

# MSW PROJECT OPPORTUNITY

## XALAPA LANDFILL

### XALAPA, VERACRUZ, MEXICO

#### MUNICIPALITY OF XALAPA

### OVERVIEW OF MSW PROJECT

The Xalapa Landfill began operations in 2003. It is owned by the Municipality of Xalapa and operated by Proactiva Medio Ambiente MMA, S.A. de C.V. (private). This landfill is a sanitary landfill with a designed waste footprint of 16 hectares (ha), a total design capacity of 1.7 million tonnes, and is expected to close in 2018. Currently, there are 1.1 million tonnes of waste in place with an average waste depth of 25 meters.

**PROJECT TYPE:** Landfill gas (LFG) projections indicate that the Xalapa Landfill could have several LFG utilization project options, including electricity generation, direct use, and flaring only. Assuming start-up of a power plant in 2014, sufficient gas is assumed to be available to support a power plant of 0.9 MW in 2014, increase to 1.3 MW by 2017, and then start to decline in 2020. The electricity that could be generated by an LFG energy project at the Xalapa Landfill could be used by the site itself for its own energy needs or it could be wheeled to any company in Mexico that is seeking to use renewable energy. A direct use project is possible depending on the availability of potential industrial end-users near the landfill.

The feasibility of any of these projects would require additional information from the Landfill and surrounding area, such as exact locations of electricity distribution and transmission lines, natural gas distribution specifications, energy requirements of nearby industrial facilities, and interest in pursuing an LFG energy project.

**ESTIMATED PROJECT LIFETIME EMISSION REDUCTIONS: 0.5 MMTCO<sub>2</sub>E**

### LANDFILL LOCATION AND ASSISTANCE REQUESTS



The Municipality of Xalapa seeks cooperation to advance the development of an LFG energy project. The Municipality does not currently have a contract to sell carbon credits.

*DISCLAIMER: The information and predictions contained within this poster are based on the data provided by the site owners and operators and site visits conducted by U.S. EPA. The Global Methane Initiative (GMI) cannot take responsibility for the accuracy of these data. It should be noted that conditions on landfills will vary with changes in waste input, management practices, engineering practices, and environmental conditions (particularly rainfall and temperature). GMI does not guarantee the quantity or quality of available landfill gas from the landfill site, which may vary from the values predicted in this report.*

# LANDFILL GAS AND ENERGY POTENTIAL

Under contract to the U.S. EPA, SCS Engineers estimated the amount of LFG generated by the Xalapa Landfill using EPA's Mexico LFG Model v2. Model input data for the preliminary assessment of the LFG capture and use project were obtained from Proactiva Medio Ambiente MMA S.A. de C.V. and collected during an EPA site visit in October 2012.

## Other Landfill Physical/Operational Data

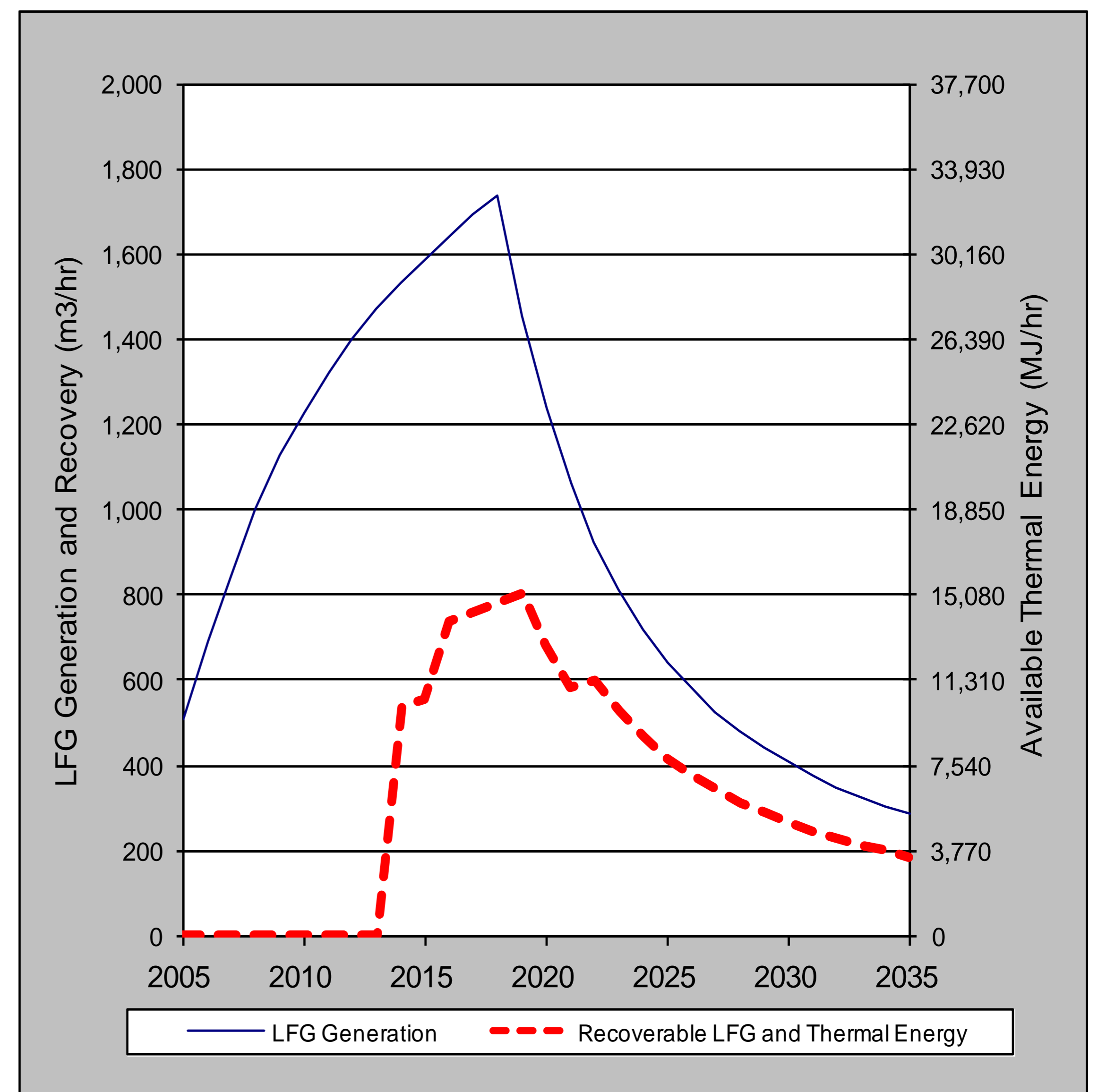
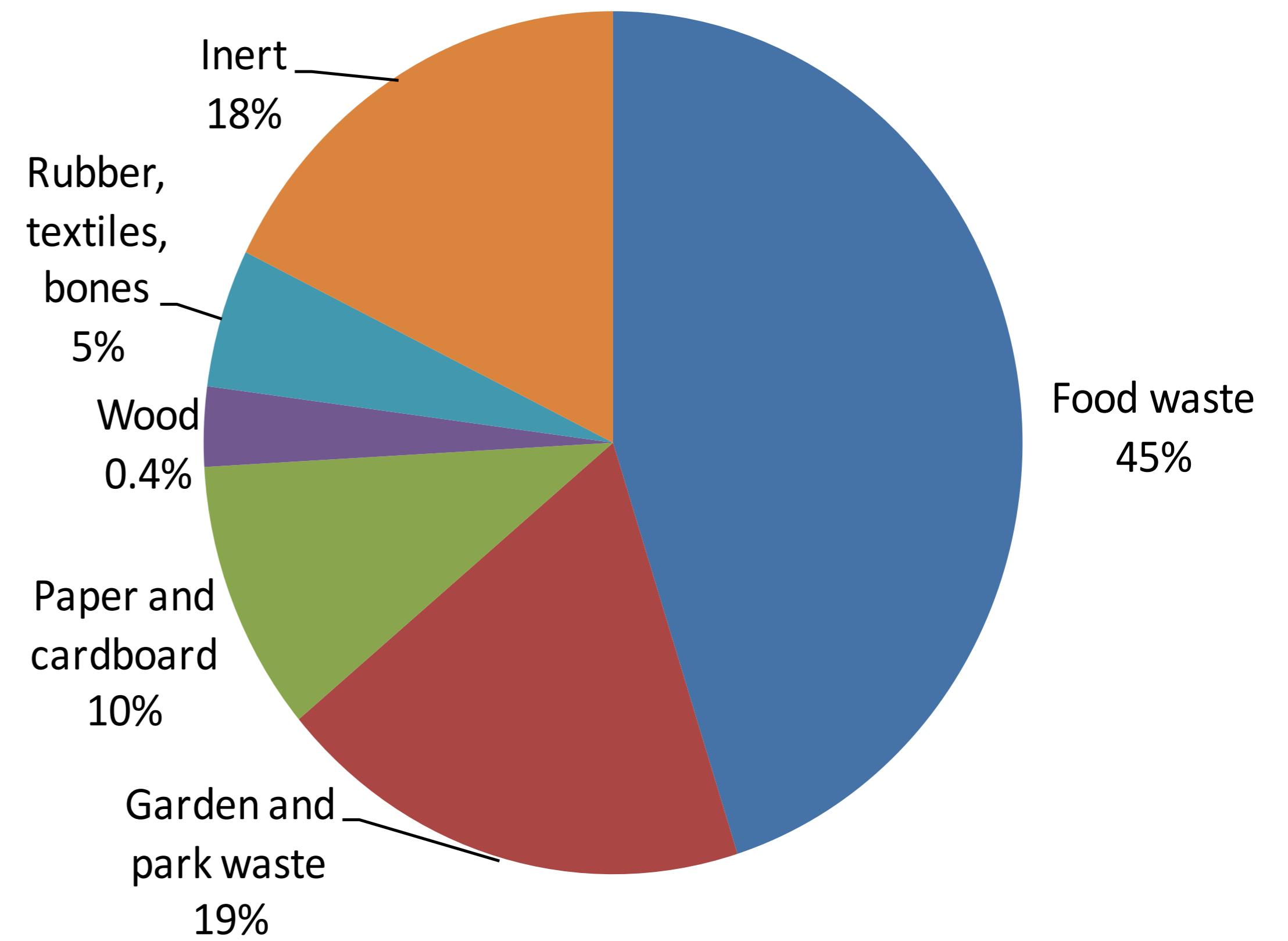
- Estimated annual MSW acceptance rates for 2006 to 2017: ranges from 109,500 to 125,000 tonnes/yr
- Landfill is lined with geomembrane and geotextile
- Waste compaction is performed with a bulldozer
- Leachate management: accumulating in standing pools and some recirculation
- LFG collection and control system: passive venting wells installed

## Landfill Gas Modeling Inputs:

- **CH<sub>4</sub> generation potential (Lo):**  
69 m<sup>3</sup>/Mg for very fast-decay organic waste  
115 m<sup>3</sup>/Mg for moderately-fast decay organic waste  
214 m<sup>3</sup>/Mg for moderately-slow decay organic waste  
202 m<sup>3</sup>/Mg for slow-decay organic waste
- **CH<sub>4</sub> generation rate constant (k):**  
0.30 for fast-decay organic waste  
0.13 for medium-fast decay organic waste  
0.050 for medium-slow decay organic waste  
0.025 for slow-decay organic waste
- **Percent methane: 50%**

Values for these modeling variables have been developed based on the waste composition data and average annual precipitation at Xalapa Landfill. It is not feasible to collect all the gas generated at the site for flaring or energy recovery, given site conditions and collection system limitations. Therefore, the amount of recoverable LFG was estimated by applying a gas availability factor to the results of the LFG generation model.

Waste Characterization



**Recoverable LFG = 90% Landfill Area Available for Gas Collection x 72% Gas Collection Efficiency = 65%**

## ENVIRONMENTAL BENEFITS

Assuming that an active gas collection and flaring system is installed in 2014, this LFG capture project has the opportunity to collect and destroy an average of 2.6 million cubic meters of methane annually over the next 13 years. This is equivalent to emission reductions of more than 0.5 million tonnes of CO<sub>2</sub>eq over the project lifetime.

| Year  | 2014   | 2015   | 2016   | 2017   | 2018   | 2019   | 2020   | 2021   | 2022   | 2023   | 2024   | 2025   | 2026   |
|---|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| Tonnes CO <sub>2</sub> eq from Flaring Activities | 35,386 | 36,709 | 48,757 | 50,199 | 51,540 | 52,853 | 44,882 | 38,562 | 39,594 | 34,760 | 30,810 | 27,549 | 24,827 |

## FOR MORE INFORMATION

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