SUSTAINABLE PORTS OF CEARÁ: ENVIRONMENTAL INNOVATION CONNECTING THE STATE TO THE WORLD

April Edition, 2025

CÂMARA DE COMÉRCIO E INDÚSTRIA BRASIL PORTUGAL CEARÁ
FIEC Federação das Indústrias do Estado do Ceará PELO FUTURO DA INDÚSTRIA
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Our Team

Ceará Global by nupex

Mônica Luz

Lucas Carvalho

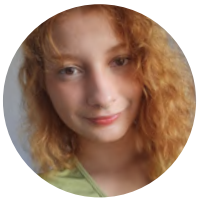
Maria Julia Boavista

Kaio Bezerra

Sabrina Guedes

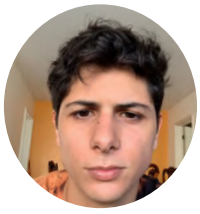
Mylena Soares

Luan Cavalcanti



Isabella Herbst

Davi Valentim



Rodrigo Ferreira

Grasiele Andrade

Sofya Damasceno

Gabriel Schmid

Executive Summary

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EDITORIAL

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As the global logistics landscape evolves, Ceará emerges as a strategic player in aligning economic growth with environmental responsibility. Throughout April 2025, Ceará Global highlighted initiatives that position the state's ports as benchmarks in sustainable development, bringing innovation to maritime and port operations.

From Pecém to Fortaleza, the state's ports are not only gateways for international trade but also catalysts for environmental transformation. The Port of Pecém has solidified its reputation as a hub of green logistics, integrating renewable energy through the Green Hydrogen Hub and establishing the Blue Corridor — a low-carbon route that connects key logistics points while reducing emissions. Meanwhile, the Port of Fortaleza is making strides in its urban operations, with the recent creation of an ESG Committee focused on aligning environmental management with community engagement and reducing the ecological footprint of port activities.

Throughout the month, Ceará Global delved into themes that underscore the importance of sustainable port management. The implementation of advanced environmental monitoring systems, the adoption of comprehensive Environmental Control Plans (PCAs), and the commitment to renewable energy have positioned Ceará as a leader in green port logistics. Additionally, the reuse of water and treatment of industrial effluents demonstrate how both ports are leveraging innovative technologies to mitigate environmental impacts.

IInternationally, the state's participation in global forums, such as the World Ports Climate Action Program, showcases Ceará's commitment to sustainable logistics on a global scale. These efforts are not just about reducing emissions but also about fostering inclusive and resilient port operations that engage local communities, as seen in the environmental education programs targeting fishing communities along the coast.

In this edition, we also present an exclusive interview with Lúcio Gomes, President of the Ceará Port Authority (Companhia Docas do Ceará), who shares insights on the strategic role of the Port of Fortaleza in advancing environmental practices and fostering global connections. His vision encapsulates the essence of Ceará's maritime strategy — a state committed to growth, innovation, and sustainability.

As we move forward, Ceará Global reaffirms its mission to connect the state's strategic initiatives to the world stage, emphasizing that sustainable development is not just a goal but a shared responsibility. The ports of Ceará are setting the course for a future where economic growth and environmental stewardship go hand in hand.

Let's go together! Enjoy the reading!

Ceará Global Team !!

ENVIRONMENTAL SUSTAINABILITY AND PORTS: GLOBAL CHALLENGES AND OPPORTUNITIES

Ports are essential to global trade, but they are also among the infrastructures with the greatest potential for environmental impact.

Ports and maritime transport are essential to the functioning of the global economy. Around 90% of international trade is carried out by sea, making ports strategic hubs for the flow of goods, the integration of global supply chains, and the supply of entire populations.

The Importance of Ports and Maritime Transport

Drivers of economic development: Well-structured ports attract investment, boost local industry, generate jobs, and stimulate international trade.
Logistical efficiency: Shipping large volumes by sea is more economical and sustainable than other modes of transport, especially over long distances.
Global connectivity: Ports connect continents, enabling access to distant and diverse markets.

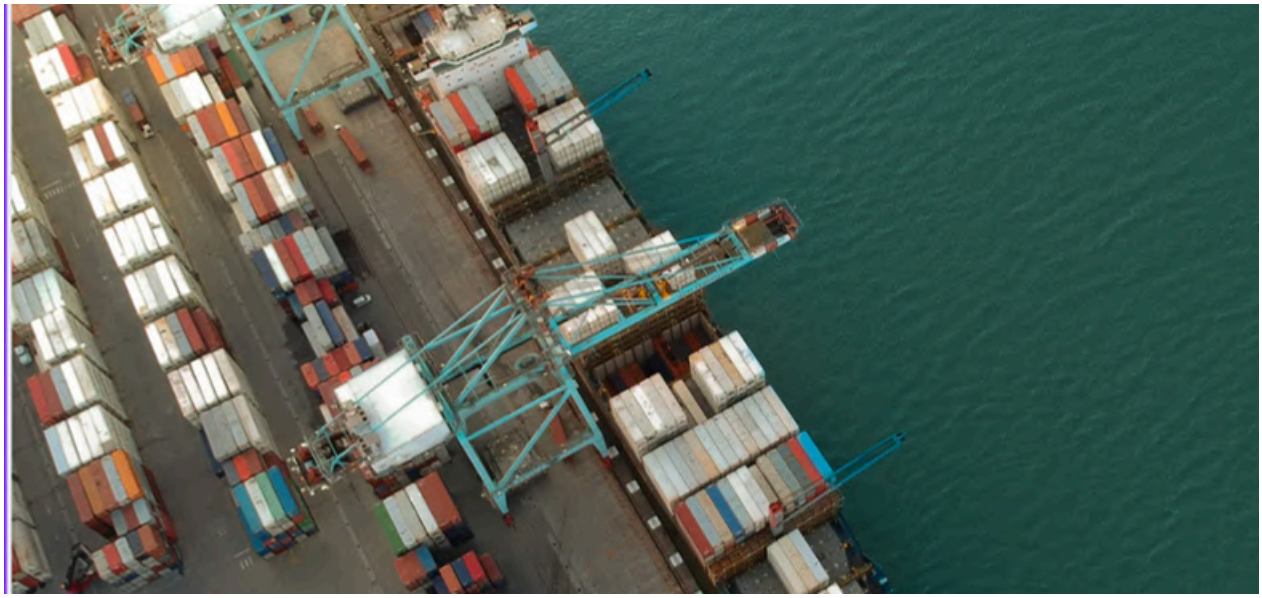
Pollutant emissions, risk of contamination of marine ecosystems, wastewater discharge, and noise are just some of the challenges faced.
In this context, the demand for sustainable solutions that combine economic development with environmental protection is growing — especially in vulnerable coastal regions.
Throughout the month of April, Ceará Global will showcase the many initiatives that are putting the state in the spotlight by turning its ports into pioneers of this new green era.

INTEGRATED ENVIRONMENTAL MONITORING SYSTEMS

Already implemented in Ceará's ports, these systems are essential to ensure sustainable, data-driven operations.
Implementation of Integrated Environmental Monitoring Systems at Pecém Port and Companhia das Docas represents a significant advancement in environmental management within port areas. Both ports have adopted modern systems that continuously monitor air, water, and soil quality, utilizing sensors to detect atmospheric emissions and noise levels. These systems aim to mitigate the negative impacts of port activities and support long-term sustainability.

At the Port of Pecém, environmental monitoring efforts also include the observation of marine mammals, sea turtles, birds, and sediment quality, as well as the evaluation of infauna and epifauna — vital components of the region's ecological balance. Companhia das Docas has likewise invested in specific control and monitoring programs, such as the Integrated Control and Monitoring Program for Nuisance Synanthropic Fauna, which is designed to prevent contamination and safeguard operational facilities.

Collecting consistent data on local biodiversity is essential to understanding how port operations affect surrounding ecosystems. These initiatives underscore the importance of continuous, integrated monitoring to ensure the long-term environmental sustainability of port infrastructure and operations.



SUSTAINABILITY IN MOTION: THE ROLE OF PCAS IN CEARÁ'S PORTS

Environmental management tools helping transform port operations into models of responsibility and innovation.
In January 2025, the Port of Pecém joined the Sustainability Pact, an initiative led by Brazil's Ministry of Ports and Airports (MPor) aimed at transforming socio-environmental management in the logistics sector.

The commitment aligns with the UN's 2030 Agenda and includes goals such as reducing emissions, promoting professional training, and fostering a greener and more efficient logistics chain.

The Pecém Complex already stands out for its Environmental Control Plan (PCA), which guides its operations based on ESG criteria. The PCA includes actions such as atmospheric emissions control, recovery of degraded areas, waste management, biodiversity monitoring, and specific environmental mitigation targets.

By joining the pact, Pecém strengthens its institutional image and expands its role as a driver of sustainable development. The initiative is expected to attract new investments and generate positive impacts for surrounding communities, with a focus on education, job creation, and environmental preservation.

At the Port of Fortaleza as well, the main program included in its Environmental Control Plan (PCA) is the Solid Waste Management Plan (PGRS), which guides the proper handling of waste generated at the port, promoting reduction, reuse, recycling, and appropriate disposal, in accordance with ANTAQ and CONAMA regulations.

CEARÁ'S PORTS CONNECT LOGISTICS AND CLEAN ENERGY PECÉM AND FORTALEZA ADVANCE CLEAN SOLUTIONS AND REAFFIRM THE STATE'S LEADERSHIP IN THE GLOBAL ENERGY TRANSITION.

The Pecém Complex is a Brazilian pioneer in integrating wind and solar energy into its energy matrix, in alignment with the Green Hydrogen Hub project, the first of its kind in the country. Over 1,331 hectares have been allocated for the installation of green hydrogen (H2V) industries, interconnected with the Port of Pecém.

The structure will include a “primary area” for hydrogen production, a “secondary area” for storage, and an “infrastructure corridor” dedicated to transporting the hydrogen to the port terminal. This initiative consolidates Ceará’s role as a key player in the global energy transition.

In addition, the Pecém Complex stands out for adopting renewable energy sources in its matrix, featuring its own solar microplant and a contract with Casa dos Ventos to supply 100% clean energy, certified by the I-REC system.

Meanwhile, at the Port of Fortaleza, Ceará's Dock Company has announced its entry into the Free Energy Market, aiming to purchase electricity from renewable sources such as solar and wind. The initiative reinforces Fortaleza's environmental commitment, promoting energy efficiency and alignment with ESG guidelines.

Many ports are now investing in advanced wastewater treatment systems that allow for the reuse of water in activities such as yard cleaning, dust control, and irrigation. These technologies help reduce the consumption of drinking water and minimize environmental impact — a key step toward circular economy practices.

A standout example is the Port of Pecém, located in the state of Ceará, Brazil. The port reuses approximately 1,200 m^3 of treated water per month, reducing its potable water usage by 25%. By adopting efficient and scalable environmental practices, Pecém demonstrates that economic development and sustainability can go hand in hand, inspiring other hubs around the world to follow suit.

WATER THAT RENEWS ITSELF: THE ROLE OF PORTS IN COMBATING WATER SCARCITY

Around the world, ports are becoming strategic players in the fight against climate change and water scarcity. With high operational demands and growing environmental pressure, sustainable water management has become a top priority for the logistics sector.

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SUSTAINABILITY IN MOTION: ENVIRONMENTAL EDUCATION AND A COMMITMENT TO PEOPLE

Environmental education and social inclusion guide the actions of Ceará's ports.At the Port of Pecém, programs such as the Integrated Environmental Education Program and the Social Communication Program have strengthened ties with neighboring communities. In compliance with IBAMA's environmental license, these initiatives offer workshops and training courses for fishers and shellfish gatherers in regions like Taíba, Pecém, and Cumbuco. More than 45 participants have already been trained, combining tradition, income generation, and environmental awareness.

At the Port of Fortaleza, the Companhia Docas do Ceará established an ESG Committee to integrate initiatives focused on education, waste management, and engagement with coastal communities. Both administrations emphasize that sustainability goes beyond port operations — it also represents social transformation and a commitment to a fairer and more environmentally responsible future.

PORT OF PECÉM EMERGES AS AN INTERNATIONAL GREEN PORT REFERENCE

With key certifications and adherence to global sustainability standards, the Ceará hub strengthens its position as an environmentally responsible terminal.

The Port of Pecém is rapidly gaining international recognition as one of Brazil's leading examples of sustainable port operations.

These achievements reflect more than operational excellence — they signal the port's alignment with global sustainability agendas, particularly the UN's 2030 Agenda and the Sustainable Development Goals (SDGs).

The certifications place Pecém among a growing number of ports considered crucial to the future of eco-efficient logistics and clean industrialization.

Recently, the port earned the ISO 14001 certification, which affirms its commitment to effective environmental management systems, and joined the Green Port Award System (GPAS) — an international program that highlights ports implementing best environmental practices across Asia and Latin America.

CEARÁ PORTS STAND OUT IN GLOBAL FORUMS ON PORT SUSTAINABILITY

The Pecém continues to strengthen its international presence as a sustainable and strategic port. In addition to being part of the World Ports Climate Action Program, Pecém is participating in Intermodal South America 2025, one of the largest logistics events on the continent.

Intermodal South America is recognized for bringing together key players in the logistics and port sectors, serving as a strategic platform for sharing innovations and sustainable practices.

The participation of the Port of Pecém in the event reinforces Ceará's commitment to sustainability and its alignment with global sustainable development initiatives.

Moreover, APM Terminals, the container terminal operator at the port, is showcasing a new direct route to major Asian hubs such as Singapore, Busan, and Shanghai — a connection that positions Ceará as a fast and environmentally conscious link between Northeast Brazil and Asia.

All these advancements reflect strong leadership from both the Pecém Industrial Port Complex and the Ceará Port Authority – Port of Fortaleza, as they work to solidify Ceará's role in building a greener and globally connected logistics network.

DEVELOPMENT OF THE BLUE CORRIDOR AND SUSTAINABLE LOGISTICS

"Inspired by international models, the Blue Corridor integrates sustainable transport modes and reinforces Ceará's role in the global environmental agenda."

The Blue Corridor is an initiative that promotes the integration of ports, highways, and inland waterways using low-carbon transport modes, with a focus on cleaner fuels such as liquefied natural gas (LNG) and biomethane.

The Blue Corridor draws inspiration from similar systems already implemented in Europe and Asia, promoting innovation in freight transport and supporting the country's energy transition.

ith studies showing significant emission reductions from the use of CNG and biomethane, the project represents a key step toward cleaner, more efficient, and competitive logistics.

The project aims to reduce freight transport emissions, improve air quality, and offer more sustainable alternatives to diesel.

At the Port of Pecém, one of Brazil's most strategic logistics hubs, the integration of road and rail infrastructure supports efficient cargo flow aligned with sustainability goals.

FROM CEARÁ TO THE WORLD A SUSTAINABLE AND GLOBALLY CONNECTED FUTURE

Ceará is showing the world that it is possible to grow with environmental responsibility. In April, we highlighted how the state's ports — Pecém and Fortaleza — have been integrating innovation, logistics, and environmental preservation.

The Port of Pecém has strengthened its global position by joining international sustainability forums, developing clean routes, and expanding its green infrastructure, such as the Blue Corridor and the Green Hydrogen Hub — a strategic initiative that positions Ceará as a benchmark in the energy transition.

The Port of Fortaleza is moving forward with the creation of an ESG Committee, reinforcing its commitment to sustainability by joining the Free Energy Market, prioritizing renewable sources, and implementing actions aimed at social engagement and reducing environmental impacts in its urban operations.

From environmental education to low-carbon logistics, Ceará proves that it is possible to align economic growth with climate commitment.

The state's ports are pillars of the new green economy, connecting innovation, logistics, and environmental preservation. We continue to build a future in which sustainability is an essential part of port development and the internationalization of the state.

LUCIO GOMES

Chief Executive of Companhia Docas do Ceará

PORT OF FORTALEZA: SUSTAINABILITY IN PRACTICE AND COMMITMENT TO THE FUTURE OF CEARÁ

We spoke to Lucio Gomes, CEO of Companhia Docas do Ceará, about the progress made by the Port of Fortaleza towards a more efficient, cleaner operation in line with good environmental practices.

The port has been adopting measures such as the use of renewable energy and the modernization of its infrastructure, with a focus on energy efficiency. In addition, the administration is studying the creation of a green tariff for ships with lower carbon emissions and the implementation of an electricity supply for moored vessels - avoiding the continuous use of fossil fuels. The company has signed a contract with Fundación Valenciaport to draw up a decarbonization plan for the entire Port of Fortaleza operating chain.

When asked what is still missing for Ceará to advance in sustainable port development, in tune with local communities, Lucio was direct: "When we arrived here in July 2023, there was no project portfolio. At first, we drew up a strategic plan with 12 objectives, covering all the company's areas and needs. Today, our portfolio contains 47 projects, which are being conceived, tendered or executed. We need to move away from talk and into action. We hope to multiply the volume of investments this year by five compared to last year." He pointed out that the progress of the projects is monitored on a weekly basis - reinforcing the commitment to concrete and lasting results.

The Ceará Global initiative is proud to highlight efforts that strengthen our state - promoting innovation, environmental responsibility and integrated economic development. We will continue to accompany and support the steps that lead Ceará to a more sustainable future.

The Port of Fortaleza deals with a high demand for fuel and oil products. How have you managed to reconcile operational efficiency and sustainable practices in this sector?

We believe that Ceará is privileged to have two ports with different characteristics - each with its own specificities. For example, here [in Fortaleza], we have an urban port, while the Port of Pecém is industrial.

An urban port, as the name suggests, is part of the urban fabric. This has advantages and disadvantages. One clear advantage is the cost of transporting cargo, both inbound and outbound, thanks to its proximity and the reduction in travel. On the other hand, it requires extra care - otherwise, it creates disruption and problems for the city.

Ports in urban areas are part of human history. Ever since towns and villages came into being, ports have appeared - many cities have developed from and around them. This reality imposes limits on operations and requires strict attention to environmental, safety and access issues. The Port of Fortaleza is no exception.

We are taking measures to deal with these issues, while at the same time making progress in sustainability and economic performance. This year, we should repeat the good results of 2023 and 2024, when we made sustainable profits. I asked for a historical check and there was no record of distributing profits to employees - but we did so last year, thanks to the good results. Even so, we are concerned about possible disruption.

For example, we recently accredited two investors to set up logistics support structures located within a radius of up to 20 km from the port. They will be responsible for organizing the accreditation of trucks, so that vehicles access the port at scheduled times - avoiding the chaos we experienced in years gone by, with queues, traffic jams, bureaucracy and drivers having to get out of their vehicles to fill in forms. All this will be done remotely, following the best practices of other urban and even non-urban ports.

In 2023, we signed a contract with Fundación Valenciaport, an internationally recognized foundation linked to the Port of Valencia - one of the largest in Europe and the largest in Spain. The Foundation specializes in decarbonization and, as part of the contract, we expect the first delivery in May: the calculation of the Carbon Footprint. In other words, we will know the total volume of carbon emissions generated by our operations.

They were here last week and gave us a preview - most of the emissions don't come from the port's land-based activities, but from the ships. This is not yet fully dealt with internationally - there is no consolidated action model for eliminating or mitigating these emissions.Their analysis focuses on the time ships spend at anchor, waiting to dock, and on loading and unloading operations - and it is in this segment that we can act. The Foundation is mapping all the sources: tracks, trucks, ships and land-based operations. Then, in a second phase, scheduled for September, they will present recommendations for concrete mitigation actions - or even long-term strategies to achieve net zero emissions, either directly or through offsetting.

In the meantime, we are already starting some more obvious actions. So when the final report arrives, some initiatives - which are already being monitored by them - will already be underway. For example, all the streetlights here use outdated mercury vapor lamps. We're going to replace the lighting with LED technology. A call for tenders will be issued in the next few weeks for the installation of luminaires controlled by Wi-Fi. As well as being more efficient, they will allow you to control the intensity and distribution of the light via tablet - with the possibility of turning it on and off as required. It's a much more intelligent system than the previous one.

More recently, we joined the Free Energy Market. We have already held a public tender, signed a contract and are in the transition phase. We're mapping all the consumer units to reduce the company's costs by 25% to 30% and - most importantly - we're demanding renewable energy generation. This was a condition of the tender.

Other actions are also underway. Today, for example, we signed a contract to install a new roof with a solar power plant on the main gate where trucks access the port. From now on, any new work or infrastructure must include a sustainability or renewable energy component.

et's take these old warehouses as an example. They need renovation. We're going to restructure them and reinforce the roofs to install solar panels. The same goes for this building we're in - it will be renovated with a focus on solar energy.
We are also launching a new tender to ensure a rapid response in the event of an oil spill - which hasn't happened, but we need to be prepared.
As for the tanking area, it is not inside the port, but in the retro area. There have been no recorded incidents for over 40 years. Even so, we have a working group that monitors all safety issues, carries out inspections, and includes the Fire Department, operators, distributors and Transpetro, the main operator. We even have a tender to be published in the next few days for the refurbishment of the oil pier.

This pier has sixteen pipelines for liquid derivatives, gas and oil - supplying almost half of Ceará with fuel. This represents 70% to 80% of the Metropolitan Region's fuel supply.

It's a strategic area for the state and for the company - it represents half of our revenue and port handling.

In short, we are implementing or improving everything that is most modern in terms of environmental protection. Our aim is to ensure that this is a modern, economically viable and, above all, environmentally sustainable port, capable of fulfilling its social role: generating jobs and fostering the development of Ceará.

In closing, we have several initiatives aligned with ESG practices - Environmental, Social and Governance. We have signed an agreement with FIEC, which is responsible for certification. They have given us a sort of list of tasks that we need to fulfill in order to obtain the ESG seal of conformity in due course, covering not only environmental issues, but also the social and governance pillars I mentioned.

You've already partially answered our second question by talking about the adoption of green technologies. But in addition: which of these actions will have a direct impact on import and export operations? For example, the effort to prevent oil spills - does that apply?

When I talk about imports and exports, I'm talking about the operation as a whole. Around 75% of our traffic is imports and the rest is exports - something we've been trying to expand. For example, the container terminal has been growing exponentially since the start of the temporary lease in the second half of 2023. Comparing 2024 with 2022, container handling has already grown by 72%.

Now, port activity - as I mentioned - is strongly impacted by ship emissions. The study [by Fundación Valenciaport] will show that ships are now the main source of these emissions. So what can we do? One of the ideas is to implement a green tariff so that ships have to prove sustainable operations.

As I mentioned, this model is still under construction around the world. Everyone is concerned, but there is still no standardization that we can apply in the Port of Fortaleza. This is partly due to the fact that ships come from very far away - from China, from Europe, or going to Europe. How can we influence a ship that has come from so far away?

One idea is this green tariff. Another is that, when they dock, the ships continue to burn fuel. So we're going to implement a system for supplying electricity to ships at berth. So, instead of using fuel, they will connect to a dedicated power source, avoiding additional pollution - the Onshore Power Supply (OPS). These are actions that have already been mapped out, but the Fundación Valenciaport study could point to others.

What has been done to treat port waste and effluents, especially to protect the urban marine environment?

As I mentioned, we work with Transpetro and other partners to prevent leaks. One of the initiatives is water reuse - reusing treated water, collecting rainwater and treating effluents.

We are also focused on collecting and recycling waste. This is part of our ongoing work. We follow a performance index called IDA (Environmental Performance Index for Port Facilities), with 38 indicators established by the Ministry. We have a coordinator responsible for this agenda, who monitors the data. At monthly results meetings, we take stock. This is already routine in our management.

To conclude the interview: in your view, what is still missing for us to build a more sustainable "Ceará Global" - with ports that grow while respecting the environment and local communities?

We need to stop talking and start doing. When the current board took over in July 2023, there was no pipeline of projects. Today we have 47 projects underway. I personally take part in weekly meetings with the teams to monitor everything from conception to bidding.

These efforts will allow us to show society that the Port of Fortaleza is committed to its social role - such as generating jobs, for example.

The Manpower Management Body has a port workforce linked to it, with 330 workers, including stevedores and operators. We also have around 160 direct employees here at Docas. We're talking about at least 500 direct jobs, not counting those linked to logistics and distribution.

Not to mention the three large mills we have here - which put Ceará on an equal footing with Santos when it comes to handling wheat. They are: J. Macedo, Grupo Jereissati and M. Dias Branco - as well as the margarine factory on the other side of the port. These industries are a source of pride for Ceará and a national highlight. We handle around 1.1 million tons of wheat a year.

So, as I said, we need to execute this portfolio of projects. I am convinced that this will position the Port of Fortaleza - if not as the largest - as one of the main ports in sustainable growth, respecting the environment, fulfilling its social function, generating taxes and creating more and more jobs.

Interview conducted by Luan Cavalcanti and Sabrina Martins

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