td>Develop Infrastructure for Reusable and Recyclable Materials</td>
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<tr>
<td><strong>Consumer Behavior</strong></td>
<td>Reduce Consumption and Buy Reused, Recycled and Compostable Products</td>
</tr>
<tr>
<td><strong>Waste Prevention</strong></td>
<td>Reduce Amount and Toxicity of Materials Used by Consumers</td>
</tr>
<tr>
<td><strong>Reuse</strong></td>
<td>Used, Reusable, Repair, Repurpose, Upcycle</td>
</tr>
<tr>
<td><strong>Recycle</strong></td>
<td>Commodity Recycling, Organics Recycling/Composting</td>
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<tr>
<td><strong>Downcycling</strong></td>
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Source: National Recycling Coalition, September 30, 2015
LINEAL ECONOMY
CIRCULAR ECONOMY
WASTE MANAGEMENT PROCESS

Landfill Waste Process

Municipal or Private Collection → Transfer Station → Landfill

Recyclables

Single Stream Curbside Collection or Drop-Offs → Recycling Centers or Clean Material Recovery Facilities → Export or Manufacture (New Products)
GOALS

Move into a post-landfill era
- Promote sustainable material management
- Bring landfill sites to environmental compliance

Reduce volume of solid waste
- Promote “reduce and reuse” strategies
- Optimize Recycling
- Promote energy recovery

Provide a feasible financial model
- Add transparency to current waste management expenses
- Promote technology and infrastructure investment
- Centralization of services
- Risk consolidation
PRIVATE PARTICIPATION

Advantages

1. Performance based metrics established
2. Precedents already in place
3. Private entities have proven to operate more efficient recycling operations
4. Security/Safety
5. Vessels
PRECEDEBT: SOME LANDFILLS
PRECEDENT: GUAYNABO, PUERTO RICO

P3 Agreement with Guaynabo Municipality and Guaynabo Recycling, Inc. transferring waste management risks:

- Processing
- Recycling
- Transporting
- Exporting
OPPORTUNITY: DIVERSIFIED SYSTEM

Landfills

Energy Recovery

Recycling

Others
ALTERNATIVE PROJECTS

- 200 Tons/ day Clean Material Recovery Facility (South)
- 150 Tons/day Composting facility (South, could include gasification)
- 200 Tons/ day Clean Material Recovery Facility (North)
- 150 Tons/day Composting facility (North, could include gasification)
CONCLUSION

Puerto Rico needs to move to the post-fill era and reduce volume of solid waste.

P3’s provide alternative financial methods for innovative waste management projects.

Viability is based on diversity and consolidation of the process.

P3 project’s formulation is focused on optimizing operations and maintenance.
Thank You

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