Project Case Study

Industrial end-users’ CHP systems use boilers and reciprocating engines fueled by Renewable Energy project’s transmission pipeline to produce revenue and electrical cost savings through Landfill Gas Purchase Agreements.

Presented by Joshua Griswold
References

1 - LMOP website: https://www.epa.gov/lmop/landfill-gas-energy-project-data
2 - Landfill Gas Energy Project Development Handbook, June 2017
3 - EGSA Reference Book: Chapter 19
4 - DSWA website: https://dswa.com/programs/landfillgas/
5 - Cummins QSK60 C1100N6C Genset Data Sheet D5470a (June 2012)
What is landfill gas and how can it power a CHP system and create financial benefit?
In 2009 the municipal landfill contained 11.8M tons of waste\(^1\). Prior to this Project the gas collection system used a set of flares to destroy approximately 3,000 standard cubic feet of landfill gas per minute.

General rule: 1M tons of Municipal Solid Waste produces approximately 300 CFM

\(^1\) LMOP website [https://www.epa.gov/lmop/landfill-gas-energy-project-data](https://www.epa.gov/lmop/landfill-gas-energy-project-data)
Landfill Gas Collection System

Landfill Gas Energy Project Development Handbook, June 2017
Landfill Gas Quality

Conditioned landfill gas quality monitored by Siemens Ultramat 23
Oil analysis result showing the rise of acid or TAN in oil of LFG Genset
Solution

Open trenching, jack and bore and directional drilling methods were used to install transmission pipeline

Hydrogen sulfide and siloxane removal vessels
Landfill Gas Purchase Agreement

- Hybrid contracts can use NYMEX index and fixed prices with “take or pay” clause
- Environmental attributes including Renewable Energy Credits can provide new revenue sources
- If LFG is being supplied to different equipment then separate pricing categories can be established based on volume and cleanliness requirements
18,308.4 MWe or 2,000 homes annually PLUS 7.4 mmBTU/hr\(^2\) recovered from the Gensets’ exhaust and cooling water systems.

<table>
<thead>
<tr>
<th>Landfill Name</th>
<th>State</th>
<th>City</th>
<th>County</th>
<th>Ownership Type</th>
<th>Landfill Owner Organization(s)</th>
<th>Waste in Place (tons)</th>
<th>Waste in Place Year</th>
<th>LFG Collection System In Place?</th>
<th>LFG Collected (mmscfd)</th>
<th>LFG Flared (mmscfd)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cherry Island Landfill</td>
<td>DE</td>
<td>Wilmington</td>
<td>New Castle</td>
<td>Public</td>
<td>Delaware Solid Waste Authority</td>
<td>15,259,416</td>
<td>2017</td>
<td>Yes</td>
<td>4.176</td>
<td>0.576</td>
</tr>
</tbody>
</table>

Table retrieved from LMOP website [https://www.epa.gov/lmop/landfill-gas-energy-project-data](https://www.epa.gov/lmop/landfill-gas-energy-project-data)

\(^2\) mmBTU/hr information taken from Cummins QSK60 C1100N6C Data Sheet D-5470a (June2012)
Wrap up Slide/Closing Thought/Thanks for Coming