Introduction

Michael Carleton ENV-SP

- Authored several solid waste management plans, including Houston, NCTCOG Regional 20 Years Solid Waste Plan and several other local plans
- Project Manager for landfill site selections in Corpus, BVSWMA, TASWA, Lubbock, NW Ark
- Waste-to-Energy Experience - Procurement 1700 tpd facility, Acceptance Testing, Feasibility Analysis

Arredondo, Zepeda & Brunz LLC

- Civil, Environmental, Surveying
- Dallas, Fort Worth, Laredo, San Antonio
- Specializing in Landfills, Transportation, Water, Transit, Environmental Assessments
- 35 Years serving Texas communities
Purpose

• Identify factors that affect available landfill capacity
• Benchmark key solid waste indicators on a regional basis
• Establish a method for examining investment priorities
• Assess the current status of landfill capacity in four major metro regions - current and proposed facilities
• Provide recommendations on how to promote greater long-term landfill capacity
Infrastructure Investments

In recent years, Texas legislators and policy makers have recognized the need to make significant investments in the state’s infrastructure. For example, proposition 1, adopted in 2014, authorized a constitutional amendment for transportation funding. Under the amendment, a portion of oil and gas tax revenues that typically go into the Economic Stabilization Fund was deposited to the State Highway Fund. The fund provided $1.75 billion for transportation projects. Currently the Texas Water Development Board’s State Water Implementation Fund for Texas (SWIFT) has $4.6 billion for water related projects across Texas. But what about the state’s municipal solid waste infrastructure?
Why is it important?

• Continued population & economic growth = more waste
• Difficulty securing new capacity - 10 to 15 year horizon on new sites
• Minimal state investment in solid waste infrastructure
• Shrinking city budgets
• In spite of major recycling efforts, landfill disposal will continue to be a critical part of waste management
Why These Regions

Houston, DFW, Austin & San Antonio Areas

- 67% of the state’s overall population;
- 76% of the state’s gross domestic product (GDP); and
- 70% of the total waste disposed statewide.

<table>
<thead>
<tr>
<th>Region</th>
<th>2015 Million Tons Disposed</th>
<th>2016 Million Tons Disposed (Preliminary)</th>
</tr>
</thead>
<tbody>
<tr>
<td>HGAC</td>
<td>8.9</td>
<td>8.8</td>
</tr>
<tr>
<td>NCTCOG</td>
<td>9.6</td>
<td>10.5</td>
</tr>
<tr>
<td>AACOG</td>
<td>3.0</td>
<td>2.8</td>
</tr>
<tr>
<td>CAPCOG</td>
<td>2.2</td>
<td>2.2</td>
</tr>
<tr>
<td>Total</td>
<td>23.7</td>
<td>24.3</td>
</tr>
</tbody>
</table>
Historically - populations in the four regions have experienced between 2 and 3 percent annual increase between 2005 - 2015. On the high side, TDC projects similar growth through 2030.

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>HGAC</td>
<td>5.39</td>
<td>6.79</td>
<td>9.46</td>
</tr>
<tr>
<td>NCTCOG</td>
<td>5.69</td>
<td>7.23</td>
<td>10.11</td>
</tr>
<tr>
<td>AACOG</td>
<td>2.01</td>
<td>2.49</td>
<td>3.32</td>
</tr>
<tr>
<td>CAPCOG</td>
<td>1.56</td>
<td>2.11</td>
<td>3.19</td>
</tr>
<tr>
<td>Total</td>
<td>14.65</td>
<td>18.62</td>
<td>26.08</td>
</tr>
</tbody>
</table>
## Historic State Disposal Rates

Does not account for waste imports/exports into the region

### Table: HGAC Pounds Per Capita Per Day

<table>
<thead>
<tr>
<th>Year</th>
<th>MSW</th>
<th>C&amp;D</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>2005</td>
<td>5.78</td>
<td>1.32</td>
<td>7.11</td>
</tr>
<tr>
<td>2010</td>
<td>5.34</td>
<td>1.16</td>
<td>6.49</td>
</tr>
<tr>
<td>2013</td>
<td>5.67</td>
<td>1.32</td>
<td>7.00</td>
</tr>
<tr>
<td>2014</td>
<td>5.83</td>
<td>1.39</td>
<td>7.22</td>
</tr>
<tr>
<td>2015</td>
<td>5.65</td>
<td>1.50</td>
<td>7.15</td>
</tr>
<tr>
<td>2016</td>
<td>5.34</td>
<td>1.58</td>
<td>6.92</td>
</tr>
<tr>
<td>2005/2016</td>
<td>0.92</td>
<td>1.20</td>
<td>0.97</td>
</tr>
</tbody>
</table>

*Source: TCEQ Annual MSW Report*
Tons have gone up - Rates have generally gone down
Projected Waste Disposal Quantities

Projected Waste Quantities (tons)

- NCTCOG
- HGAC
- AACOG
- CAPCOG
Capacity Comparison for Regions (MSW)

Forecasted Regional Capacity in Years

- **NCTCOG**:
  - 2015: 18
  - 2025: 16
  - 2030: 13

- **HGAC**:
  - 2015: 12
  - 2025: 12
  - 2030: 11

- **AACOG**:
  - 2015: 6
  - 2025: 5
  - 2030: 5

- **CAPCOG**:
  - 2015: 3
  - 2025: 3
  - 2030: 3
Type IV Capacity - 2015

Region

- Lone Star Recycling and Disposal Facility
- Tall Pines Landfill
- Ralston Road Landfill
- Hawthorn Park Landfill
- Cougar Landfill
- Greenhouse Road Landfill
- WCT Greenbelt Landfill
- Fairbanks Landfill
- Greenshadows Landfill
- Casco Hauling and Excavation Landfill
- Addicks Fairbanks Landfill
- North County Landfill
- Sprint Fort Bend County Landfill
- Dixie Farm Road Landfill

Values:

-20 0 20 40 60 80 100
Type IV Capacity - 2030

Region
- Lone Star Recycling and Disposal Facility
- Tall Pines Landfill
- Ralston Road Landfill
- Hawthorn Park Landfill
- Cougar Landfill
- Greenhouse Road Landfill
- WCT Greenbelt Landfill
- Fairbanks Landfill
- Greenshadows Landfill
- Casco Hauling and Excavation Landfill
- Addicks Fairbanks Landfill
- North County Landfill
- Sprint Fort Bend County Landfill
- Dixie Farm Road Landfill
As facilities close - access becomes more important

- Number of facilities available
- Ownership issues
- Distances required
Type I Market Share (disposal)

NCTCOG MSW Disposal Market Concentration - 18 Landfills

HGAC MSW Disposal Market Concentration - 12 Landfills

CAPCOG MSW Disposal Market Concentration - 4 Landfills

AACOG MSW Disposal Market Concentration - 6 Landfills

If a landfill closes - an average of 500,000 tons has to find a new home - equal to about 180,000 households
Public - Private Capacity Market Share

2015 NCTCOG Remaining Capacity - Public / Private

- Public: 76%
- Private: 24%

HGAC MSW Capacity Concentration

- 41%
- 3%
- 7%
- 12%
- 4%
- 4%
- 7%
- 3%
- 5%
- 0%

*three are publicly owned, but privately operated
Options for long-term capacity

- Reduce the amounts of waste going to the landfills
- Improve efficiency of operations
- Select new sites or expand existing landfills
<table>
<thead>
<tr>
<th>Region</th>
<th>MSW PCD</th>
<th>C&amp;D PCD</th>
<th>Total PCD</th>
</tr>
</thead>
<tbody>
<tr>
<td>HGAC</td>
<td>5.34</td>
<td>1.58</td>
<td>6.92</td>
</tr>
<tr>
<td>NCTCOG</td>
<td>7.38</td>
<td>0.52</td>
<td>7.85</td>
</tr>
<tr>
<td>AACOG</td>
<td>5.19</td>
<td>0.91</td>
<td>6.10</td>
</tr>
<tr>
<td>CAPCOG</td>
<td>5.47</td>
<td>0.52</td>
<td>5.98</td>
</tr>
</tbody>
</table>

Between 2015 and 2016, HGAC MSW disposal quantities dropped by approximately 300,000 tons, while C&D disposal quantities increased by approximately 150,000 tons.
Landfill efficiencies have gotten better in most regions - larger facilities = greater efficiency

**Operational Efficiency Changes 2005 – 2015 Type I Facilities**

<table>
<thead>
<tr>
<th>Region</th>
<th>2005 Weighted PPCY</th>
<th>2015 Weighted PPCY</th>
<th>% Improvement 2015/2005</th>
</tr>
</thead>
<tbody>
<tr>
<td>NCTCOG</td>
<td>1294</td>
<td>1504</td>
<td>16%</td>
</tr>
<tr>
<td>HGAC</td>
<td>1662</td>
<td>1658</td>
<td>0</td>
</tr>
<tr>
<td>AACOG</td>
<td>1609</td>
<td>1737</td>
<td>8%</td>
</tr>
<tr>
<td>CAPCOG</td>
<td>1344</td>
<td>1410</td>
<td>5%</td>
</tr>
</tbody>
</table>
Landfill Efficiency Quotient

<table>
<thead>
<tr>
<th>Region</th>
<th>Population</th>
<th>Generation Rate (pcd)</th>
<th>Disposal Efficiency (ppcy)</th>
<th>Annual Tons</th>
<th>Landfill CY</th>
<th>CY/Capita</th>
<th>% Best Case</th>
</tr>
</thead>
<tbody>
<tr>
<td>HGAC</td>
<td>500,000</td>
<td>5.34</td>
<td>1,658</td>
<td>487,275</td>
<td>587,786</td>
<td>1.18</td>
<td>108%</td>
</tr>
<tr>
<td>NCTCOG</td>
<td>500,000</td>
<td>7.38</td>
<td>1,504</td>
<td>673,425</td>
<td>895,512</td>
<td>1.79</td>
<td>164%</td>
</tr>
<tr>
<td>AACOG</td>
<td>500,000</td>
<td>5.19</td>
<td>1,737</td>
<td>473,588</td>
<td>545,294</td>
<td>1.09</td>
<td>100%</td>
</tr>
<tr>
<td>CAPCOG</td>
<td>500,000</td>
<td>5.47</td>
<td>1,410</td>
<td>499,138</td>
<td>707,996</td>
<td>1.42</td>
<td>130%</td>
</tr>
<tr>
<td>Best Case</td>
<td>500,000</td>
<td>5.19</td>
<td>1,737</td>
<td>473,588</td>
<td>545,294</td>
<td>1.09</td>
<td>100%</td>
</tr>
<tr>
<td>Worst Case</td>
<td>500,000</td>
<td>7.38</td>
<td>1,410</td>
<td>673,425</td>
<td>955,213</td>
<td>1.91</td>
<td>175%</td>
</tr>
</tbody>
</table>

By reducing MSW disposal rate from 5.65 to 5.34, the HGAC saved Approximately 400,000 cy of landfill space.
Securing new capacity ... Heavy public opposition

- In 2016 - only 3 Type IV (c&d) and 1 Type I (msw) permit amendments approved in 4 regions
- 6 new permits or permit amendments known to be in process - all 4 Type I’s facing heavy public opposition
- The success in legislatively affecting landfill site
- County land use ordinances
In addition to public opposition - land use more difficult

- Harder to find land with minimal development
- Oil & gas development is now significant land use
- Transportation issues & Access
Greenfield Capacity - Long-term project

- Site Selection & Procurement - 3 to 5 years
- Permitting - 3 - 5 years
- Construction - 2 - 4 years
# Recent Permitting Activity

<table>
<thead>
<tr>
<th>Region</th>
<th>Landfill</th>
<th>Type</th>
<th>Additional Capacity (MM CY)</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>NCTCOG</td>
<td>Camelot Landfill</td>
<td>I</td>
<td>37.7</td>
<td>Recent agreement with local government following state legislation requiring local approval in this specific case</td>
</tr>
<tr>
<td>NCTCOG</td>
<td>IESI Fort Worth C&amp;D Landfill</td>
<td>IV</td>
<td>18.4</td>
<td>Approved by ED in December 2016</td>
</tr>
<tr>
<td>NCTCOG</td>
<td>City of Denton Landfill</td>
<td>I</td>
<td>34.5</td>
<td>In review</td>
</tr>
<tr>
<td>H-GAC</td>
<td>Pintail Landfill</td>
<td>I</td>
<td>Unknown</td>
<td>On July 6, 2016 Pintail Landfill initiated a new landfill permitting process</td>
</tr>
<tr>
<td>H-GAC</td>
<td>Ralston Road Landfill</td>
<td>IV</td>
<td>1.0</td>
<td>Application Process</td>
</tr>
<tr>
<td>H-GAC</td>
<td>Tall Pines Landfill</td>
<td>IV</td>
<td>15.1</td>
<td>Application Process</td>
</tr>
<tr>
<td>H-GAC</td>
<td>Fairbanks Landfill</td>
<td>IV</td>
<td>26.2</td>
<td>Approved in 2016</td>
</tr>
<tr>
<td>H-GAC</td>
<td>Galveston County Landfill</td>
<td>I</td>
<td>22.4</td>
<td>Approved in 2016</td>
</tr>
<tr>
<td>AACOG</td>
<td>Post Oak Landfill</td>
<td>I</td>
<td>87.0</td>
<td>Public hearing completed - awaiting Commission’s decision</td>
</tr>
<tr>
<td>CAPCOG</td>
<td>130 Environmental Park (Calhoun County)</td>
<td>I</td>
<td>33.0</td>
<td>Administrative review and Technical reviews have been completed. Public hearing is ongoing, with no scheduled agenda date (TCEQ Web Site November 23, 2016)</td>
</tr>
<tr>
<td>CAPCOG</td>
<td>IESI Travis Co. Landfill</td>
<td>IV</td>
<td>6.9</td>
<td>Approved by TCEQ in 2016</td>
</tr>
</tbody>
</table>

*Source: TCEQ Web Site: Municipal Solid Waste Applications Posted on the Internet, December 2016*
Increasing / High Waste Generation Rates

*State*

- Support public information
- Mandatory bans on the disposal of certain materials
- Providing financial incentives through the State Fund 5000
Local Governments

• Support public information programs to encourage source reduction and recycling, including composting of organics.
• Greater attention on the commercial sector’s waste stream.
• Communities may want to limit the types of materials accepted at landfills.
Thoughts and Recommendations...

Decreasing Available Disposal Capacity

*State*

- Continue to monitor landfill capacity throughout the state.
- Establish a permitting protocol that both protects local residents and allows for future new facilities and expansions.
- Provide funding through subsidized loans or other means to encourage investments in better landfill equipment to improve operational efficiency. Place greater emphasis on landfill operating efficiency as part of training program for landfill operator licenses.
- Evaluate the results of landfill methods such as landfill mining & enhanced leachate recirculation
- Encourage less political involvement in permitting process
Thoughts and Recommendations...

**Local Governments**

- Undertake a current assessment of solid waste disposal capacity.
- **Evaluate contracts for disposal and determine if modifications are necessary to assure long term availability of capacity.**
- Evaluate contracts and procurement documents for future capacity. Consider whether *landfills are operating efficiently, their long-term capacity situation* and whether they are planning expansions.
- **Encourage the development of more Type IV landfills for C&D waste** so that valuable Type I landfill capacity is not used for this specific waste stream.
- Cities should begin *examining the potential need for transfer stations as a means of reducing future haul cost increases if landfills reach capacity* and longer haul distances are required.
Questions

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