Overview

- WTE Overview
- Market Conditions for WTE
- Overview of WTE Economics
- Specific Policy Opportunities
  - REC — TAX — GHG — SOLID WASTE — ASH
- Potential Impact of Specific Policies on Bottom Line
- Conclusions
2/27/2014

WASTE-TO-ENERGY OVERVIEW

Waste-to-Energy Locations in the US
Waste-to-Energy Locations in the Northeast

**Connecticut**
1) Bristol Resource Recovery Facility
2) CRRA Hartford Trash-to-Energy Plant
3) Southeastern Connecticut Resource Recovery Facility
4) Wallingford Resource Recovery Facility
5) Wheelabrator Bridgeport, L.P.
6) Wheelabrator Lisbon Inc.

**Massachusetts**
1) Haverhill Resource Recovery Facility
2) Pioneer Valley Resource Recovery Facility
3) Pittsfield Resource Recovery Facility
4) SEMASS Resource Recovery Facility
5) Wheelabrator Millbury Inc.
6) Wheelabrator North Andover Inc.
7) Wheelabrator Saugus Inc.

**Maine**
1) ecomaine (Portland)
2) Mid-Maine Waste Action Corporation
3) Penobscot Energy Recovery Company

**New Hampshire**
1) Wheelabrator Claremont Company, L.P. (inactive)
2) Wheelabrator Concord Company, L.P.

**New Jersey**
1) Covanta Camden Energy Recovery Center
2) Covanta Warren Energy Resource Company Facility
3) Essex County Resource Recovery Facility
4) Union County Resource Recovery Facility
5) Wheelabrator Gloucester Company, L.P.

**New York**
1) Babylon Resource Recovery Facility
2) Covanta Hempstead
3) Dutchess County Resource Recovery Facility
4) Huntington Resource Recovery Facility
5) MacArthur Waste-to-Energy Facility
6) Niagara Resource Recovery Facility
7) Onondaga County Resource Recovery Facility
8) Oswego County Energy Recovery Facility
9) Wheelabrator Hudson Falls L.L.C.
10) Wheelabrator Westchester, L.P.

Industry Status - 84 WTE facilities in 23 States in 2014
Industry Status - 84 WTE facilities in 23 States in 2014

WTE Production

Industry Status - 84 WTE facilities in 23 States

MSW in the United States

Source: 2011 data based on Columbia University EEC 2013 Survey
What are the Market Conditions for WTE?

Monthly and annual range of wholesale electricity prices for selected regional trading hubs, August 2013

Source: U.S. Energy Information Administration based on EIA Energy Information Administration
What are the Market Conditions for WTE?

Figure 2. MSW Landfill Tipping Fees

Source: “Municipal Solid Waste Landfill Facts” (National Solid Waste Management Association)

OVERVIEW OF WTE ECONOMICS
It’s the Economy!

The economics of a WTE facility must make sense for the facility to be developed. Other issues are important, but subordinate.

Palm Beach County Waste-to-Energy Project, April 19, 2013

Policy Impact (+ or -)

Does a policy help build a project that would not have otherwise been built or increase the economic viability of an existing facility?

OR

Does a policy create a burden that makes it more difficult for a facility to sustain itself economically?
Illustrative Profit & Loss Statement

NOTE: This is a hypothetical situation and a combination of facility-specific factors and market conditions can lead to vastly different overall financials.

<table>
<thead>
<tr>
<th>Hypothetical Waste-to-Energy Facility, Privately Owned</th>
<th>Waste Capacity (tpd):</th>
<th>1,000</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tipping Fees</td>
<td>24,703,200</td>
<td></td>
</tr>
<tr>
<td>Special Waste</td>
<td>2,956,500</td>
<td></td>
</tr>
<tr>
<td>Energy Sales</td>
<td>7,982,550</td>
<td></td>
</tr>
<tr>
<td>Recycled Metals</td>
<td>1,231,875</td>
<td></td>
</tr>
<tr>
<td>Policy-related Revenue</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Total Operating Revenues</td>
<td>36,874,125</td>
<td></td>
</tr>
<tr>
<td>Operating Expenses</td>
<td>Ash Disposal Tip Fee:</td>
<td>45</td>
</tr>
<tr>
<td>Wage &amp; Benefits</td>
<td>4,927,000</td>
<td></td>
</tr>
<tr>
<td>Parts &amp; Maintenance</td>
<td>6,898,000</td>
<td></td>
</tr>
<tr>
<td>Supplies</td>
<td>1,576,000</td>
<td></td>
</tr>
<tr>
<td>Ash Hauling and Disposal</td>
<td>3,695,625</td>
<td></td>
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<tr>
<td>Misc Expense</td>
<td>397,000</td>
<td></td>
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<tr>
<td>State &amp; Local Taxes</td>
<td>900,000</td>
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<tr>
<td>Total Operating Expenses</td>
<td>18,193,625</td>
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<tr>
<td>Debt Service</td>
<td>17,603,290</td>
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<tr>
<td>Maintenance Capital Expenditures</td>
<td>750,000</td>
<td></td>
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<tr>
<td>Net Operating Income (Loss)</td>
<td>327,210</td>
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Summary of Economic Factors

- The combination of many different factors contribute toward the economics of any particular facility, including:
  - Location of the facility
  - Facility capacity and % of capacity utilized
  - Market conditions for MSW tipping fees, energy revenue, metals revenue, and ash disposal fees
  - Operations and maintenance costs
  - Meaningful policy incentives
SPECIFIC POLICY OPPORTUNITIES

RENEWABLE ENERGY CREDITS
REC: Renewable Energy Credits

Pro:
- Can be applied to new and existing facilities

Con:
- Market price can fluctuate dramatically

Compliance market (primary tier) REC prices, January 2008 to June 2012
Sources: Spectron Group (2012).
TAX: Production Tax Credit (PTC)

- Currently lapsed
- 10 years payout @ 1.1 cents/kwh
- The future of the program is being debated in Congress.
- It only applies to new capacity owned by taxpayers.

![Production Tax Credit Revenue](chart.png)

Production Tax Credit Revenue (hypothetical 25MW facility) (thousands)

- 1.1¢/kwh
- 1.7¢/kwh
- 2.3¢/kwh
GREENHOUSE GASES

GHG: Greenhouse Gases

- Putting a price on carbon
  - State and regional GHG programs address global warming
  - The national debate ebbs and flows

- Policy drives economics
  - Will WTE generate and sell offsets?
  - Will WTE be forced to buy credits?
GHG: Potential Carbon Offset Revenue

![Graph showing Carbon Offset Revenue](image)

<table>
<thead>
<tr>
<th>Offset per ton processed</th>
<th>Annual Revenue (thousands)</th>
</tr>
</thead>
<tbody>
<tr>
<td>25</td>
<td>82,125</td>
</tr>
<tr>
<td>5</td>
<td>3,125</td>
</tr>
<tr>
<td>75</td>
<td>246,375</td>
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</table>

GHG: Potential Carbon Credit Expense

![Graph showing Carbon Credit Expense](image)

<table>
<thead>
<tr>
<th>Source of Carbon</th>
<th>Annual Expense (thousands)</th>
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</thead>
<tbody>
<tr>
<td>Anthropogenic CO2</td>
<td>9,659,505</td>
</tr>
<tr>
<td>Biogenic CO2</td>
<td>9,659,505</td>
</tr>
<tr>
<td>Total CO2</td>
<td>19,319,010</td>
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SOLID WASTE

SOLID WASTE: Pressures on Landfill Tip Fees

LANDFILLS AVERAGED $44/ton in 2010
SOLID WASTE: EU Solid Waste Policy

Comparison of European Landfill & SWW Levies with Recycling Rates

ASH DISPOSAL AND REUSE
From ASH Disposal to ASH Reuse

ASH IS ~25% OF INCOMING WASTE BY WEIGHT AND ~20-40% OF O&M COSTS

MOVING FROM DISPOSAL TO REUSE REQUIRES OVERCOMING

TECHNICAL BARRIERS  REGULATORY BARRIERS  COMMERCIAL BARRIERS

CONCLUSIONS
Conclusions

- Market conditions play a large role in renewable industries
- Government policies can and oftentimes do influence markets
- Specifics of policy have enormous impact on usefulness of policy for any technology. Details matter.
- Policies are relative to competitors: a small gain can be a big win if it coincides with a disadvantage for a competitor
- The market conditions for new WTE development can improve with progressive government policy

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