

Carbon project:

Landfill gas capture, Ecoparque Maceió, Brazil

Gold Standard **GS 12199**



A Cool Effect onsite report

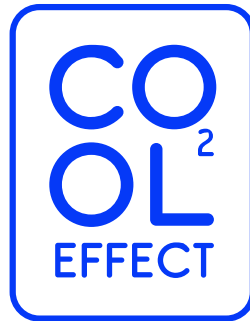
November 2025



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:

Ecoparque Maceió,
Brazil

Project type:

Landfill Gas Capture

Standard:

Gold Standard 12199

Methodology:

ACM0001 v19.0



Expected issuance:

200,000 per year

Crediting periods:

5 years

Ecoparque Maceió (GS 12199) is a Gold Standard-registered, CCP-eligible landfill gas collection and destruction project in Northeastern Brazil.

The project is owned by Orizon Valorização de Resíduos, a publicly-traded leading company in the Brazilian waste management sector, which also holds the concession to operate the municipally-owned landfill.



The project currently operates with a gas collection system, high-temperature enclosed flare, and a 0.5 MW generator that generates electricity for internal use. In the future, Ecoparque Maceió will create renewable energy to displace fossil fuels either by generating electricity or by producing biomethane. Orizon operates both the landfill and the carbon project with high cleanliness, safety, and performance standards.



From left to right:

Hugo de Leon – Landfill gas specialist at Ecoparque Maceió

Jorge Maicon – Manager of landfill gas plants at Ecoparques Maceió, Sergipe, and Joao Pessoa

Kelvin Romano – Ecoparque Maceió Manager and leachate specialist

Johanna Depenthal, Cool Effect Director of Project Research

Paulo Laguardia – Environmental Operations Superintendent at Orizon and Executive Director of the Orizon Social Institute

Laura Nunes – Operational supervisor of Ecoparque Maceió

Agenda

We started the morning with an opening meeting with the Ecoparque Maceió team in the on-site conference room. We then headed up to an overlook point on top of the landfill, where we could see waste filling operations, the gas collection system feeder lines, and nearby communities. Orizon has installed a swing on top of the landfill to create photo opportunities that can be used to increase their community engagement via social media outreach.

Next we went to look at the leachate treatment process: Orizon is currently transitioning from an older chemical-based system to a novel biological treatment process. approach. Finally, we visited the carbon project's flare and flare control room before returning to the conference room for a closing meeting, including viewing 3D drone imagery of the landfill used to inform management decisions.

Opening meeting with the Ecoparque Maceió project team: from left to right, Cool Effect Director of Project research Johanna Depenthal, Hugo de Leon, Laura Nunes, Jorge Maicon, Paulo Laguardia, and Kelvin Romano



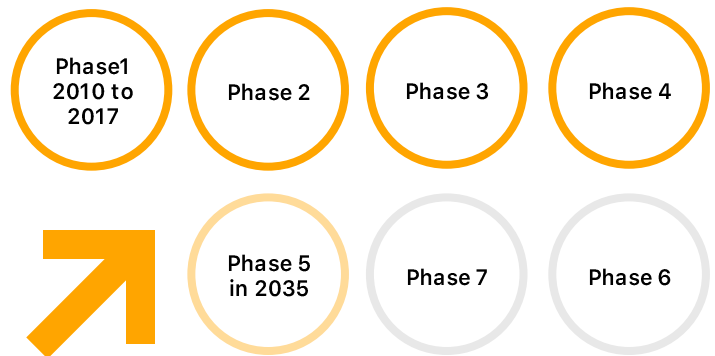
Background

Ecoparque Maceió is a municipal landfill owned by Maceió, the capital city of the state of Alagoas. The landfill began operations in 2010, and Orizon won the concession from the city of Maceió to operate the landfill in December 2022. Maceió is a beachside city which attracts significant tourism, resulting in seasonally variable waste flows (averaging 2000-2500 tonnes of municipal solid waste per day) with high percentages of food waste to Ecoparque Maceió.

Prior to Orizon's current carbon project, the landfill had no active gas collection system.

Ecoparque Maceió is an official sanitary landfill, with a LDPE (low density polyethylene) liner to prevent leachate from infiltrating into the groundwater and sculpted sides and surface drains to reduce the amount of rainwater that enters the landfill. Unlike many landfills, Ecoparque Maceió is an excavated pit that is slowly being filled in, rather than layering waste beginning from the ground level.

The landfill is divided into 4 areas based on fill-date: Phase 1 areas were filled between 2010 and 2017, prior to Orizon's involvement with the landfill, and have no gas collection system. Orizon is implementing Phase 4 filling now, and the phase 2, 3, and 4 areas all have a gas collection system. Orizon is currently applying for licensing to begin filling waste in the phase 5 area in 2032 and will probably complete phases 6 and 7 at a future point.



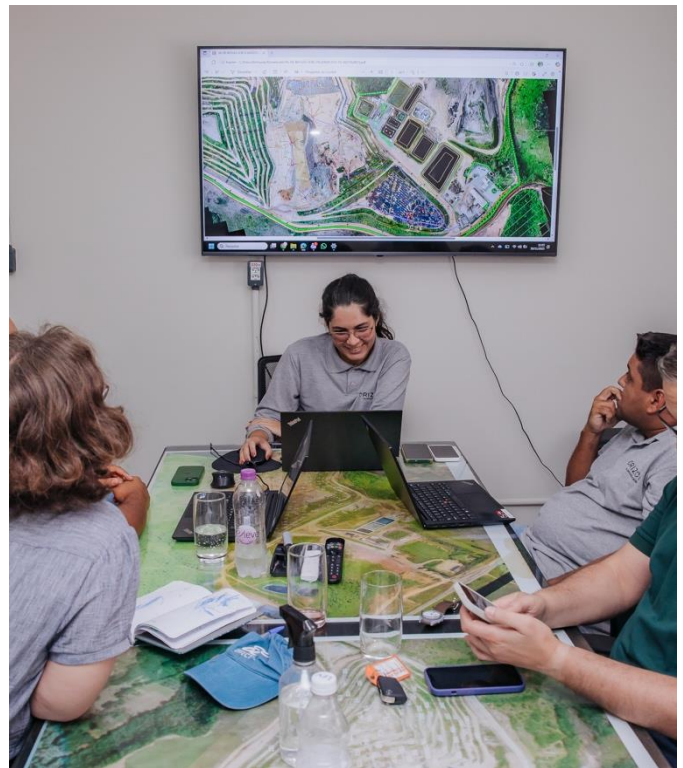
Active face of the landfill with the gas collection system feeder lines visible on the right



Operations and management

Orizon has implemented multiple best practices in their landfill management. Orizon hires a topographer to advise on and monitor the compaction and movement of the landfills. The company has also invested in high tech drone monitoring of all landfills two times per month, resulting in a 3D, true color rendering of the landfills that enables management to ensure that the trash fill plan is being followed and that operations in general follow operational plans.

Waste is layered into the landfill by machinery moving from uphill to downhill (as opposed to the opposite), which saves fuel and results in less emissions. The landfill has specialized areas for breaking down construction material for internal use as necessary and for breaking trees and landscaping waste down into compost. Workers collect trash that blows away along the inside of the fence, and Orizon also planted double rows of shrubs along the fence line to help capture the trash.



Operational Supervisor Laura Nunes demonstrates the 3D landfill imagery captured via drone



Ecoparque Maceió manages

2,000-2,500

metric tonnes of municipal solid waste *per day*

Operations and management

At the time of the site visit in November 2025, Orizon treated Ecoparque Maceió's leachate with a system of coagulation and filtration using aluminum polychloride and other additives. Beginning in Q1 2026, however, the landfill switched to a novel biological treatment method developed and improved over time by Orizon at their Ecoparque Nova Iguaçu landfill, in which leachate is processed via ponds with aerobic and anaerobic microbes.

Cool Effect was able to see the ponds for the new system in preparation as the microbes acclimated. The biological treatment method has three steps: continuous treatment in the ponds with aerobic and anaerobic bacteria, agitation and filtration, and then filtration from ultra to nano filtration. The process is more expensive than reverse osmosis (costing about 40 reales per m³ treated), but leaves less concentrate, which is why it's being implemented at the larger landfills.

Price drops as volume filtered scales. Concentrate is put back at the beginning of the process, not re-added to the landfill. Treated water is currently used internally while Orizon waits on licenses from the environmental agency to reincorporate it into water sources.

Part of the old leachate treatment system



Leachate filtration station



Operations Manager Kevin Romano explains the new biological treatment system to Cool Effect Director of Project Research Johanna Depenthal



The project

The landfill's gas collection and destruction project is funded entirely by carbon revenue and destroys approximately 217,600 metric tonnes of carbon dioxide equivalent (converted using GWP100) of methane per year under the ACM0001 methodology. Exact values will change from vintages 2026 on as the project transitions to a new methodology.

Management of the landfill is focused on capturing the landfill gas, which is typically about 50% methane, as efficiently as possible. Currently the project captures approximately 65-70% of the gas generated in the landfill.

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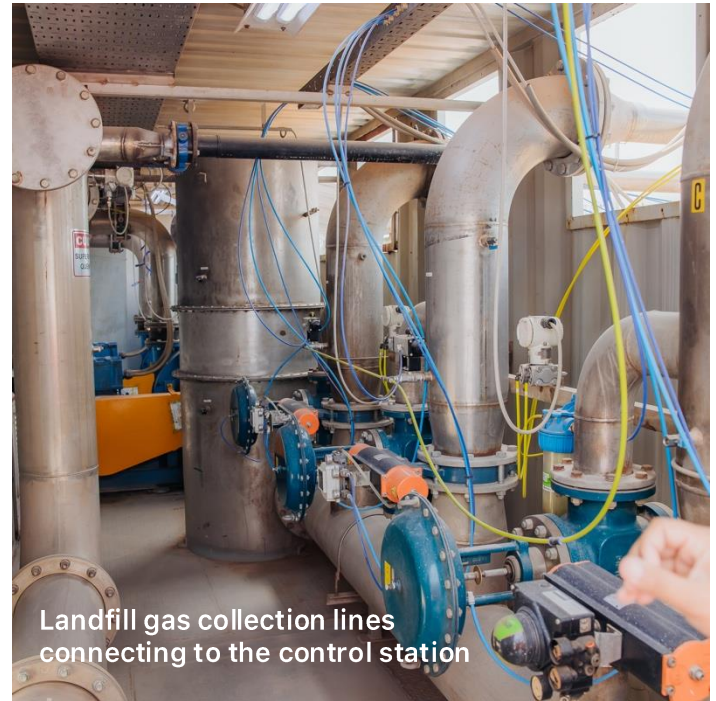
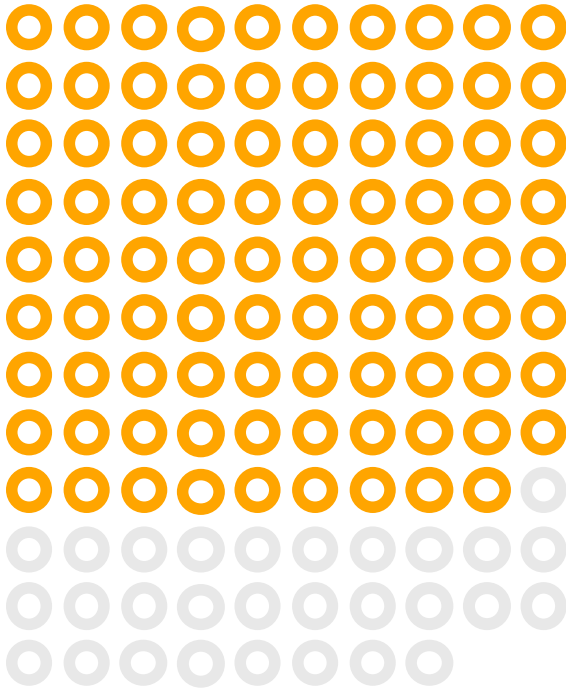


The Orizon team and Cool Effect Director of Project Research Johanna Depenthal in front of the carbon project control station

The project

Gas collection starts in the project's wells, which are placed vertically in the landfill. The project has 89 wells currently capturing gas, plus another 29 wells installed and ready in areas of the landfill that haven't been filled with waste yet.

The wells are connected by approximately 1,200 meters of feeder lines to two main gas lines which come together at the flaring station, where the blower, small one 0.5 MW generator, high-temperature enclosed flare, and the operational center with meters are located.



Landfill gas collection lines connecting to the control station



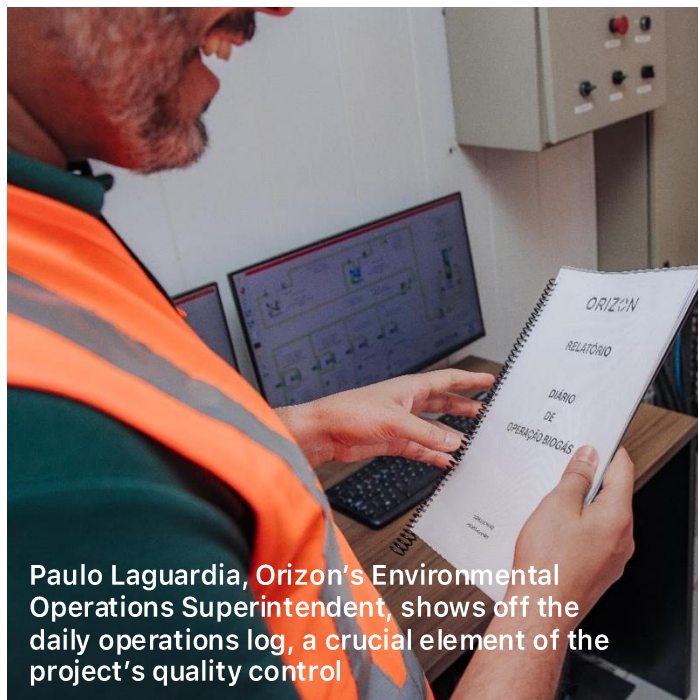
Landfill gas specialist Hugo de Leon explains the project's blower

The project

The high-temperature enclosed flare has 5000 m³ of gas/hour flare capacity and combusts landfill gas at a temperature 1000 degrees Celsius. The flare operates 24/7 except for during scheduled maintenance for approximately 6 hours per month. The landfill gas composition is carefully monitored, and the landfill gas plant and flare shut off automatically for safety reasons if the oxygen levels are > 3%. Electricity generated by the 0.5 MW generator is used for the landfill only and covers roughly 90% of the administrative building and landfill gas plant's needs.

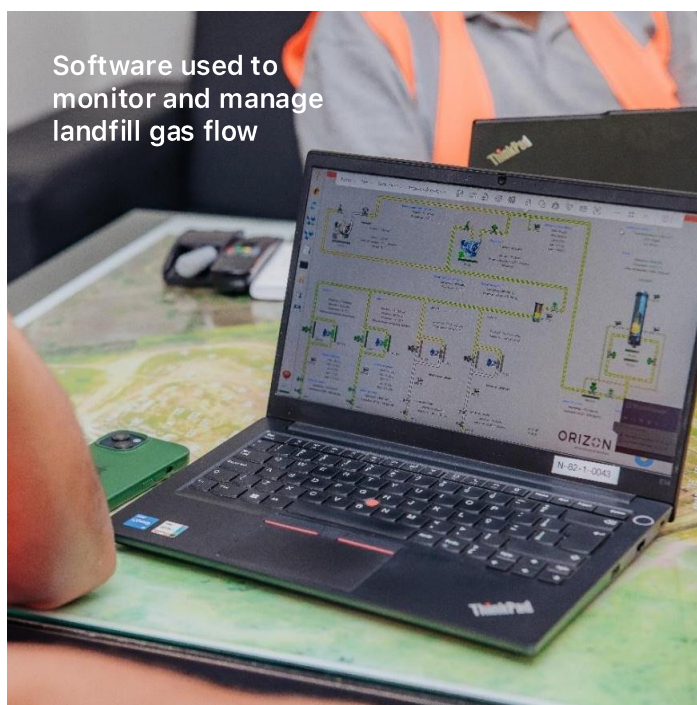
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In the near future, Ecoparque Maceió will install further electricity generators or a biomethane plant so that the project produces renewable energy and displaces fossil fuel use. Orizon plans to verify the project twice per year, with the next issuance of credits planned for Q2 2026.



Paulo Laguardia, Orizon's Environmental Operations Superintendent, shows off the daily operations log, a crucial element of the project's quality control

Below: Cool Effect Director of Project Research and the Orizon team in front of the Ecoparque Maceió flare



Software used to monitor and manage landfill gas flow



Social benefits

Community relationships

Orizon has close relationships with the communities surrounding the landfill, who have stated they noticed a positive change in landfill odor relative to the previous management by ESTRE. Program of helping the neighbors that is unique to Maceió—leaders of barrios bring community needs to Orizon, Orizon evaluates and typically funds repairs (generally infrastructure issues such as street repair and structural issues). They addressed 209 issues between January and October 2025.

Orizon Social Institute – Environmental Education

The Orizon Social Institute was founded three years ago and focuses on engaging young people ages 12 through 25 with information about concepts like Circular and Low-Carbon Economies. The Orizon Social Institute coordinates visits to the landfill for school groups of all ages, even providing transport in some cases. OSI staff also visit schools for a project to train teachers about waste management and the circular economy.

The number of visitors varies by season (and they take off during the school break in the summer), but roughly 170,000 people have visited all Orizon projects over the past 3 years. Other Orizon Social Institute programs include funding academic research with universities and supporting nearby communities with sustainability efforts and women's empowerment.

Landfill and gas collection project model used by the Orizon Social Institute for educational visits with students



Social benefits

The Orizon Social Institute coordinates visits to the landfill for school groups of all ages and provides transportation to the landfill in some cases. Bruno also does visits to schools and a project to train teachers about waste management and the circular economy. The number of visitors varies by season (and they take off during the school break in the summer), but roughly 5-10 groups of 20-30 people visit Ecoparque Sergipe per month.

Overall, roughly 160,000 people have visited all Orizon projects over the past 3 years. Other Orizon projects include funding academic research with universities and supporting nearby communities, including with topics such as women's empowerment and sustainability.

Above and Beyond

As part of their contract with the municipality, Orizon was also required to take control over monitoring and treating leachate at Maceió's older, closed dumpsite. Orizon installed a containing wall and drainage system around the old dumpsite, including water drainage. Previously, people from the surrounding community would go to the dumpsite to pull out metals, and local kids also would also swim in the leachate collection pools, which are very diluted with rainwater. Orizon typically transports one truckful of leachate from the old dumpsite over to the landfill for treatment per day.



Conclusion

The Cool Effect team was highly impressed by the site visits to Ecoparque Maceió and its sister project, Ecoparque Sergipe. The Orizon 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 Orizon to further support the destruction of this critical super pollutant.

