

Carbon project:

Buried Treasure, Ciudad Juárez, Mexico



CAR 1696

A Cool Effect onsite report

October 2024

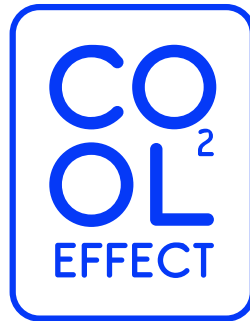
Landfill Gas Capture



As part of Carbon Done Correctly, Cool Effect conducts a site visit after completing scientific due diligence and ensuring the GHG integrity of each project we represent. Sometimes visits take place before we purchase credits and sometimes after.

The site visit is intended to see operations of the project firsthand, gather information on any outstanding questions, meet the project management team, see them in action and assess project interactions with the local community.

Our team also focuses on gathering details on how revenue from the sale of carbon credits is being used. We look for evidence of how income from previous years has been applied and we discuss funding for future expansion.



Project specifications

Name of project:

Ciudad Juarez Landfill
Gas to Energy Project,
Mexico

Project type:

Technology-based
Avoidance

Standard:

Climate Action Reserve

Methodology:

Mexico Landfill Protocol, v2.0



AA

2021-2023

Calyx Global

A

12/22/25

Sylvera

Expected issuance:

105,000 per year

Crediting periods:

7 years

Ciudad Juárez Landfill Gas to Energy Project (CAR 1696) is a CCP-eligible landfill gas project located in the Chihuahuan Desert on the outskirts of Ciudad Juárez, Mexico.

The project is owned by Biogas de Juárez, S.A. de C.V., a Mexican company set up specifically for this project.



The project currently operates with 28 vertical gas collection wells, an enclosed flare, and an electricity generation plant with 6.4 MW installed capacity across four generator engines.

Prior to the project, the landfill did not have any landfill gas capture or flaring system. It was registered under CDM in 2007 and transitioned to CAR for its third crediting period in 2021.



Rodolfo Garcia
Biogas de Juárez
Plant Manager

Johanna Depenthal
Cool Effect
Director of
Project Research



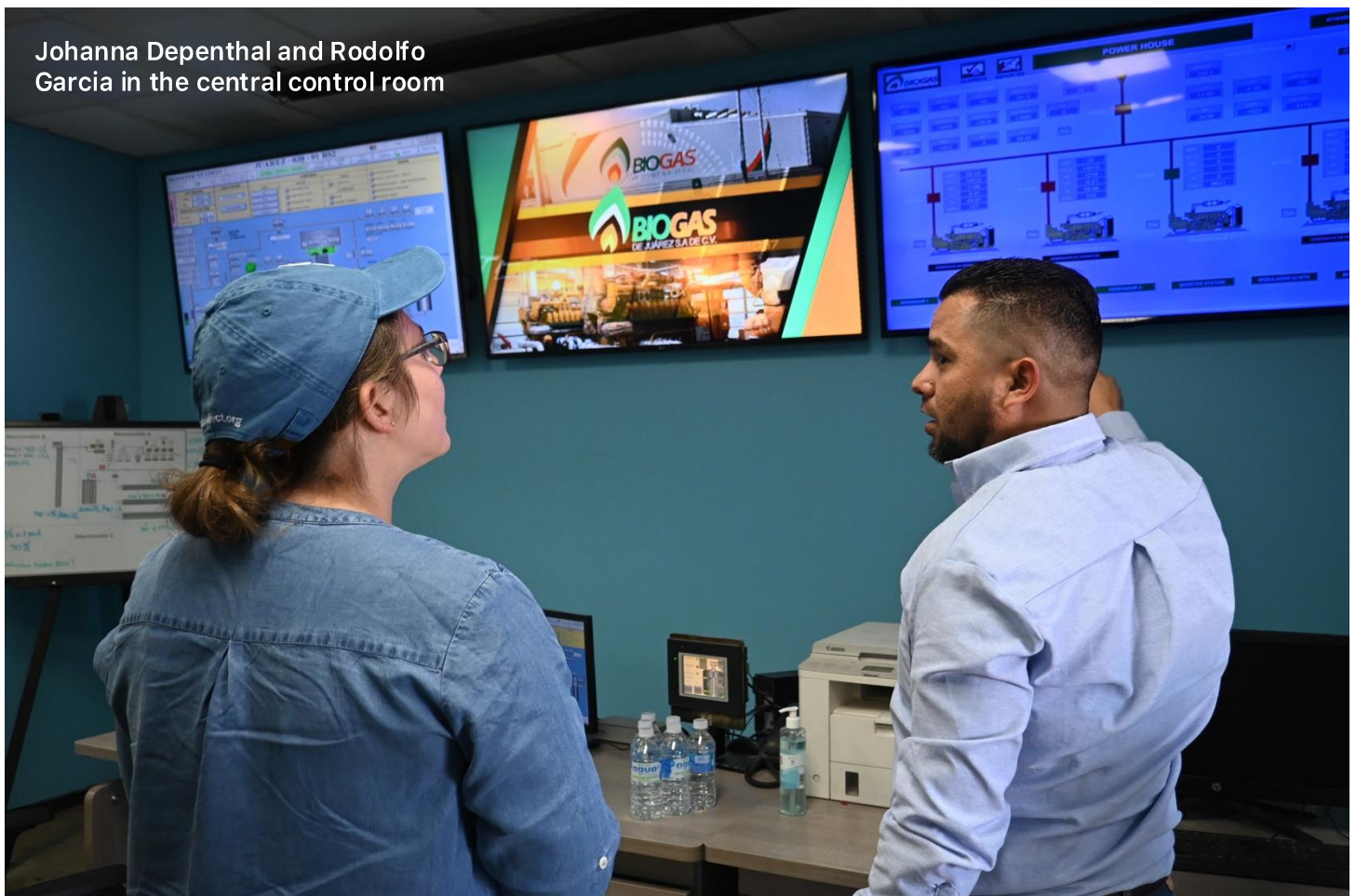
Agenda

We started the morning at the Biogas de Juárez offices, where we discussed project operations. We then headed to the landfill site where we toured the generator room. Rodolfo explained that, apart from regularly-scheduled maintenance breaks, the generators are running 24/7/365.

We drove onto the landfill to get an understanding of the active gas collection system. Vertical wells are inserted to a depth of approximately 19 meters, spaced 25 meters apart. Horizontal collection tubes channel the gas to the control stations.

We also toured the project's new onsite fire station, which houses a second-hand fire truck and a water truck with 10,000 L capacity.

The station was funded with carbon revenues after a series of fires in 2023. Biogas de Juárez employees conduct fire drills and have found that their fire response time is 10 minutes, compared to the 30 minutes it takes first responders from the city to reach the site.



Background

The Ciudad Juárez landfill sits in the desert state of Chihuahua, Mexico, and began operating in 1994. It covers a 79-hectare footprint with an estimated capacity of 30 million cubic meters and is projected to reach capacity and close around 2040. Like most municipal landfills in Mexico, it decomposes solid waste that releases methane, a potent superpollutant.

The site became a carbon project when it was registered under the UN's Clean Development Mechanism (CDM) on November 30, 2007. For its third crediting period, the project transitioned from the CDM to the Climate Action Reserve registry where it is now listed.

Prior to the incentive from carbon revenues, the landfill had no active gas collection system.

The landfill represents
~\$20M USD
in equipment investment



Operations & Management

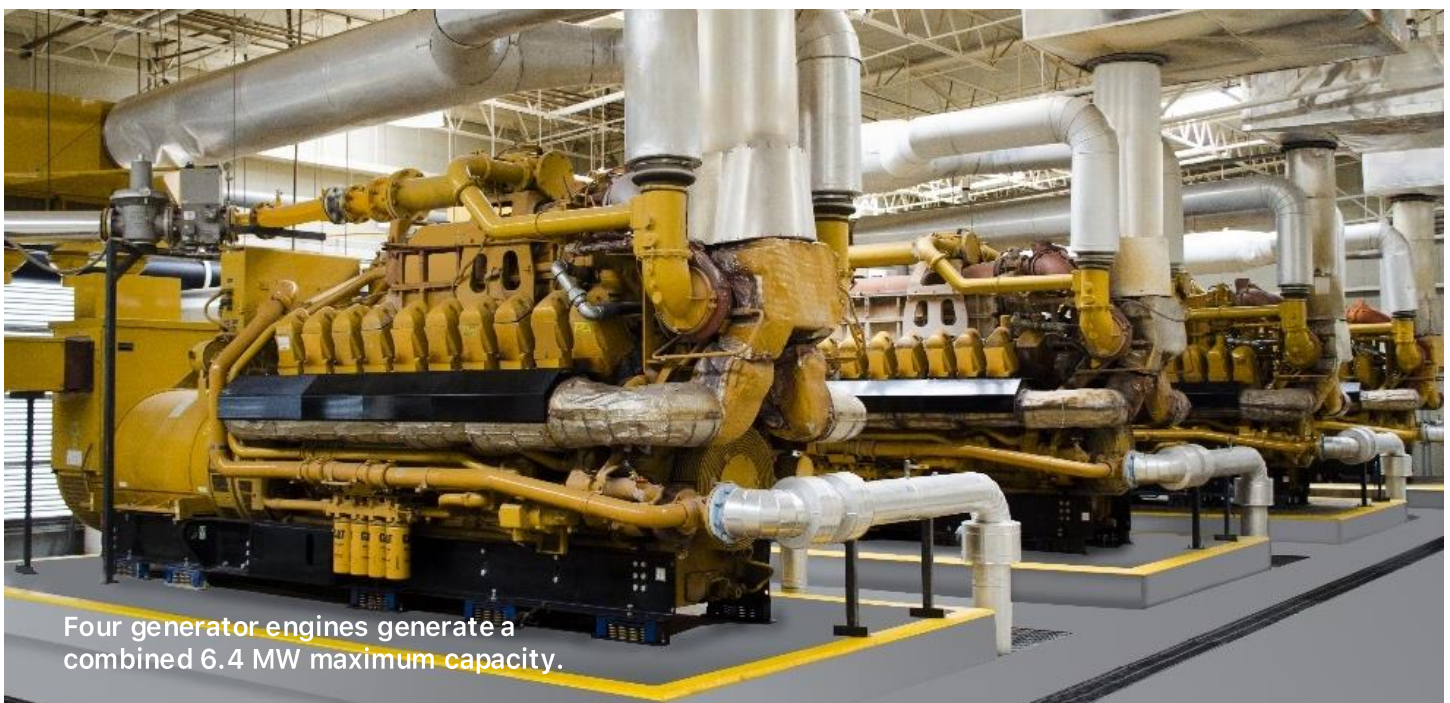
The daily craft here is managing gas quality. Generators need a certain blend of methane to function properly (at least 38%), and as the landfill ages, the methane component has slipped from 55-70% in its early years to as low as 33%.

In the control rooms, the team can blend flows to keep the methane above the threshold, pull samples, and fix problems without stopping the whole field. Several rooms are fully automated and can be shut down remotely from plant headquarters.

At the heart of the plant, captured landfill gas is burned to make electricity in four 1.6 MW generator engines. Three run at a time, at about 80% of capacity, while a fourth is kept offline as a ready backup.



Sector control room with valve shut-offs for landfill gas collection system



Four generator engines generate a combined 6.4 MW maximum capacity.

Operations & Management

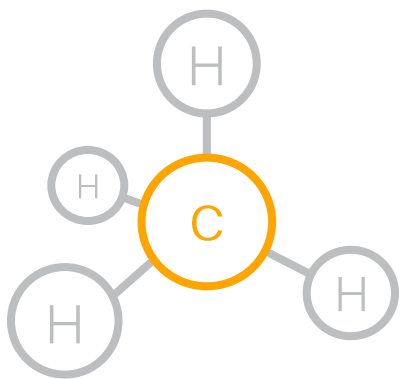
The generators run 24/7, 365 days per year, and are only shut off for maintenance breaks. The oil is changed every 1,000 hours and a full overhaul is done every 15,000 hours. During these breaks, a backup flare is used to destroy the methane flow until the generators are brought back online.

One of the four generators is typically offline in case any issues arise with one of the other three. A platform has been built to host a fifth generator should the demand justify its installation.

The landfill receives roughly

1,500 tonnes

of municipal solid waste *daily*.



The active gas capture system processes about

3,000 m³

of landfill gas per hour.

The methane flare is only used when all generators are offline for maintenance.



The Carbon Project

The project is heavily dependent on carbon revenue, which pays for much of the infrastructure that allows methane destruction to take place. In Mexico, municipalities simply do not have the resources to pay for LFG collection and utilization without the additional revenue from carbon credits.

The energy produced by the project is sold to the municipality at a discount. The project provides about 40% of the electricity for street lighting in Ciudad Juárez and 20-25% of the street lighting in the city of Chihuahua.

This bio-energy directly displaces demand that would otherwise be met in part by the combustion of fossil fuels. The project therefore mitigates climate damages in two ways: by destroying methane and by producing clean energy that displaces fossil fuel demand.



The project destroys approximately

105,000

metric tonnes of carbon dioxide equivalent of methane *per year*



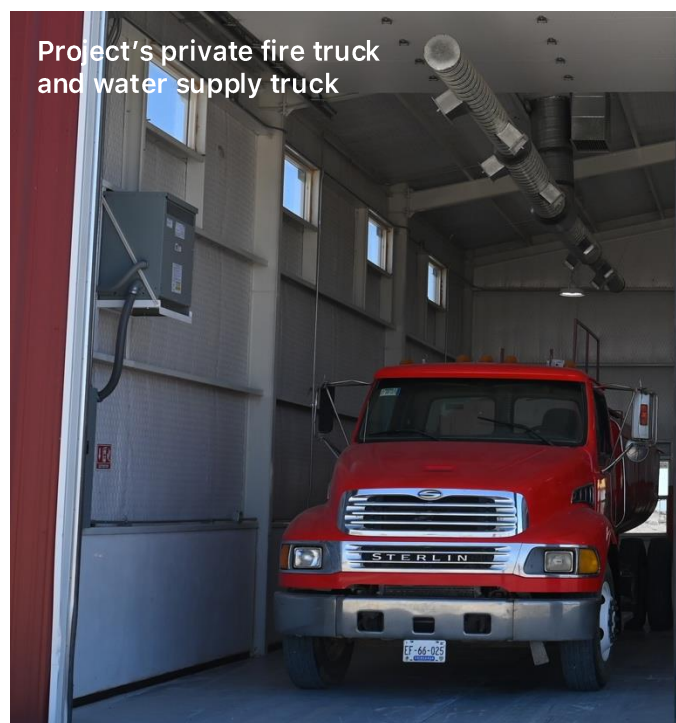
Rodolfo Garcia showing the engine exhaust pipes and exhaust silencer to Johanna Depenthal

The Carbon Project

The project invested in its own fire station using revenues from the sale of carbon credits. These investments have cut down fire response time from 30 to 10 minutes, improving landfill worker safety and local air quality.

After a series of fires in 2023, the project took several precautions to derisk the landfill. This fire station was one such precaution. The project also began burying its horizontal collection tubes belowground as an additional measure against fire damage.

The fire station houses a fire truck and a water truck with 10,000 L capacity. The fire truck was purchased second-hand from Arizona for roughly 500,000 MXN pesos, or ~\$25,000.



Social Benefits

Biogas de Juárez offers educational tours of the project to students ranging from primary school through the university level, as well as to researchers and government officials. Nearly all local schools have come to visit, and the company has also hosted visits from institutions in other states, such as students from the Universidad Tecnológica de Nogales in Sonora.

Rodolfo Garcia himself became aware of Biogas de Juárez during an educational visit as a renewable energy engineering student. Now, he works there as Plant Manager and has been with the company for nearly ten years!



Conclusion

The Cool Effect team was highly impressed by the site visit to Ciudad Juárez. The Biogas de Juárez team demonstrates an enthusiasm and commitment that shows up in every detail of their work, from basic landfill and project operations to QA/QC, environmental education, and community outreach.

It's clear that carbon revenue is decisive for implementing methane collection and destruction at this landfill, and Cool Effect is excited to continue partnering with Biogas de Juárez to further support the destruction of this critical super pollutant.

