

Carbon project:

Landfill gas capture, Ecoparque Sergipe, Brazil



Gold Standard GS 12205



A Cool Effect onsite report

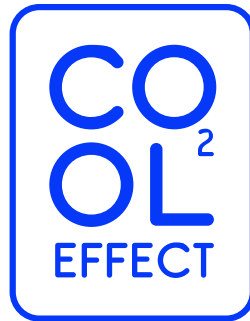
November 2025



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 Sergipe,
Brazil

Project type:

Landfill Gas Capture

Standard:

Gold Standard 12205

Methodology:

ACM0001 v19.0



Expected issuance:

290,000 per year

Crediting periods:

5 years

Ecoparque Sergipe (GS 12205) is a Gold Standard-registered, CCP-eligible landfill gas capture project in Northeastern Brazil. Both the project and the landfill are owned and operated by Orizon Valorização de Resíduos, a publicly-traded leader in the Brazilian waste management sector.

The project currently operates with a gas capture system, two flares, and a 0.5 MW generator that generates electricity for internal use.

In the future, Ecoparque Sergipe 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.



Agenda

November 19th, 2025 We arrived at the landfill at around 9am and met in the administrative offices with Paulo, Bruno, and Jorge for introductions and an overview of the site visit. We then went to the landfill's environmental education room, where Bruno told us about the Orizon Social Institute's work in engaging teachers and students throughout the educational system with core topics of circular economies, waste management, and the generation of renewable energy.

We then suited up in PPE for a tour of the carbon project and landfill, first stopping by the flare and generator location and control room, then driving up onto the landfill to get a close-up of the gas collection wells and piping network. We also got a view of the open face of the landfill where trash is being added. We then toured the landfill's leachate treatment area, the landfill's greenhouse, and the employee soccer field. We closed the visit by discussing final questions with Marcos, the assistant manager of the landfill.



Background

The landfill was founded in 2013 and owned by waste management company ESTRE until it was purchased by Orizon in 2022.

Prior to the current carbon project, the landfill had no active gas capture system: landfill gas was vented directly to the atmosphere.

Today, Orizon owns the actual landfill property. The former owners had listed the landfill as a carbon project under the Clean Development Mechanism but hadn't completed the project registration or installed any gas capture infrastructure.



Operations and management

Ecoparque Sergipe receives

1.9-2K

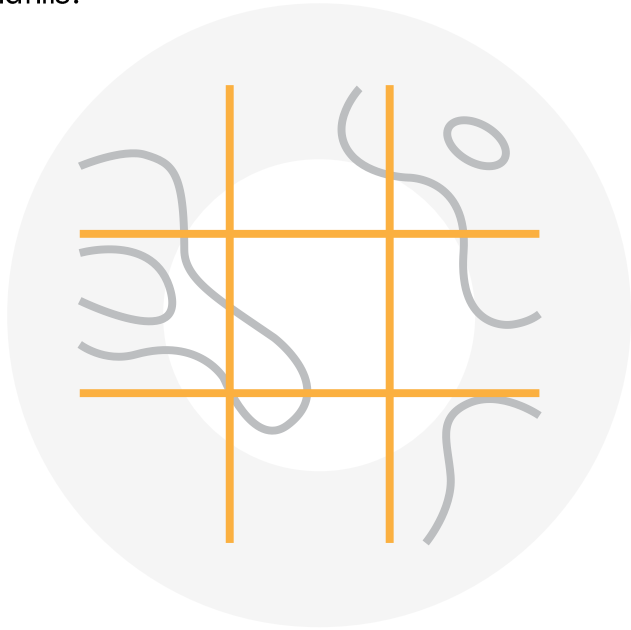
metric tonnes of municipal solid waste per day from 31 municipalities.

The landfill is an engineered sanitary landfill, with a hard plastic 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.

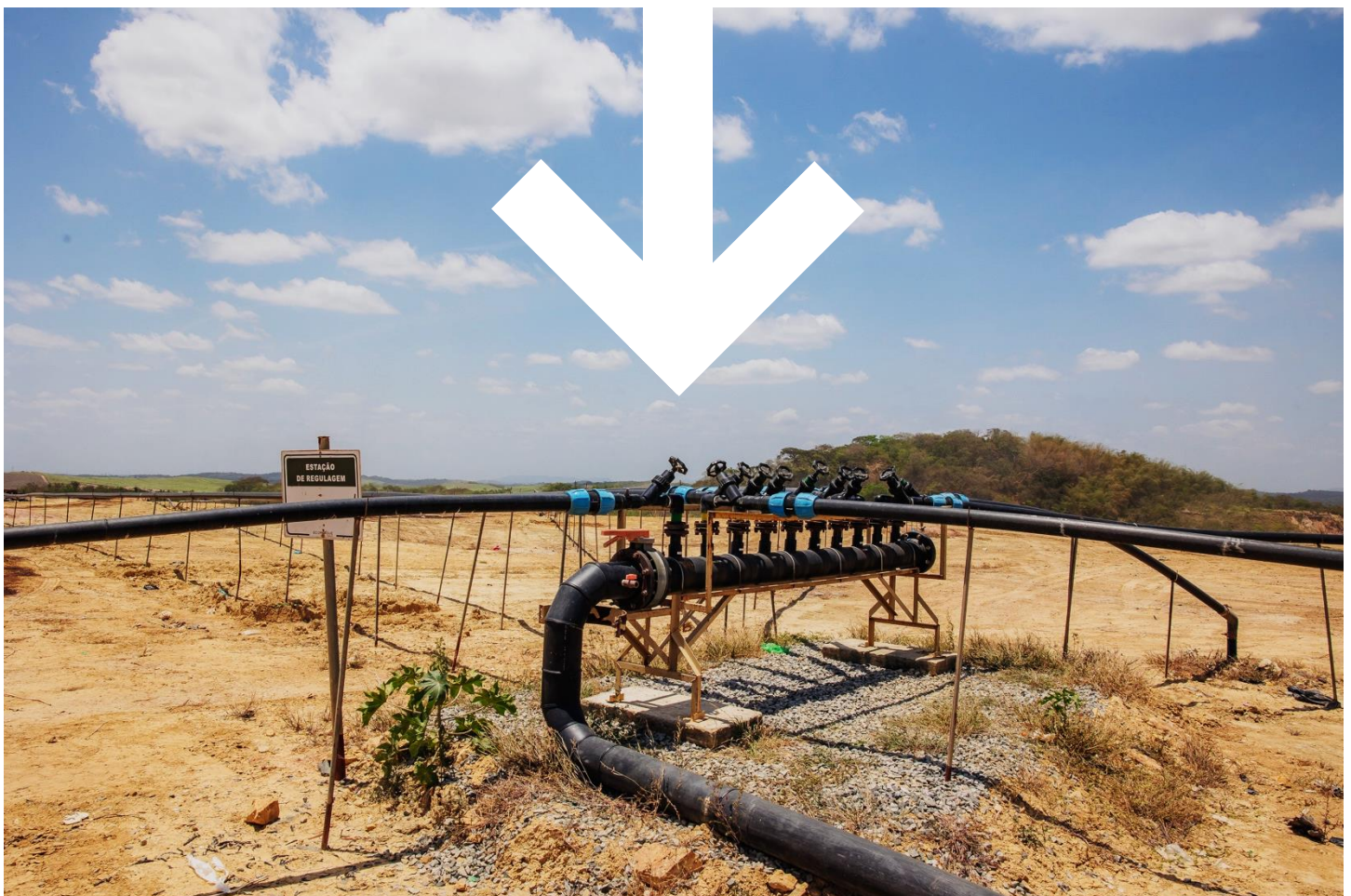
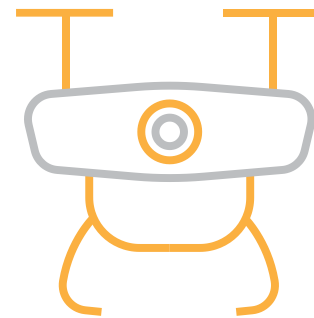


Operations and management

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. Paulo described the landfill as “a living being that is a giant biodigester.” The “final” cover layer (Orizon may still receive permission to add another layer of trash in the future) is clayish soil that is 60 cm deep.



Operations and management

Orizon invests significant resources and technical expertise in treating the landfill's leachate using a high-tech reverse osmosis treatment system.

First, sulfuric acid is added to the leachate to decrease the pH (because leachate is high in ammonium), and then the leachate is processed through a series of tubes that contain polymeric membranes, with increasingly smaller pore sizes to filter out particles. These specialized filters are imported from Portugal.



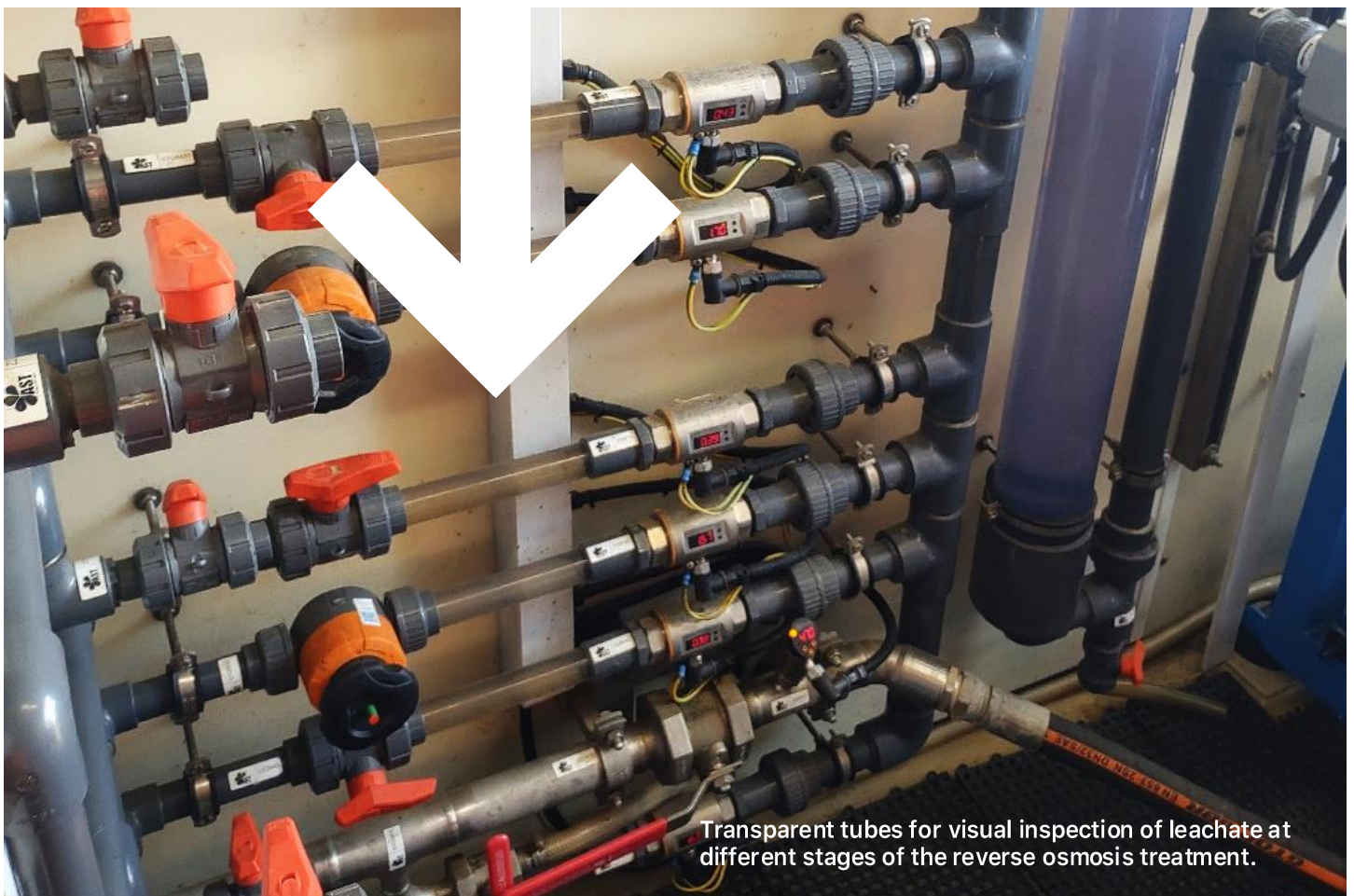
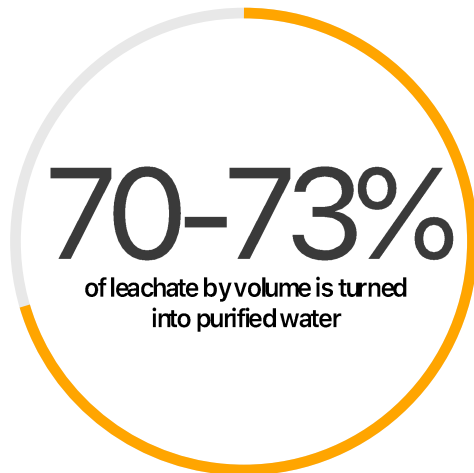
Reverse osmosis leachate treatment system
(horizontal cylinders in the background)

Operations and management

Each of the two systems has the capacity to process about 270 m³ of water per day: 70-73% of the leachate by volume is turned into purified water, and the rest is a concentrate that is returned to the landfill. Overall, they generate 200-500 m³ of water per day, depending on

season. As a final step, water is treated with chlorine.

The reverse osmosis treatment process costs about 25 reales (approximately \$5 USD) per m³ of treated water; costs stay fixed even with scaling. Currently treated water used only within the landfill for cleaning equipment and wetting roads to reduce dust, but they are in process of getting the license to discharge purified water in local rivers. (Orizon says the purified water has better water quality than the rivers). Wells around the landfill are tested every two months to monitor for possible leachate leaks.



Transparent tubes for visual inspection of leachate at different stages of the reverse osmosis treatment.

Operations and management

At one point, the landfill management received complaints about leachate odor. Assistant manager Marcos stayed overnight to see what was going on and noticed that the wind direction changes (from south-to-north to north-to-south) in the early morning hours, which directed the odor towards neighboring communities. The landfill now covers the super concentrated leachate pond and that has addressed the issue. Urban population is growing towards the landfill. No other health, safety, or environmental risks reported.

In case of landfill expansion, Orizon would have to plant multiple trees for every tree removed, as determined by the state of Sergipe. Trees would be native Mata Atlantica species and would be provided by the state.



Pond with treated water derived from leachate

Carbon project

Management of the landfill is very focused on maximizing the efficiency of their gas capture system. Paulo quoted the manager of their Nova Iguaçu landfill as saying “Before, biogas capture had to adapt to the operations of the landfill – now the landfill operations adapt to biogas capture.”

Landfill gas is captured at Ecoparque Sergipe via 99 vertical wells which are connected to a network of pipes that feed into three main lines. The wells are vertical perforated tubes within a wire cage filled with rocks to allow for the gas to flow while also protecting the wells from displacement or damage by heavy machinery used to layer the trash. The wells are installed in each layer of the landfill as trash is filled in.



Landfill relative to nearby communities, with covered leachate pond visible in mid-right



Wire cages (visible on the ridge) being prepped for new gas well installation.



Monitoring team checking gas composition in the gas capture system feeder lines.

Carbon project

Each of the 99 biogas wells and the three main lines are monitored daily by a dedicated team that works from 6:00am to 5:00pm: the team monitors the landfill gas's methane and oxygen composition at dedicated sample points and can open or close valves to balance the flow of gases as necessary.

The collection pipes have a specific elbow with a special valve to remove condensation from the landfill gas, since moisture must be removed before flaring.



Carbon project

The main gas lines come together at the flaring station, where the blower, small generator, operational center with meters, and flares are located.

Two high-temperature enclosed flares operate simultaneously to combust landfill gas at a temperature roughly 1000-1006 deg C. The flares have a joint capacity of destroying 7000 Nm³ of biogas per hour. Electricity generated by the 0.5 MW generator is used for the biogas project only, not connected to the grid. The project anticipates generating electricity for the regional grid once the sale of carbon credits is sufficient to undertake further investments in electrical generators.



Three main lines of landfill gas coming into the flaring station.



Flaring station

Carbon project

Ecoparque Sergipe's future installation of electricity generators will enable the project to produce renewable energy and displace fossil fuel use.

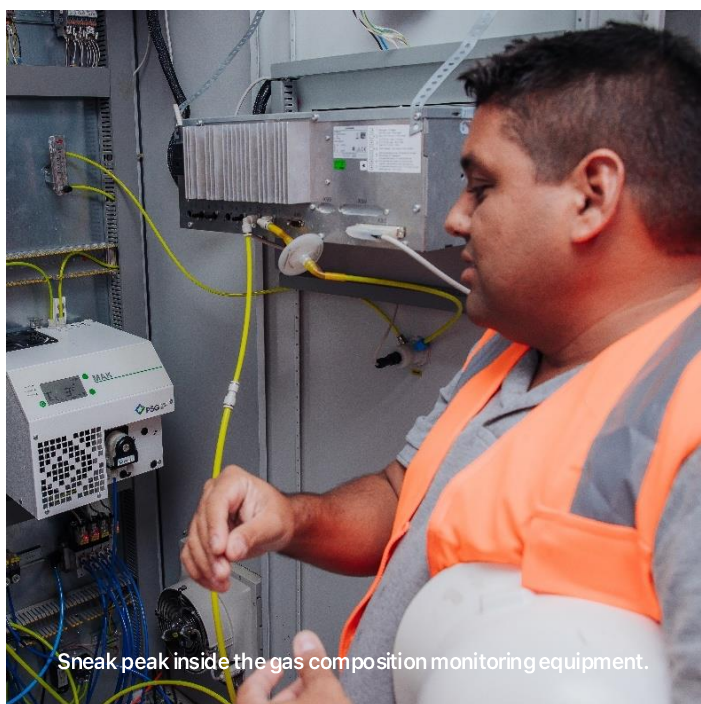
Orizon plans to verify the project once or twice per year, with the next issuance of credits planned for Q2 2026.



Jorge explaining the landfill gas collection lines.



Flaring station control room.



Sneak peak inside the gas composition monitoring equipment.



The project's 0.5 MW electricity generator

Social benefits

Orizon Social Institute – Environmental Education

The Orizon Social Institute was founded 3 years ago and focuses on engaging young people ages 12 through 25 with information about concepts like Circular and Low-Carbon Economies. The Institute hosts activities in all regions where Orizon has landfills and is financed by the sale of carbon credits.

Bruno, a warm person who Paulo described as “very loved” by the communities, oversees environmental education at Orizon’s landfills in northeastern Brazil. Bruno is a biologist by training who did environmental education for ESTRE and returned to work for Orizon as the social projects specialist for the Orizon Social Institute in the northeast. Ecoparque Sergipe has a small but well-equipped environmental education room with creative, engaging, up to date, and informative activities and games to teach about both the landfill management and the biogas project. Highlights were the hands-on model of the landfill and its operations and their touch-screen table showing different components of waste management at Orizon’s different landfills, such as the waste separation plant at Ecoparque Paulínia.



Model of the Ecoparque used to explain landfill's roles in generating renewable electricity

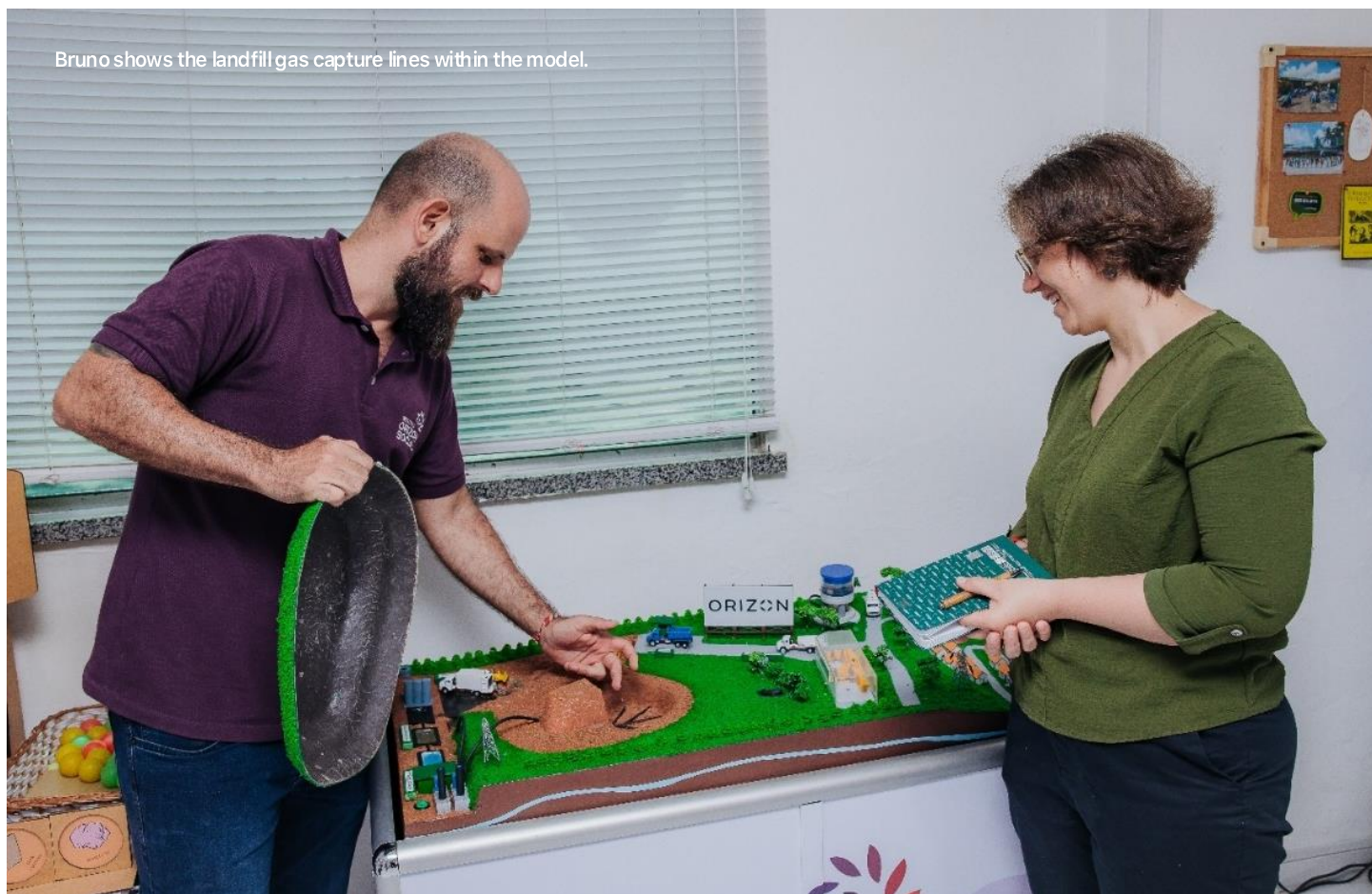
Social benefits

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.



Interactive touch-screen about different components of waste management.



Bruno shows the landfill gas capture lines within the model.

Social benefits

Employment As mentioned in the project's reported SDGs, 7 people are employed specifically for the carbon project at Ecoparque Sergipe. The majority of the Orizon Sergipe employees are from Rosario de Catete, as evidenced by the multiple bicycles parked outside of the administrative building. Orizon has a policy to preferentially hire employees nearby to support the local economy.

All Orizon employees have company-provided health and life insurance, which most employees (especially at lower levels) have never had before. The landfill's greenhouse, which provides ornamental plants for the property as well as a backdrop for company celebrations (such as the Sao João festival in June), and the soccer field help contribute to employee's mental and physical wellbeing as well as company morale.

Orizon even has an annual "Orizon Cup" soccer competition between all the landfills in the Northeast –Sergipe's sister project Ecoparque Maceió usually wins!



Employee soccer field



Greenhouse and company celebration area

Conclusion

The Cool Effect team was highly impressed by the site visits to Ecoparque Sergipe and its sister project, Ecoparque Maceió. 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.

