G.A.A. Background

- Governmental Advisory Associates, Inc. is a research and consulting firm focusing on solid waste management issues.
- Serves as consultant to federal, state and local governments and the private sector.
- Conducts periodic studies and surveys of solid waste facilities—recycling facilities, waste-to-energy, and landfill gas to energy.
Materials Recycling Facility Survey

- Since 1990, firm has been surveying recycling facilities-MRFs and Mixed Waste Processing Facilities in the United States.
- Results published as *Materials Recycling and Processing in the United States: Yearbook and Directory*.
- The 7th edition will be published in Spring/Summer 2015.
Outline of Presentation

- Overview of Mixed Waste Facilities
- A Closer Look at the Numbers
- Case Studies-Three MWPFs
- Conclusions and Recommendations
What is a Mixed Waste Processing Facility

- Incoming stream is unsorted MSW
- MSW is sorted at the facility
- Recyclables are retrieved from the waste, either manually or by an automated system.
- Materials are either marketed to end users or sent on to other facilities for further separation.
Overall Developments in MWPFs in United States

- Part of the recycling infrastructure for at least 20 years.
- Growth in numbers through the early 2000s
  - Filled void, where no recycling programs
  - Tied to production of refuse derived fuel pellets
- At that point, development of MWPFs slowed.
  - Many closures or conversion to clean recyclable processing
  - Widespread adoption of curbside recycling
  - OSHA problems
  - Issues with costs and sorting equipment
- Within the last several years, MWPFs have made a comeback
  - MWPF may capture recyclables where there is a lack of interest or infrastructure
  - Particularly in California, facility sorts recyclables from commercial, multi-family stream
  - There has been an Improvement in sorting equipment.
Figure 1: Operating and Planned MWPFs in the United States
Regional Distribution of MWPFs

- MWPFs have always been and continue to be found on the West Coast, particularly California.
- They are also present in the Midwest
  - Front end of WTE facilities, particularly in Minnesota
  - Slow development of recycling infrastructure in some states
- Some growth in the South
  - Low recycling rates
  - Pressure on state and local budgets
- Do not exist in the Northeast
  - Strong recycling culture
  - Prevalence of curbside programs
Figure 2: Distribution of Operational MWPFs by Region Over Time
Assessing MWPFS

- Geographic Location
  - Region
  - Sparsely populated versus more densely populated areas
  - Existence of recycling infrastructure in area
  - Political culture with respect to recycling

- Type of waste streams
  - Commercial (Dry Waste) only
  - Green waste
  - C&D
  - Residential and Commercial MSW

- Level of automation
  - Manual floor sort
  - Automated sort lines

- Energy component on the back end
## MWPF Characteristics

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Measure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number operating facilities</td>
<td>52</td>
</tr>
<tr>
<td>Number of planned facilities</td>
<td>9</td>
</tr>
<tr>
<td>Percent of operating facilities in California</td>
<td>67%</td>
</tr>
<tr>
<td>Average incoming tons per day (tpd)</td>
<td>1328 tpd –range of 90 to 4800 tpd</td>
</tr>
<tr>
<td>Average percent recycled of incoming tons processed (ex. yard waste)</td>
<td>20%</td>
</tr>
<tr>
<td>Number of plants-no curbside collection</td>
<td>5</td>
</tr>
<tr>
<td>Number serving rural areas</td>
<td>15</td>
</tr>
<tr>
<td>Number handling only dry commercial stream</td>
<td>17</td>
</tr>
<tr>
<td>Number with manual floor sort only</td>
<td>9</td>
</tr>
<tr>
<td>Number with energy recovery on back end</td>
<td>7 planned; 3 operating</td>
</tr>
</tbody>
</table>
Case 1: Medina County OH Central Processing Facility (CPF)

- Built by County in 1993 to be in compliance with state Solid Waste Law. Operating for 22 years.
- Envision Waste, the operator is the original developer. Has one other facility in Colorado.
- All solid waste generated and collected in county taken to facility.
- Facility ceased processing as of Jan. 11, 2015. County is looking to reduce costs and will pursue other options.
What Medina County Plant Looks Like

MEDINA COUNTY MATERIALS RECOVERY FACILITY
Will process all solid waste generated by Medina County residents.

1. Each load is entered into a security compartment for billing and control.
2. Material is fed into the primary sorting station.
3. Trash is separated into recyclable and non-recyclable materials.
4. Recyclable material is transported to the recycling area.
5. Conveyors lift material to the Primary Sorting Station.
6. Fly ash and other residues are transferred to the fly ash facility.
7. Remaining waste enters the shredding machine.
8. Shredded waste is conveyed to the secondary sorting station.
9. Sorted waste is conveyed to the recycling area.
10. Mixed waste is conveyed to the energy recovery facility.
11. Remaining waste is conveyed to the energy recovery facility.
12. Energy recovery facility converts waste to energy.
## Medina County CPF Characteristics

<table>
<thead>
<tr>
<th>Description</th>
<th>2012 Data</th>
</tr>
</thead>
<tbody>
<tr>
<td>County population</td>
<td>175,000</td>
</tr>
<tr>
<td>Located in greater Akron area</td>
<td>26 miles from Akron</td>
</tr>
<tr>
<td>Incoming waste to facility</td>
<td>81,183 tpy</td>
</tr>
<tr>
<td>Incoming tons processed</td>
<td>65,797 tpy</td>
</tr>
<tr>
<td>Percent incoming waste processed</td>
<td>80%</td>
</tr>
<tr>
<td>Recyclable tons extracted</td>
<td>5611 tpy (incl. 1555 tons fuel product)</td>
</tr>
<tr>
<td>Percent tons recycled of waste processed (excludes green waste)</td>
<td>8.5%</td>
</tr>
</tbody>
</table>
## Medina County CPF Cost Data

<table>
<thead>
<tr>
<th>Description</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ownership of CPF</td>
<td>Medina County</td>
</tr>
<tr>
<td>Operation of CPF</td>
<td>Envision Waste under contract to county</td>
</tr>
<tr>
<td>Contract term</td>
<td>In fifth year of five year contract. 3rd five year contract extension. County will not renew for a new 5 yr. term.</td>
</tr>
<tr>
<td>Original Capital Cost</td>
<td>$8,200,000 (1993)</td>
</tr>
<tr>
<td>Total county cost/ton</td>
<td></td>
</tr>
<tr>
<td>Operations-pd. to Envision</td>
<td>$50.80</td>
</tr>
<tr>
<td>Debt Service</td>
<td>$42.86</td>
</tr>
<tr>
<td></td>
<td>$7.94</td>
</tr>
<tr>
<td>Revenue Share</td>
<td>None</td>
</tr>
<tr>
<td>Tip Fee</td>
<td>$61.00/ton</td>
</tr>
</tbody>
</table>
Case 2: Sunnyvale Materials Recovery and Transfer Station (SMaRT)

- Built by City of Sunnyvale in 1994. Facility is operated on behalf of cities of Mountain View, Palo Alto and Sunnyvale.
- Two new trommels were added in 2012. Cities looking to continue modernization.
- Also processes single stream recyclables from Sunnyvale and Mountain View.
## SMaRT Transfer Station and MRF

<table>
<thead>
<tr>
<th>Description</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Population served</td>
<td>288,601</td>
</tr>
<tr>
<td>Incoming waste to facility</td>
<td>181,736 tpy</td>
</tr>
<tr>
<td>Incoming tons processed</td>
<td>145,571 tpy*</td>
</tr>
<tr>
<td>Percent incoming waste processed</td>
<td>80%</td>
</tr>
<tr>
<td>Recyclable tons extracted</td>
<td>18,134</td>
</tr>
<tr>
<td>Percent tons recycled of waste processed.</td>
<td>12%</td>
</tr>
</tbody>
</table>

* Assuming 19.9% bulky waste pulled out before processing.
### SMaRT Cost Data

<table>
<thead>
<tr>
<th>Description</th>
<th>2012 Data</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ownership of SMaRT</td>
<td>City of Sunnyvale. Participating localities Mountain View, Palo Alto</td>
</tr>
<tr>
<td>Operation of SMaRT</td>
<td>Bay County Waste Services</td>
</tr>
<tr>
<td>Contract term</td>
<td>Contract just re-bid for another 7 year term.</td>
</tr>
<tr>
<td>Original Capital Cost</td>
<td>$23, 600,000 (1993)</td>
</tr>
<tr>
<td>Total operating cost/ton –MSW</td>
<td>$59.29 for up to 280,000 tpy.</td>
</tr>
<tr>
<td>Revenue Share</td>
<td>None for MSW</td>
</tr>
<tr>
<td>Tip Fee</td>
<td>None-part of franchise agreements with haulers.</td>
</tr>
</tbody>
</table>
Republic’s Newby Island facility underwent major reconstruction in 2012. Republic Waste won a 15-year exclusive franchise agreements with the city of San José to collect commercial waste and recyclables.

Republic collects waste, using a two bin system from 8000 businesses. One bin is for organics, one is for everything else.

Facility has four segregated lines, 2 for single stream recyclables, one for mixed dry waste, and one for mixed organic waste.

Anaerobic digester nearby site built by ZWED-Zero Waste Energy Development.
San Jose Wet/Dry Collection Bins
Newby Island Operations

- Reconstructed facility cost $45,000,000
- Republic receives revenues in the range of $33.9 million/yr. Includes profit margin of 17%.
- System designed to handle 240,000 tons per year.
- At full capacity, lines are designed to capture 161,000 tons per year, or about 60% of tons processed.
- Issues with amounts of higher than planned amounts of wet paper, lowering marketable tonnage. Are in the midst of modifying equipment.
Flow Diagram: Newby Island Commercial Mixed Waste Line
Flow Diagram Newby Island Wet Recyclables Line
Flow Diagram: Newby Island Container Line
Cautionary Tales

- Medina County, Seville OH
  - Old plant in relatively urbanized area
  - Near existing single stream MRFs
  - Issues of cost, design, role of public and private sector
  - Is no longer operating.
Cautionary Tales

- American Waste, Traverse City MI
  - Local private hauler, serving northern MI
  - Located MRF in former auto parts plant in Traverse City
  - In 2011, installed a BHS automated sort line, hoping to recover about 50% of incoming stream.
  - As of 2014, the decision was made to stop processing MSW, due to high costs and low yield. Some portion of the equipment is idle, although they are processing single stream recyclables.
Van der Linde Recycling, Troy VA

- Former real estate developer, turned recycling entrepreneur.
- Merchant facility. Began with C&D recycling and expanded into MSW. Competes on the basis of tip fee, $52.00/ton vs. the prevailing $66.00/ton. Serves small local haulers.
- High degree of manual sorting, but has upgraded equipment to include bag breaker, trommel, air separator.
- Operates in Charlottesville VA area. There is substantial push back to this plant. Sued by Albermarle County. Republic has single stream collection contracts in the area.
- Is continuing to operate.
Houston One Bin System?

- Houston has single stream curbside recycling, which will be expanded to all single family dwellings as of January 2015.
- Abysmal recycling rate and participation at about 6%, compared to national average of 34%.
- In 2013 won first prize in Bloomberg Philanthropies’ Mayor’s Challenge. Received $1 million to pursue idea of a mixed waste processing plant.
- Five vendors responded to RFP.
- Despite strong opposition, city of proceeding with a planned start up date of 2016.
Conclusions: Benefits of MWPFs

- Achieve recycling where curbside recycling is problematic
- Reduce collection costs
- Provide front end sorting for a waste conversion facility
- Maximize landfill diversion from traditionally low yield recycling streams, i.e. commercial and multi-family dwellings
- Capture additional waste streams, particularly food and other organic waste
Conclusions: Issues With MWPFS

- Require substantial capital investment.
- May charge high tip fees, particularly when recycling commodity prices are low.
- Require constant monitoring and modification of equipment.
- Reduce the amount of quality recyclable materials that are recovered, particularly with fiber.
- Diminish the recycling ethic as we know it today.
Other Thoughts on MWPFs

- MWPFs are evolving as new technologies are being implemented.
- It is hard to generalize across all MWPFs.
- To the extent that facilities are capturing materials from hard to recycle streams, which would previously been landfilled, they serve to increase material quantities.
Some Thoughts about the More Distant Future

- Role of sustainability models—i.e. composting, biodegradable plastics
- More attention paid to recycling in the commercial and multi-family sector.
- Re-design of office and home to accommodate resource conservation.
- “Back to the future”—sorting at the source and not at a centralized facility.
- European model of legislation, mandating pre-treatment all waste prior to disposal.
- Move to a “wet/dry” collection system as in San Jose CA
Thank You!

Contact:
Eileen Berenyi, PhD
Governmental Advisory Associates, Inc.
ebb@governmentaladvisory.com
203-226-3238