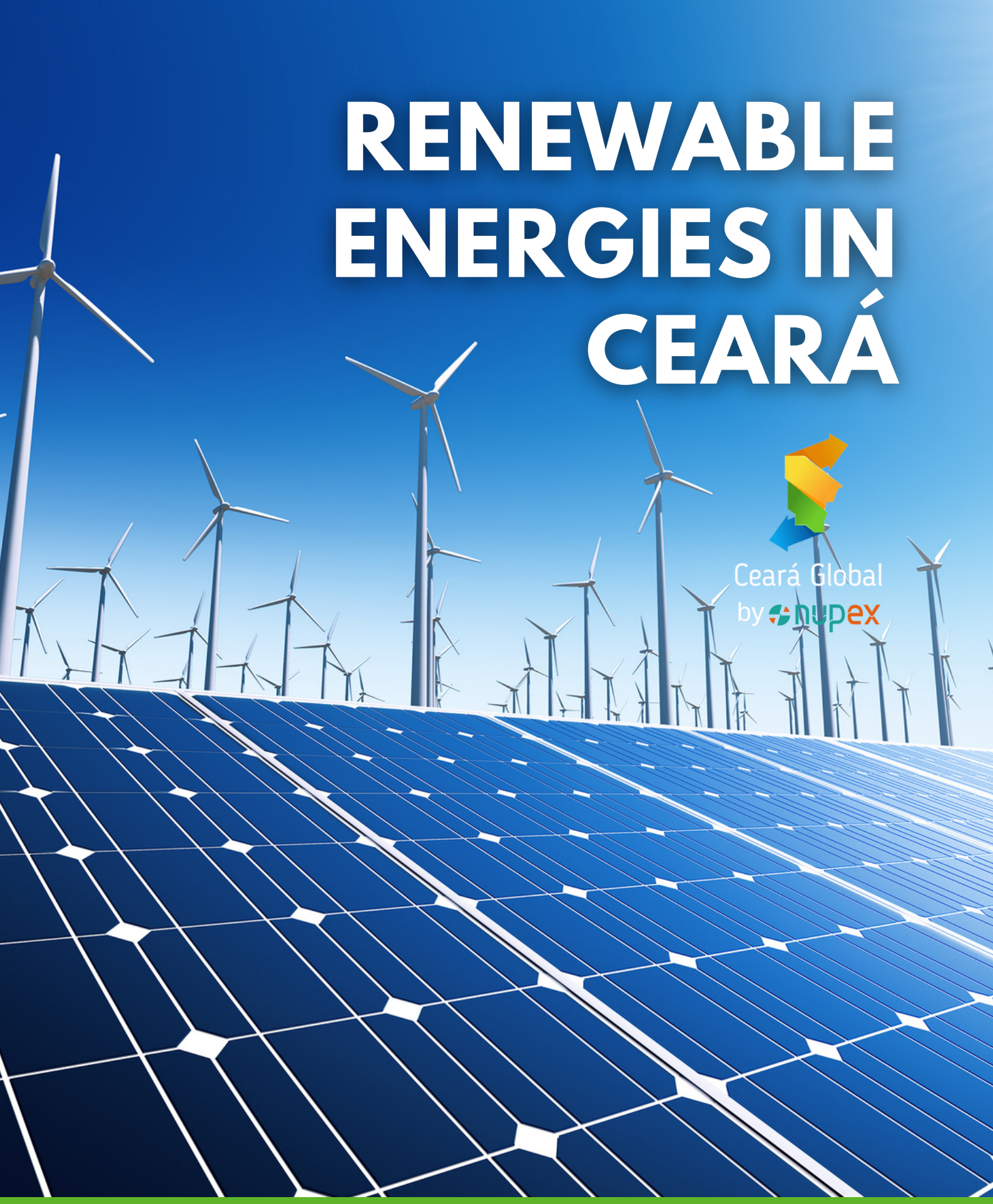
RENEWABLE ENERGIES IN CEARÁ



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

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Executive Summary

Ceará Global by nupex

EDITORIAL

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The energy industry around the world has witnessed unprecedented levels of volatility. Among the many reasons for this are concerns over energy security, stemming from geopolitical tensions and industry demand, and climate change, resulting from increased greenhouse gas emissions. In this sense, it is recognized that climate change increasingly presents itself not only as a challenge for international relations, but also for governance, creating considerable opportunities for learning from political, economic, and social experimentation. In light of these facts, attention has been drawn to government responses to climate change at regional scales that also shape global climate policy.

Technological and learning factors determine the speed with which organizations and institutions in countries around the world press their governments for public policies aimed at decarbonizing their energy matrices. In order to promote the advancement of the energy transition towards the use of cleaner energies, one notices the adoption of strategies that stimulate the formation of intersectoral partnerships and the creation of safer institutional environments that ensure the continuity of the businesses of the various stakeholders. In this scenario, renewable energies are configured as windows of opportunity for new investors such as prosumers, those who start consuming the energy they produce, increasing the complexity of negotiations in the sector. Given this scenario, it is necessary to adopt strategies that align the interests of the players involved in the energy transition, such as government, industry, consumers, the community and society in general.

Decision makers in the public and private spheres seek to strike a balance between boosting the clean energy business so that they can guarantee a return on their investments with profitable and efficient solutions and mitigate the impacts of energy matrices on the environment.

EDITORIAL

As far as Brazil is concerned, among the commitments made by the nation in the Paris Agreement in 2015 is the proposal to reduce greenhouse gases by 2025 and to increase the share of renewable energy in the energy matrix by 2030. To achieve this goal, the role of federal and regional public policies is fundamental for the economic development and strengthening of the generation and distribution sector of renewable energy sources in Brazil, especially in coastal regions (exploiting the wind potential) and in regions with higher incidence of sunshine (with incentives to solar energy). In this sense, the transition to a low-carbon energy matrix requires energy governance that promotes the integration of the interests of organizations and the government, and it is often necessary to offer fiscal and financial incentives for the installation and operation of the onshore and offshore solar and wind energy production chain.

There are other challenges to be overcome to guarantee the energy transition in Brazil, among them the implementation of mechanisms to promote the creation of intelligent energy networks and to adjust regulations to eliminate technological barriers. In this context, in order to define an agenda for negotiation, implementation, monitoring and enforcement of rules and agreements focused on emerging energy issues, it is necessary to adopt collaborative governance models. It is noteworthy that renewable energy sources have reached a significant demand for participation in Brazil's energy matrix, and by 2020, the indicator will have a performance three times higher than the world's (EPE, 2020).

According to the National Energy Balance BEN (2021), the Northeast represents 88.37% of energy generation by wind source in Brazil, and the state of Ceará, in just two decades, went from a state dependent on power generation to energy exporter and stands out for being one of the states in Brazil that has advanced the most in offering a safe institutional environment for investors. It is in the awareness of the need for energy to promote economic development that the process of collaborative governance in the state of Ceará has intensified.

EDITORIAL

The contours of this Ceará state governance environment have been shaped by the culture present and the geographical aspects in which the players in each economic, political, and social dimension are embedded. As interests were achieved, the institutional environment became more consolidated, and the **energy** transition was driven forward as new institutional arrangements, designed by Ceará's governance, and adapted as opportunities arose. With a pioneering profile the state once more stands out in the Brazilian energy scenario and presents the Green Hydrogen Hub, since it takes advantage of the fact that it is the closest point to Europe and has a wide connectivity with the continent thanks to the partnership of the Port of Pecém with the Port of Rotterdam. Such circumstances are configured as competitive advantages that offer real conditions to guarantee the economic transformation that the State of Ceará aims for its future.

BACKGROUND OF GREEN HYDROGEN

In the international context, green hydrogen has been highlighted as a solution to reduce carbon emissions and combat climate change. Several countries have invested in research, development, and implementation of green hydrogen-related technologies.

For example, the European Union created a clean hydrogen strategy in July 2020 to promote the production, distribution, and use of clean hydrogen in the region. In addition, other countries such as Japan, South Korea, the United States, Canada, and Australia have also shown interest in green hydrogen and are implementing policies and programs to promote its production and use. These countries see green hydrogen as a way to diversify their energy sources, reduce dependence on fossil fuels, and stimulate economic and technological development.

In addition, several international partnerships have been established to promote cooperation in the field of green hydrogen. For example, the International Hydrogen Initiative, launched in 2019, brings together countries working to promote the use of hydrogen as part of a sustainable energy transition.

In Brazil, green hydrogen is the subject of growing interest from both government and private enterprise. For example, the National Hydrogen Program (PNH2) was launched in August 2021 to strengthen the hydrogen value chain in the country. The main goal of the program is to support the production, consumption, and export of green hydrogen, in addition to supporting research, development, and innovation in this area.

BACKGROUND OF GREEN HYDROGEN

Green hydrogen production in the country has the potential not only to meet the domestic demand for clean energy, but also to become an important export item. Countries with ambitious decarbonization goals, such as European and Asian countries, are seeking suppliers of green hydrogen, and Brazil can benefit from this expanding market.

In the case of Ceará, it stands out as a place that presents favorable conditions for renewable resources and infrastructure. Already a protagonist in the wind energy industry, its resources can be used to fuel the electrolysis of water and the production of green hydrogen in a sustainable way.

The state government has shown interest in promoting the development of green hydrogen in the state. In 2021, a pilot project for green hydrogen production was announced in cooperation with the Norwegian company Golar Power. The project involves the installation of electrolysis equipment at Fortaleza's liquefied natural gas (LNG) regasification terminal, which uses local wind energy to produce green hydrogen. In addition, Ceará has sought to establish partnerships with research institutions and universities to promote innovation and development of technologies related to green hydrogen.

BACKGROUND OF GREEN HYDROGEN

Regarding the sector's next steps, at the end of this month the governments of Ceará and the Netherlands signed a partnership to foster production and exportation through the creation of a green hydrogen corridor between the ports of Pecém and Port in Rotterdam and a green ports partnership between Ceará and the Netherlands. With the signing, the Pecém complex and the Port of Rotterdam create an integrated green hydrogen supply chain corridor, including production in Pecém and reception and distribution in the Port of Rotterdam, to meet demand in the Netherlands and other countries. in Europe. The companies AES Brasil, Casa dos Ventos, Nexway, Havenbedrijf Rotterdam, Fortescue and EDP have signed up for the creation of the corridor at the Pecém Industrial and Port Complex.

Focusing on the development of the Green Hydrogen Pole, the state of Ceará is heading towards the mark of 30 memorandums signed with companies interested in the production. Three of them have already closed preliminary contracts and have dedicated space in the Export Processing Zone (ZPE) of Ceará: Fortescue, Casa dos Ventos, and AES. The total investment is estimated at US$ 8 billion. In addition, the Port of Pecém must invest R$2.2 billion to provide the terminal with infrastructure capable of accommodating the projects.

In this sense, the Green Ports partnership between the government of Ceará and the Netherlands introduces support for Dutch companies to export and invest in Brazil and supports Brazilian companies with investments and exports to the Netherlands. The partnership is expected to enhance bilateral cooperation and knowledge to jointly support public and private initiatives in port development, port logistics, hinterland connectivity, as well as port energy projects such as onshore and offshore wind energy and green hydrogen production.

Green Hydrogen Hub: Government of Ceará and The Netherlands sign partnership to boost production and export

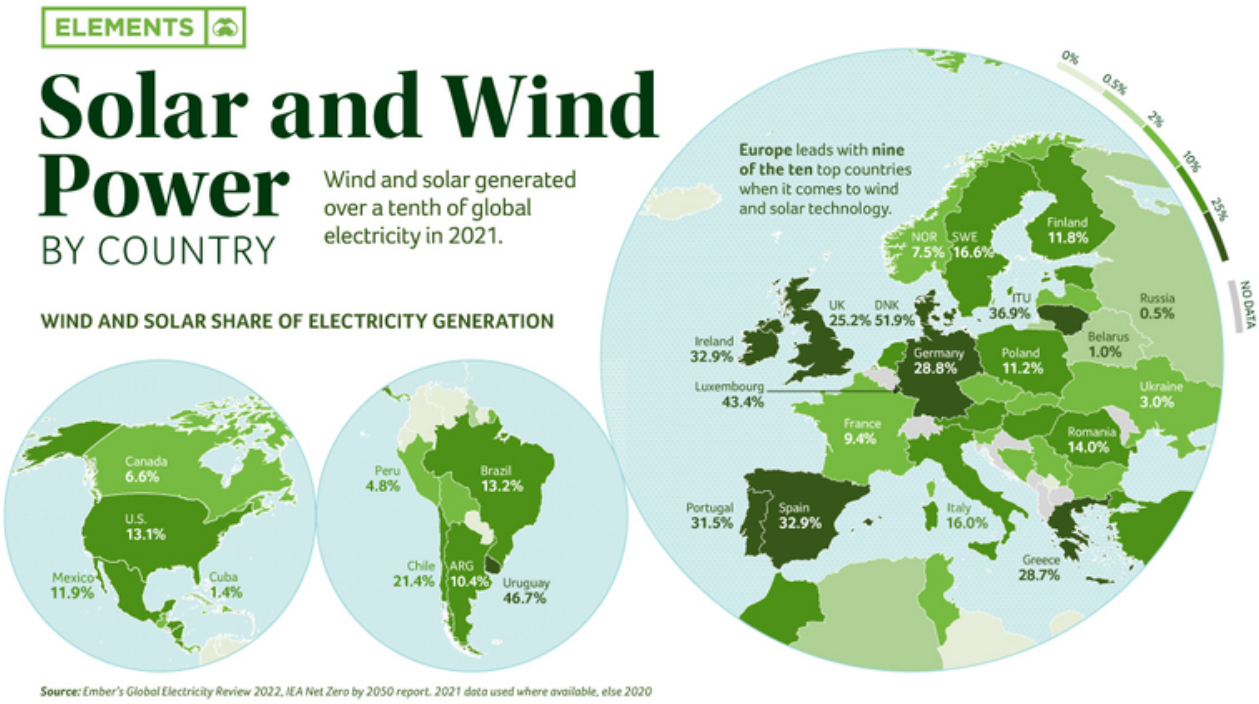
SEMA CE. 2023.

BACKGROUND OF WIND ENERGY

Wind energy is playing an increasingly important role in the international energy scene. In recent years, there has been a significant increase in wind power generation capacity around the world. Countries on different continents have invested in wind projects as a way to diversify their energy sources, reduce greenhouse gas emissions, and move toward energy sustainability.

Several countries have excelled in the development of wind energy. China has been the world leader in installed wind power capacity, driven by its high energy demand and its strategy to reduce dependence on fossil fuels. Wind turbines are becoming more efficient and larger in terms of size and power generation capacity. The United States has also been investing heavily in wind energy, especially in states such as Texas, Iowa, and California. Europe, particularly Germany, the United Kingdom, and Spain, has been one of the most active regions in implementing offshore wind projects.

The global wind energy market is expected to pass the 1 TW mark of installed capacity by the end of 2023, according to a study by Wood Mackenzie. The same amount should be added in the next eight years, projects Luke Lewandowski, Research Director of the consultancy. In 2022, wind power added 78 GW of installed capacity, reaching 906 GW in the total installed worldwide. Germany, Brazil, China, the United States and Sweden led the capacity addition ranking last year, representing 71% of the installations.



BACKGROUND OF WIND ENERGY

Besides the traditional leaders, other countries are increasing their investments in wind energy. Brazil has great potential for wind energy due to its extensive coastal areas and favorable winds, and has seen significant growth in installed capacity. By February this year, the country had registered 890 wind farms installed in 12 Brazilian states. They add up to 25.04 GW (gigawatts) of installed capacity in commercial operation, which benefit 108.7 million inhabitants. Of this total, 85% are in the Northeast region. By 2028, according to Abeeólica (Brazilian Wind Energy Association), Brazil will have 44.78 GW of installed capacity of this type of energy, whose share in the national matrix currently reaches 13.2% of the total.

In the case of Ceará, the commercial exploitation of wind energy in Ceará began in the late 1990s, when the first wind turbines were installed in the region, in Praia de Taíba (1998) and Prainha (1999), both in the municipality of Aquiraz, in Ceará. Over the years, Ceará has attracted significant investments from national and international companies in the wind sector.

The state, today, is the fourth state in the national ranking of wind power generation, with 2.5 megawatts (MW) of installed capacity, 98 wind farms, and a total of 1,138 aerogenerators currently, centralized in regions such as the Wind Coast, which covers cities like Trairi, Acaraú, Camocim, and Jijoca de Jericoacoara. In January 2023 alone, Ceará produced 1,009 of wind energy in January, according to the Chamber of Commercialization of Electric Energy - CCEE.

Wind power towers in Ceará. 2020.

BACKGROUND OF WIND ENERGY

For the next few years, Petrobras and Equinor confirmed that they are studying the installation of offshore wind farms (installed offshore) on the coasts of several states, including Ceará.

Altogether, the projects have a generation potential of 14.5 gigawatts. In a statement, the companies said they signed a letter of intent "that expands the cooperation between the companies to evaluate the technical-economic and environmental feasibility of seven projects."

Ibitucatu is the name of the park under analysis for the Ceará coast and is the result of a partnership signed between Petrobras and Equinor as recently as 2018, which provided for only the two parks Aracatu I and II (located on the coastal border between the states of Rio de Janeiro and Espírito Santo).

The state has encouraged the manufacture of wind components and equipment, stimulating the local economy and job creation. In addition, Ceará has stood out in research and innovation in the wind sector. Universities and local research institutions have developed studies and advanced technologies to improve the efficiency and performance of wind turbines, and seek solutions to the challenges of the sector.

Offshore wind power plant.

BACKGROUND OF SOLAR ENERGY

The exploitation of natural resources has made emergency measures necessary to maintain the quality of life on the planet, and has brought about the debate about conscious consumption, with this, photovoltaic solar energy has had great expansion in recent years due to the fact that it is an unlimited energy, generated from the light and heat of the sun.

When we consider solar capacity, through photovoltaic panel installation, China is in the lead well ahead of the rest, with 392 GW. In second place, the United States produces and consumes 111 GW, followed by Japan with 78.8 GW, Germany with 66.5 GW, and India with 62.8 GW.

According to a study released by the IEA (International Energy Agency), solar capacity is expected to triple between 2022 and 2027 worldwide, growing by 1.5 TW and surpassing coal as the largest source of energy capacity. In its "Renewables 2022" report, the agency noted that it expects residential and commercial rooftop installations to accelerate, with global additions of 170 GW per year by 2027.

BACKGROUND OF SOLAR ENERGY

Despite not being among the top 5 countries in terms of installed solar capacity, Brazil has grown a lot in the sector in recent years, mainly due to the advantage of high solar incidence in its territory.In addition, Brazil entered, for the first time, the list of the ten countries with the highest cumulative installed power of the solar photovoltaic source. The country ended 2022 with 24 gigawatts (GW) of solar operational power. With this result, the country assumed the eighth position in the international ranking.

Growing gradually all over the country, solar energy also has a great development potential in Ceará, since the state has one of the highest irradiation indexes in Brazil. Because of this, both Ceará as a whole and its capital, Fortaleza, are considered the main generators of photovoltaic energy in the Northeast region.

According to a recent mapping by the Brazilian Photovoltaic Solar Energy Association (Absolar), the state of Ceará has surpassed 56.3 thousand own solar energy generation connections on rooftops and small plots of land.The state has 604.5 megawatts (MW) in operation in residences, commerce, industry, rural properties, and public buildings.

BACKGROUND OF SOLAR ENERGY

Since 2012, the own generation of solar energy has already provided Ceará with the attraction of R$ 3.1 billion in investments, generation of more than 18,100 jobs and the collection of more than R$ 865 million to public coffers.The installed power of own generation of solar energy in Ceará places the state in the eleventh position of the national ranking of Absolar. Currently, there are more than 60.4 thousand consumers of electric energy that already count on a reduction in the electricity bill and greater autonomy and electric reliability.

There are already several municipalities in Ceará that have solar energy systems installed, both in the countryside and near urban centers. It is worth noting that there are negotiations to install photovoltaic plants in more than 13 municipalities in Ceará, and that there are also plans to build solar parks in the state, which could produce about 2.4 GW of energy through sunlight.

As in the case of the Chinese company Powerchina that closed a R$1.8 billion deal to build a solar energy park in Mauriti, in the interior of Ceará.

The equipment will have 343 MW of power and construction should begin on March of this year, with the park to be delivered in February 2025.

Meeting with Powerchina representatives that was held at the SDE headquarters, in Fortaleza

DIÁRIO DO NORDESTE. 2023.

RENEWABLE ENERGIES POSTS

Wind energy is considered to be the cleanest energy source on the planet, being obtained through the movement of air masses (wind) that are captured by propellers connected to generators. In Brazil, the state of Ceará stands out for being one of the largest national producers of this type of energy because the winds are more constant, have a stable speed, and do not change direction frequently. Ceará currently has 1.2 GW of capacity (16.1% of Brazil). The wind energy generated in Ceará is equivalent to 41.5% of the energy consumed in the state.

Check out the full versions on our LinkedIn page!

Energy in Ceará is an important factor for economic growth and development in the state. Its availability is essential for families to enjoy a quality life. In addition, it is through it that companies operate and produce goods and services necessary for domestic consumption and also for export.

Solar energy brings many benefits to society and the world. It is a renewable energy source and we can consider it inexhaustible since it depends on the sun to exist. It is clean energy, does not pollute and its modules (solar panels) have a useful life of up to 25 years. Economically, such a source can generate a reduction of up to 95% in the electricity bill of those who own it, bringing a return on investment in the medium term.

RENEWABLE ENERGIES POSTS

Check out the full versions on our LinkedIn page!

White Martins is a pioneer in the supply of industrial and medical gases and, in 2022, signed a protocol of intentions with the City Hall of Maracanaú, Ceará, to implement the company's new unit in the city. The company is the largest global industrial gases and engineering company, with around 80 thousand employees worldwide, and represents Linde in South America.

Qair is an Independent Power Producer (IPP) company, operating 220 MW of power generation assets exclusively from renewable sources. The Qair International group currently operates in 16 countries around the world and in Brazil, Qair is headquartered in Fortaleza, in the state of Ceará, known for being one of the regions with the greatest potential for the development of renewable energy.

Aeris is a company founded in Ceará in 2010, which operates in the area of renewable energy, more specifically in the manufacture of wind blades for wind turbines. The company has grown rapidly in recent years as the state's renewable energy industry expands. Aeris has been a valuable partner in Ceará's energy journey, providing high quality wind blades for power generation projects in the state, coupled with favorable weather conditions and investments in wind infrastructure.

RENEWABLE ENERGIES POSTS

Check out the full versions on our LinkedIn page!

The governor of Ceará, Elmano de Freitas, said, on Friday, April 28, at the João Pessoa Convention Center, where he is participating in the Ordinary General Assembly of the Northeast Interstate Development Consortium (Consórcio Nordeste), that the event will be of fundamental importance for discussing the Tax Reform and the region's potential for renewable energies.

The five parks (Lightsource Milagres I, II, III, IV and V Geração de Energia Ltda) form a photovoltaic solar complex for generating electricity with an installed capacity of 163.7 MW, in the municipality of Abaiara (CE). The total investment in Lightsource Milagres IV will be R$ 201.7 million, while the financing of the fund managed by Sudene will be R$ 111.7 million. In all, there are R$ 782.6 million in total investments, with the participation of R$ 422.9 million from the FDNE.

In the last month of April, SENAI Ceará, represented by Regional Director Paulo André Holanda, received the Interconnected Collective Action seal for its commitment to encouraging the presence of women in technical training programs and the renewable energy job market. The action is an initiative of the Women in Solar Energy Network (MESol), also established by the Future Professionals Project and the Brazil-Germany Cooperation for Sustainable Development.

RENEWABLE ENERGIES POSTS

Check out the full versions on our LinkedIn page!

Ceará has presented a spectacular development in the green hydrogen (H2V) sector, which is the production of hydrogen from renewable energy sources. In the state of Ceará, there is a gigantic potential for this development, due to the abundance of renewable energy sources in the region. Later in 2019, the state government signed a cooperation agreement with Harvard University for the development of projects in the renewable energy sector, including green hydrogen.

The tendency is for the substance to take on more and more versatile roles in industry and the economy in general. White hydrogen, for example, is located in gaseous form in underground deposits, which is much more unusual, and efficient and viable techniques for extracting it are still under development. There have been research projects on blue hydrogen for the reuse of captured CO2, but the emissions always end up escaping into the atmosphere, making this solution still considered environmentally inefficient.

The Government of Ceará will join an international task force of the World Bank focused on structuring the green hydrogen market in developing countries. The World Bank project was launched at COP 27, which took place last year in Egypt, and aims to discuss everything from financing, technologies, and business models to governance and the circular economy. This working group will have the support of other sector entities, such as the Hydrogen Council.

JURANDIR PICANÇO JR.

Consultant from FIEC in the field of Renewable Energies.

Are renewable energies truly the future of energy?

This question indeed needs to be put in context, what happened is that became pretty clear that for the planet's decarbonization, which is the whole world's goal into account the studies that show that if we keep our gas emissions the planet will be in danger and that the main factor for emission of greenhouse gases is the power production based on fossil fuel and the available alternative is the renewable energy, that is its really the energy future. We have another option that also doesn't emit those gases, that is nuclear energy, but it has other issues that are not present in renewable energy. Then, look, the Whole world is aimed for renewable energy, that's why your question is its answer; it is the future of energy.

What is FIEC's role in supporting companies and industries that wish to transition to the use of renewable energies?

In the energy sector, FIEC has two forms of operation. One of them is the evaluation of the entire industrial park of the companies associated with the unions that make up the federation. The objective is for these companies to use energy in a more suitable and economical manner, which is the main focus.

However, another focus that has been gaining prominence is to take advantage of the opportunities offered by renewable energies to develop industries and activities related to this field. The Northeast as a whole has enormous potential for wind and solar energy, which can be transformed into great wealth. This is an emerging opportunity, and by seizing it, it is possible to develop the economy through the creation of new industries.

In the specific case of Ceará, the wind energy sector already has an important foundation, with the production of wind turbines and blades for these devices. The role of FIEC is to seize this opportunity and work towards establishing a solid foundation in the energy industry segment.

What are the main benefits of this energy transition for businesses and the environment?

The accelerated development of renewable energies, now with the opportunity of green hydrogen, will bring many opportunities for new activities in our industrial park. It's a new area of economic development, and there will be a need for the production of services, equipment, and accessories demanded by this new market. FIEC has to provide support throughout this process.

This whole process is related to the environmental benefits. Whenever renewable energy is produced, it replaces energy generated from fossil fuels, which would create environmental problems. So, it is a benefit for the global environment. However, it is crucial to be cautious and avoid creating local environmental problems in the pursuit of global environmental benefits. All projects must be developed with great care to prevent any negative local environmental impact.

FIEC has been advocating this discourse and even leading the entire ESG process here in the state. The aim is to ensure that all companies, while developing their projects, prioritize social and environmental concerns along with good governance.

Ceará has been standing out more and more on the national stage when it comes to renewable energies. In your opinion, what are the differentiating factors for the development of the sector in Ceará?

The situation in Ceará regarding renewable energies is more or less equivalent to that of the entire Northeast region. The entire Northeast region indeed possesses significant wind and solar potential. However, Ceará gained prominence because it took the lead in the development of green hydrogen. Green hydrogen was identified as a vector for decarbonizing certain sectors where directly utilizing renewable energy is challenging.

In the specific case of Ceará, European countries that are highly committed to decarbonization do not have sufficient renewable energy potential to meet their demands. However, green hydrogen produced from renewable energies can be stored and transported, which has sparked their interest in importing green hydrogen to decarbonize their economies. This fact brings an additional dimension to the renewable energy market in the Northeast. Currently, renewable energies in the Northeast are primarily directed towards the electric sector. However, by producing green hydrogen from these renewable energies, you can export renewable energy in the form of hydrogen. Additionally, domestically, this hydrogen can be used to decarbonize activities that currently rely on fossil fuels. In Ceará, there is a notable example of this. The Pecém steel company, which previously used imported coal, was acquired by ArcelorMittal, a major player in the steel sector. Their goal is to replace coal with hydrogen in the future. Therefore, in addition to directly serving the electricity sector, renewable energies can now cater to other segments that were previously solely reliant on fossil fuels.

This represents significant growth, both in terms of export markets and other applications, such as the production of green products like green steel, green cement, and the opportunity for green fertilizers in Brazil. In fact, there is already a concrete project in Bahia to produce fertilizers using hydrogen.

Can you point out the main trends in the renewable energy market?

Renewable energies have immense importance in Brazil, especially in the electricity sector. The most prominent renewable source is hydroelectric power, with a large park of hydroelectric plants that remains the main source of energy for the electric sector. Biomass also plays a significant role in Brazil, not only in electricity generation through the use of sugarcane bagasse but also in the Proálcool program, which utilizes alcohol, particularly ethanol, as a fuel. Brazil already stands out significantly in renewable energies.

However, wind energy and solar photovoltaic energy, which are the two most favorable forms of energy production in the Northeast, have undergone technological advancements, and their costs have become more competitive. Wind and solar energy are now the most competitive forms of electricity generation. Hence, the focus of this process is directed towards the Northeast, and Ceará seized the opportunity to identify the best conditions for the development of a hydrogen hub. The Pecém complex, with its export processing zone, brings benefits for activities involved in hydrogen export. Moreover, Ceará has a modern and efficient port, positioning it well within this region of enormous potential.

However, the benefit to the state from this opportunity could be limited if there is solely reliance on importing equipment, technicians, and technologies. To maximize the benefit, it is crucial for all areas to participate in this business and develop a productive chain for this new sector. Green hydrogen is widely discussed in newspapers and in daily life, but it is still an emerging market, in its infancy. Worldwide projects in this sector are still relatively small, but projections indicate that billions of dollars will be involved in this market. The expectation is that this market will gradually develop between 2030 and 2050 when the technology is more mature and the processes are better mastered, leading to a competitive green hydrogen market. This will likely result in rapid growth and expansion, as projected in studies of this segment.

Any comments on Green Hydrogen technology ?

Everything that has happened so far has been driven by economic competitiveness. Why did oil and coal assume such important roles? Because they were the most economically viable solutions for energy production, including steel production. In the case of Green Hydrogen, it goes against economic factors because currently, Green Hydrogen is more expensive compared to other market alternatives.

This process is driven by the awareness of the need to decarbonize the environment. It is an unprecedented process because it is not dominated by economic market forces. Green Hydrogen is not competitive in terms of price, but all studies indicate that as technologies and markets develop, it will become competitive. However, overcoming this initial barrier requires going against economic forces. It necessitates the implementation of public policies. European countries are already heavily involved in this by imposing taxes on products with high carbon footprints. All of this represents a novelty because we are developing an important segment of the energy industry against economic forces.

What can be expected in terms of job creation from the exploration of Green Hydrogen?

First of all, it's important to note that this is a new industry, and every job created will be an addition to the existing employment landscape. Without this activity, things would continue at the current level. Estimating job creation in an emerging market is challenging, but recent estimates in the state of Ceará suggest around 80,000 jobs. These numbers are based on various simulations and can vary, but the key point is that regardless of the specific number—whether it's 80,000, 60,000, or 90,000—they represent additional employment opportunities beyond the normal growth of the economy. This new activity complements the traditional jobs in our economy, such as those in renewable energy and the construction sector.

In your point of view, based on all your experience in the sector, how can we make Ceará increasingly global?

Never before has Ceará had such a great opportunity to become global because only now is Ceará being recognized as a major opportunity, which has already placed it in the global spotlight. I don't know if you followed the recent event that took place in the Netherlands, in Rotterdam, where there was a major hydrogen event, and Ceará had a significant prominence. The Prime Minister of the Netherlands came here to sign an agreement to create an energy corridor from Pecém to the port of Rotterdam here in Ceará. Never before has Ceará had such global prominence as it did last week during this event. It was a huge highlight, and those who were there say that Ceará truly had enormous prominence at a global event, the largest hydrogen event in the world. Ceará stood out with this unprecedented fact of the Prime Minister being here to sign this agreement simultaneously here and in the Netherlands.

It is very important that the entire society is focused on this opportunity. It is necessary to truly develop competence in order to take advantage of it. If we don't do our homework, we will have a hydrogen hub where foreign companies will have the prominence, make their profits, and very little will stay here. **It is necessary for us to participate, to develop ourselves, and for these ideas to become widespread so that everyone can engage and try to participate in this process.**

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