RESPOND

COP31: ANTALYA



Prince Sultan Bin Abdulaziz International Prize for Water

Recognizing Innovation



Winners for the 12th Award (2026)

Creativity Prize

[1] The team led by Mohamed S. Ghidaoui (HKUST, China) and Silvia Meniconi (University of Perugia, Italy)

for transforming the time reversibility of hydraulic waves into a powerful diagnostic framework to monitor water infrastructure health. Team members include: Bruno Brunone (University of Perugia), Moez Louati, Xun Wang, and George Grigoropoulos (HKUST).



Mohamed Ghidaoui



Silvia Meniconi

[2] The team of James Famiglietti (Arizona State University, USA)

for transforming satellite gravimetry into a practical tool for monitoring groundwater depletion and terrestrial freshwater change. Team members include: Hrishikesh Chandanpurkar, Karem Abdelmohsen (Arizona State University); Matthew Rodell, Pang-Wei Liu (NASA GSFC); and John T. Reager (NASA JPL/Caltech).



James Famiglietti

Surface Water Prize

Jeffrey McDonnell (University of Saskatchewan, Canada)

for integrating field work and isotope hydrology to advance surface water hydrology and the discovery of new hydrological and ecohydrological processes.



Jeffrey McDonnell

Groundwater Prize

The team of Scott Jasechko & Debra Perrone (University of California Santa Barbara, USA)

for using real-world observational data to provide the most detailed empirical picture to date of the state of global groundwater resources.



Scott Jaseckho



Debra Perrone

Alternative Water Resources Prize

Despo Fatta-Kassinos (University of Cyprus)

for integrating advanced treatment, micropollutant and transformation-product abatement, microbiological water quality, antimicrobial resistance, and environmental sustainability into holistic frameworks for safe water treatment and reuse.



Despo Fatta-Kassinos

Water Management & Protection Prize

The team of Xin Li (ITP, Chinese Academy of Sciences, Beijing)

for developing a new paradigm for basin-scale integrated ecohydrological research in cold and arid regions. Team members include: Kun Zhang (Sun Yat-sen University, China), Ling Zhang, Yingchun Ge, and Guodong Cheng (NIEER, Chinese Academy of Sciences).



Xin Li

Invitation for Nominations

13th Award (2028)

Nominations open online until 31 December 2027

www.psipw.org e-mail: info@psipw.org

COP31 VISION



MURAT KURUM

Minister of Environment, Urbanization and Climate Change of the Republic of Türkiye

COP31 President-Designate

> “COP31 will be a meeting point for dialogue, consensus and action in climate diplomacy. Türkiye’s goal is to bring all Parties together around shared solutions in Antalya and to make COP31 an implementation-focused summit that delivers results and accelerates global climate action.”
>
> *Murat Kurum*

COP31: A TURNING POINT FOR CLIMATE ACTION

COP31 will stand as the epicentre for the most concrete actions to safeguard humanity’s shared future, amid the compounding impacts of the global climate crisis and geopolitical uncertainties. Shaped by Türkiye as the “*COP of the Future*,” this vision aims to elevate climate action beyond abstract promises and paper commitments, transitioning into a verified, measurable and sustainable era of implementation on the ground.

Grounded in the principle that “*commitment is a declaration of intent, but implementation is trust*,” the COP31 Presidency is determined to rebuild this global trust and bring a new momentum to climate diplomacy.

In line with this vision, COP31 will be built upon three core pillars.

THREE CORE PILLARS OF OUR VISION:

1. Rebuilding trust through dialogue

By amplifying the voices of vulnerable communities, developing nations, local authorities, civil society, and the youth within the negotiation rooms, COP31 will foster a fair and inclusive climate diplomacy framework where no one is left behind.

2. Shared responsibility through consensus

Energy security and climate goals will not be treated as alternatives, but as complementary elements. Global consensus mechanisms will be strengthened on the basis of a just green transition that respects the development rights of all nations.

3. Turning commitments into action on the ground

From the “*35% by 2035*” global electrification target to the Zero Waste movement, and from reducing methane emissions to building resilient, energy-efficient cities, all commitments will be backed by concrete projects. Through the establishment of the “*Climate Implementation Bridge*,” a rational, rapid and effective distribution of climate finance will be ensured.

The collective will arising from Antalya is not merely a goal for a successful summit; it is a profound promise to leave a clean, just, liveable, and prosperous world for generations to come.

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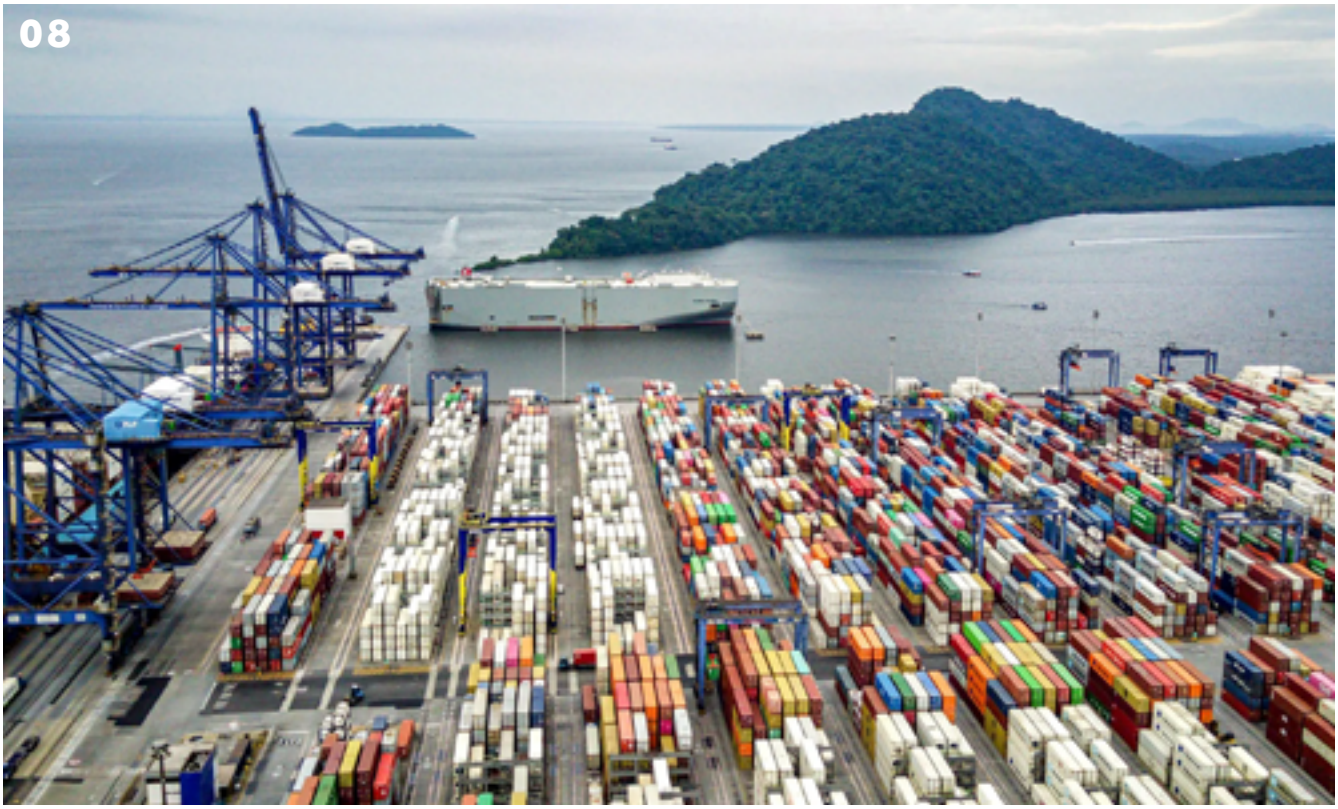
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HOW BRAZIL'S LARGEST PAYMENT NETWORK IS HELPING BUILD TRUST IN CARBON CREDIT MARKET

Blockchain-powered platform brings traceability, governance, and security from the issuance of carbon credits to the final registration of offsets.

Brazil is establishing itself as one of the global leaders in the carbon credit market. With over 60% of its territory covered by native vegetation, the country approved Law 15.042/2024 in November 2024, which created the Brazilian Emissions Trading System (SBCE), regulating the national carbon credit market. According to a McKinsey report, Brazil holds 13% of the global potential in this sector by 2030.

However, despite its promising outlook, the market faces numerous challenges, such as fraud, lack of traceability, greenwashing, and fragmentation. In light of these challenges, Elo, the largest 100% Brazilian payment network, saw an opportunity to help transform the sector.

But what is the connection between the carbon credit market and a credit card network? The answer lies in the similarities between the two sectors' processes. A payment network's core role is to connect buyers and sellers, organising all the players in a complex ecosystem with both security and credibility.

Founded in 2011 focusing on debit and credit cards, Elo has in recent years expanded its role as a payment technology company into other areas, including tokenisation. Noting the lack of a player capable of validating the credentials of the entire transactional process in a carbon credit trade, Elo began developing a solution to bring its extensive expertise into this sector. It's worth noting that the company processes an average of 4 billion card transactions every year, making it one of Brazil's leading payment networks.

This led to the creation of **Elo Eco**, a digital platform that uses blockchain to ensure traceability, governance, and security from the issuance of carbon credits to the final registration of offsets. Elo acts as an intermediary in the trading of credits generated by third parties and offers integration with other partner platforms.



Elo is one of Brazil's leading payment technology companies. Founded in 2011 with a focus on debit and credit cards, Elo has expanded over the years into areas such as tokenisation, fraud prevention, and data consultancy.



By entering this segment, Elo expects to transact 150 projects by 2030, with tokenisation potential of approximately 70 million tonnes of CO2 per year. The company estimates it could move more than R$25 billion (~USD 4.9 billion) in credits by the end of the decade.

The platform offers a complete digital journey, from origin to the commercialisation of carbon credits. This includes the onboarding of buyers and sellers, through to the so-called "retirement" of credits, encompassing all steps such as submission of the Project Description Document (PDD), project due diligence, and blockchain-based registration and tokenisation of credits.

Since its launch, **Elo Eco** has evolved from a tokenisation platform into a complete digital marketplace connecting buyers and sellers. The platform now offers access to a diversified portfolio of carbon credit projects, including forest conservation and renewable energy projects, and is preparing to incorporate additional nature-based solutions in the near future, enabling organisations to build carbon strategies aligned with different sustainability objectives.

By moving into this strategic sector of the green economy, Elo is expanding its role beyond payment methods, consolidating itself as a technology company committed to sustainability, with robust processes for verifying and certifying projects and the credits they generate — further strengthening the platform's transparency and credibility.

> **"We are applying our expertise in connecting buyers and sellers, developed in the card payments sector, to foster an efficient and transparent model for the carbon credit market. Tokenisation is crucial, as it guarantees traceability, security and scalability for operations."**
>
> ***Giancarlo Greco, CEO of Elo***

FINANCE WITHOUT BORDERS: financing the factories behind the energy transition

Halil Demirdağ, Executive Chairman, Smart Solar Technologies



Halil Demirdağ
Executive Chairman,
Smart Solar Technologies

As a solar manufacturer and investor, I see the energy transition from two connected perspectives: the power plants that generate clean electricity and the factories that make those plants possible. Both require long-term investment. Yet discussions about climate finance too often focus on deploying technology, with less attention to building the industrial capacity behind it.

For COP31 in Antalya, my proposal is straightforward: bring clean-technology manufacturing into the centre of climate finance. If we want an energy transition that reaches more countries, creates lasting employment and withstands supply disruptions, we must finance the capacity to produce it.

This is what I mean by "***Finance without borders***": making capital accessible to credible projects across markets, supported by clear standards and practical mechanisms for sharing risk.

The Same Sun, Different Financing Conditions
Solar investment is particularly sensitive to financing conditions because much of its cost is incurred before electricity generation begins. A strong solar resource and proven technology are not enough when debt is expensive, maturities are short or revenues and borrowing are in different currencies.

Manufacturing adds another dimension. A solar cell factory requires patient capital, specialised skills and confidence in future demand. Its contribution extends beyond its own operations: it builds technical capabilities, supports suppliers and gives developers more options for sourcing equipment.

Solar technology is fundamentally a semiconductor technology: photovoltaic cells rely on the same silicon-based materials, precision manufacturing processes and specialised expertise that underpin the broader semiconductor industry. Financing solar cell manufacturing therefore goes beyond supporting renewable energy; it also strengthens a country's advanced manufacturing capabilities, technological competitiveness and industrial resilience.





Smart Solar Technologies takes confident steps to accelerate carbon neutrality through innovation and science, with its bold mission for a sustainable future. Operating two production facilities in Türkiye, the company has an annual total solar panel production capacity of 2,4 GW, solar cell production capacity of 2,2 GW, and wafer production capacity of 1,5 GW, serving hundreds of customers in over 20 countries.

At Smart Solar Technologies, our manufacturing experience in Türkiye informs how we approach these challenges. Investing in solar cells alongside modules has reinforced our conviction that the transition requires industrial capability as well as generation capacity. Financing frameworks should recognise the connection between the two.

Our planned €122 million solar cell and module investment in Bulgaria brings this argument into a European context. Expected to create more than 800 jobs in the Stara Zagora region, the project would connect cross-border investment with industrial diversification in a coal region.

For me, this is a practical expression of a just transition: creating opportunities for workers and regions through investment in the industries that will supply tomorrow's energy system. It also shows why capital should be able to follow credible industrial projects across borders.

Three Priorities for Antalya

First, match finance to investment horizons. Development banks and commercial lenders should work together on longer maturities, guarantees and instruments that manage currency and political risk. These tools should help viable projects reach financial close on terms that reflect their operating lives.

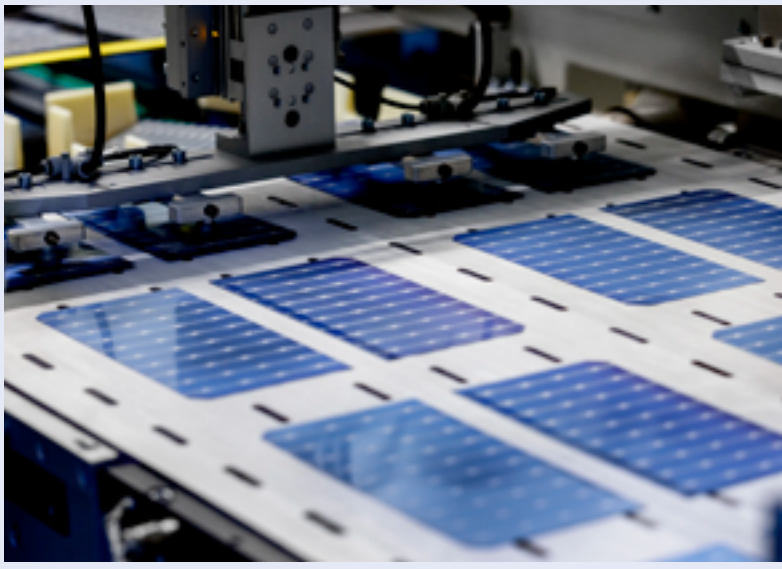
Second, reduce duplication without lowering standards. Investors need reliable environmental and social information. Businesses need clarity about what qualifies for support. Greater compatibility between taxonomies, reporting requirements and due-diligence processes would help projects access international capital while preserving accountability.

Third, recognise clean-technology manufacturing as strategic climate infrastructure. Financing a solar factory supports the supply of equipment needed for electrification. Climate-finance institutions should explicitly consider this enabling role, alongside jobs, skills, environmental performance and supply-chain resilience.

These priorities give COP31 a concrete agenda. Governments can provide predictable investment frameworks. Development banks can share risks that private lenders cannot readily absorb. Manufacturers must bring credible projects, transparent operations and measurable commitments.

Türkiye can contribute the perspective of an emerging economy building industrial capacity and investing internationally. We should use that perspective to connect policy discussions with investment decisions.

I would judge progress by projects reaching financial close, factories entering production and people gaining skilled employment. Finance Without Borders must become a practical investment framework that delivers those outcomes.



FROM CARBON ACCOUNTING TO CLIMATE ACTION: the Portos do Paraná decarbonisation journey

How Portos do Paraná is using science, international cooperation and innovative port policy to accelerate the transition towards net-zero shipping.

Ports are no longer judged solely by cargo throughput and operational efficiency. As global trade moves towards a low-carbon future, port authorities are increasingly expected to become active enablers of the energy transition. Recognising this responsibility, Portos do Paraná has adopted a science-based approach that transforms climate commitments into practical actions capable of influencing not only its own operations but also the entire port community.

The first milestone of this journey was understanding where emissions originate. In partnership with Fundación Valenciaport, one of Europe's leading research and innovation centres dedicated to sustainable ports, the Port Authority completed the first comprehensive greenhouse gas inventory covering the entire organised port complex. Developed according to the internationally recognised GHG Protocol and the Methodological Guide for Calculating Carbon Footprints in Ports, the study quantified emissions across Scopes 1, 2 and 3, providing an unprecedented picture of the carbon footprint associated with port activities.

The results revealed an important finding. Although Portos do Paraná has consistently invested in improving the environmental performance of its own operations, direct emissions from the Port Authority represented only 2.7% of total greenhouse gas emissions. Nearly 90% originated from vessels calling at the port, demonstrating that meaningful decarbonisation requires coordinated action across the entire maritime logistics chain rather than focusing exclusively on port infrastructure.

Rather than treating the inventory as a reporting exercise, Portos do Paraná used it as the foundation for a comprehensive Decarbonisation



Located within Brazil's Atlantic Forest Biosphere Reserve, Portos do Paraná manages one of South America's most strategic port complexes. Beyond operational excellence, the Port Authority has embraced climate leadership by integrating robust carbon accounting, international partnerships and innovative regulatory instruments to accelerate maritime decarbonisation and strengthen environmental resilience.

PORTOS DO PARANÁ
PORT AUTHORITY



Plan, also developed with Fundación Valenciaport. Aligned with the International Maritime Organization's ambition of achieving net-zero emissions by 2050, the roadmap identifies priority mitigation measures, establishes emission reduction pathways and supports strategic investment decisions, including equipment electrification, improved energy management and future shore power assessments. More importantly, the plan actively involves terminal operators and other stakeholders, recognising that decarbonisation can only succeed through collective action.

However, measuring emissions and defining targets are only part of the solution. Influencing behaviour across the shipping industry is equally important. Based on the inventory's findings, Portos do Paraná introduced an innovative berthing policy that rewards vessels capable of demonstrating lower greenhouse gas emissions through cleaner technologies, alternative fuels or other recognised emission-reduction strategies. By granting preferential berthing to greener ships, the Port Authority sends a clear market signal: environmental performance is becoming an operational advantage rather than simply a compliance requirement. This regulatory approach illustrates how ports can actively accelerate the maritime energy transition while maintaining operational competitiveness.

Climate mitigation at Portos do Paraná also extends beyond operational emissions. Through its Degraded Areas Recovery Programme (PRAD), the Port Authority restores degraded watersheds upstream of the Paranaguá Estuarine Complex using agroforestry systems developed in partnership with local farming communities. Besides increasing biodiversity and promoting carbon sequestration, the programme reduces soil erosion and sediment transport into »

» navigation channels. By addressing the causes of sedimentation, the initiative has the potential to reduce future dredging requirements, lowering fuel consumption and associated greenhouse gas emissions while simultaneously strengthening ecosystem resilience.

The experience of Portos do Paraná demonstrates that climate leadership is not defined by isolated environmental projects, but by integrating scientific evidence, long-term planning and public policy into everyday port management. As the maritime sector advances towards net-zero emissions, ports will increasingly be measured not only by the cargo they move, but by their capacity to drive the transition to a more resilient, low-carbon global economy.



PORTOS DO PARANÁ
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FROM AMBITION TO IMPLEMENTATION: the next phase of sustainable finance

Fabiana Costa – Head of Sustainability at Bradesco

The global climate agenda is entering a new stage. After years focused on targets, commitments and strategies, attention is shifting towards delivery. The discussion now centres on how to mobilise investment, scale solutions and turn long-term ambitions into measurable outcomes.

Across Climate Weeks, COP conferences and other international forums, a common theme has emerged: the need to accelerate the practical actions required to support the transition to a lower-carbon economy. Business leaders, investors, policymakers and multilateral organisations have highlighted the importance of mobilising investment, scaling solutions and creating the conditions for long-term resilience and competitiveness.

As preparations advance towards COP31, this shift is shaping expectations for both public and private sector organisations. Progress will depend on the ability to strengthen markets, expand investment opportunities and create the conditions required for sustainable growth.

Building the Foundations for Implementation

Financial institutions have an important role to play in this process. Over recent years, the sector has strengthened risk assessment frameworks, expanded climate-related metrics and improved the integration of sustainability considerations into business decisions. These advances are helping direct capital towards activities that support a more resilient and lower-carbon economy.

The next decade of climate action will be defined by the ability to turn commitments into measurable outcomes.

Bradesco is one of Brazil's leading financial institutions and has incorporated sustainability into its business strategy. Through sustainable finance, responsible risk management, financial inclusion and client engagement, the bank supports the transition towards a more resilient, inclusive and lower-carbon economy, creating long-term value for society and stakeholders.

At Bradesco, this work has supported the continued development of sustainable finance solutions and risk management practices designed to help clients navigate the opportunities and challenges associated with the transition.

International discussions are now focused on the broader ecosystem that enables investment to reach projects with the greatest potential for impact. Greater transparency, stronger governance and more consistent standards are helping build confidence among investors and support capital allocation across different sectors and regions.

Access to finance remains a critical element. Many of the technologies and business models needed to accelerate the transition already exist. The priority is to expand the mechanisms capable of connecting capital to projects, particularly in emerging markets, where investment needs remain significant.

In Brazil, initiatives such as the Eco Invest programme reflect this effort by creating conditions to attract international capital and support investments aligned with the country's sustainable development agenda. These initiatives can help strengthen the financial ecosystem needed to scale the transition economy.

Brazil's Opportunity in the Transition Economy

Brazil holds a distinctive position within this landscape and is increasingly viewed as a strategic destination for sustainable investment. The country combines abundant natural resources, a diversified economy and growing experience in sustainable finance. As a result, it is frequently highlighted in international discussions on renewable energy, sustainable agriculture, bioeconomy and nature-based solutions.

Carbon markets are one example of this potential. Recent debates have focused on creating the



Solar and wind energy projects illustrate how investment, innovation and sustainable finance can help accelerate the transition to a more resilient, lower-carbon economy. (Photo: © Adobe Stock.)

Brazil is increasingly recognised as a strategic market for renewable energy, bioeconomy and nature-based solutions.

credibility, transparency and governance required to strengthen market development and attract long-term investment. For Brazil, these advances can support emissions reductions while creating economic opportunities linked to conservation, innovation and sustainable production.

The country is also well positioned to contribute to solutions that combine environmental objectives with economic growth. This combination is becoming increasingly relevant as governments, investors and companies seek practical pathways to support climate goals while fostering development.

Financial institutions can help accelerate this process through financing, advisory services and collaboration with clients, investors and other stakeholders. Their role extends beyond providing capital. It also includes supporting market development and helping create the conditions required for investment to generate lasting impact.

As COP31 approaches, attention is turning from ambition to execution. The coming years will be shaped by the ability to convert commitments into projects, investment and tangible results. At Bradesco, we remain committed to contributing to this effort through sustainable finance, responsible risk management and initiatives that support sustainable development and financial inclusion. Since 2021, the bank has allocated more than R$ 416 billion to activities with social and environmental benefits.



HOW SMARTER LIGHTING CAN HELP CITIES EVOLVE

From harbour walks to neighbourhood streets, light shapes how a city is experienced after dark. It influences how people move. How safe they feel. And how public spaces come to life. But lighting also shapes something less visible: the way cities use energy, manage resources and invest for the future.

Cities are already recognizing that potential. A ***2025 assessment*** found that nearly 90% of participating cities include lighting measures in their climate action plans. In half of those cities, lighting accounts for more than 5% of total electricity consumption.

Lighting has already shown what large-scale transformation can achieve. ***In 2006***, it accounted for around one fifth of global electricity consumption. Thanks to advances in ***LED technology***, that share has dropped to 9%, even as demand for lighting has continued to grow.

Now, cities have the chance to build on that progress. The next wave of lighting is smarter, more circular and more efficient. It is not only about replacing technology that is outdated or reaching the end of its life. It is about helping existing infrastructure deliver more value over time.

That shift is already visible in places like ***Tuborg Harbour in Copenhagen***, which, instead of replacing its historic streetlights, has instead refurbished them. The fittings have been part of the harbour's identity since the 1990s. Today, they are being upgraded to LED technology and reinstalled. The result is a familiar design with up-to-the-minute performance. Each upgraded luminaire uses ***32.7 watts instead of 115 watts***. That makes it around 3.5 times more efficient.



Refurbished streetlights in Tuborg Harbour, Copenhagen.

Another example is from ***Grenchen, Switzerland***. Instead of replacing existing streetlights, the city retained the original aluminium housings. By upgrading and adding smart connectivity, Grenchen created a lighting network that can be monitored and managed through one lighting system. The approach delivered ***up to 76% lower CO2 emissions and around 30% lower energy consumption***.



Signify is the world leader in lighting for professionals and consumers. We proudly bring to market the world's best lighting brands, including ***Signify, Philips, Philips Hue, Signify Interact, Signify Dynalite, Color Kinetics*** and many more. Our advanced products, connected systems and services unlock the extraordinary potential of light for brighter lives and a better world.

The next generation of city lighting will be defined by how existing lights can be ***refurbished, upgraded and given a longer life***. Light can guide movement, support safety, reduce energy use and help public spaces feel more connected. That is the promise of unlocking the potential of light. Not simply brighter streets, but smarter, more responsive, and more sustainable cities.

Signify Circle is our approach to helping customers use less, use longer and use again. Through services such as repair, upgrades and the reuse of existing components, it helps extend the life and value of lighting infrastructure while supporting a more sustainable future.



Light refurbishment station at Signify.

MINING AND ENERGY TRANSITION: the challenge of sustainability in the critical minerals supply chain

Maria João Rolim, Jéssica Teijido Melo and Helena Marinho Ketzer Yacoub,
Rolim, Goulart, Cardoso Advogados

The Mineral Paradox of Energy Transition

The energy transition has become one of the most important economic and social processes of the 21st century. Yet it harbours a central paradox: the development of a cleaner energy mix depends increasingly on mining, an activity historically associated with significant environmental and social impacts. Understanding this relationship is essential to ensure that decarbonisation does not reproduce, at its very foundation, the environmental liabilities it seeks to overcome.



The expansion of renewable energy sources, the electrification of sectors such as transport and industry, and the growing use of energy storage systems are substantially increasing demand for mineral inputs. According to the Energy Research Office (EPE in its Portuguese acronym), Brazil's installed electricity generation capacity is projected to grow by 35% between 2024 and 2034, equivalent to 84 gigawatts, of which 56 gigawatts are expected to come from solar and wind power. This expansion is expected to increase demand for critical minerals by 54% over the same period[1]. This illustrates, on a national scale, a global phenomenon: every unit renewable capacity installed, every electric vehicle produced and every storage system deployed requires minerals that the fossil fuel-based system did not demand to the same extent.

The scale of this demand is striking: a typical electric vehicle requires around six times more mineral inputs than a conventional vehicle, while an onshore wind farm demands around nine times more mineral resources than an equivalent gas-fired powerplant[2]. Lithium, nickel, cobalt and graphite are essential for batteries, whilst rare earth elements are indispensable for magnets used in wind turbines and electric motors. These figures demonstrate that the energy transition – and the resulting expansion of renewable energy, electrification and storage – is driving mineral extraction and exacerbating the socio-environmental challenges long associated with the sector. Mining has historically been linked to deforestation, biodiversity loss, water consumption and contamination, and generation of tailings. Its social impacts include displacement, land disputes, health risks and the unequal distribution of costs and benefits[3].

Sustainability at the Basis of Energy Transition

The importance of renewable energy to decarbonisation can lead to renewable technologies being portrayed as inherently sustainable. This, however, is an oversimplification that overlooks their broader environmental and social impacts. Sustainability extends beyond the climate benefits delivered by a technology; it also requires consideration of the risks and impacts throughout the value chain that

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supports it. Ignoring this dimension can give rise to greenwashing, in which the positive narrative surrounding the final product - the technology enabling the energy transition - obscures the environmental and social impacts of extracting and processing raw materials.

Recent regulatory initiatives are beginning to reflect this understanding. In Brazil, for example, the Brazilian Sustainable Taxonomy includes the extractive sector within its scope, recognising the structural role of critical minerals in the low-carbon economy and requiring related activities to meet specific criteria to be considered sustainable.[4] A similar rationale underpins the National Mining Plan 2050 and the Basic Framework for Sustainable Brazilian Mining, which were approved by the Ministry of Mines and Energy in 2026, and incorporate social and environmental responsibility, governance and decent work into the sector's planning.[5] These instruments show that increasing the supply of critical minerals alone is not sufficient for the energy transition; such expansion must take place on an environmentally responsible and socially just basis.

In this sense, the legitimacy of the transition depends not only on the emissions avoided by the final product, but also on how the minerals it requires are extracted and processed. Mining sustainability should therefore be treated as a prerequisite for decarbonisation, rather than as an expected consequence of its expansion. Without a responsible mineral supply chain, energy may be cleaner in use, but not necessarily at its source.

1 Energy Research Office (EPE). *Report on Critical and Strategic Minerals for the Energy Transition*. Rio de Janeiro: Energy Research Office, 2025. Available at: https://www.epe.gov.br/sites-pt/publicacoes-dados-abertos/publicacoes/PublicacoesArquivos/publicacao-877/Caderno_Minerais_English.pdf

2 International Energy Agency (IEA). *The Role of Critical Minerals in Clean Energy Transitions*. Paris: International Energy Agency, 2021. Available at: https://www.iea.org/reports/the-role-of-critical-minerals-in-clean-energy-transitions

3 The world's three largest producers account for more than two-thirds of global production of cobalt, lithium and nickel, and for almost 90 per cent of rare-earth elements production; this concentration exposes supply chains to additional geopolitical, commercial and environmental risks (OECD, 2026). Available at: https://www.oecd.org/en/topics/sustainable-mining-for-development.html

4 BRAZIL. Ministry of Finance. Action Plan for the Brazilian Sustainable Taxonomy (TSB). Brasília, 2025. Available at: https://www.gov.br/fazenda/pt-br/orgaos/spe/taxonomia-sustentavel-brasileira/audiencias/plano-de-acao-da-tsb

5 Ministry of Mines and Energy. *Ministerial Ordinances Nos. 924 and 925. Approve the National Mining Plan 2050 (PNM 2050)* and establish the Basic Framework for Sustainable Brazilian Mining. Official Gazette, Brasília, 2026. Available at: https://www.gov.br/mme/pt-br/assuntos/secretarias/geologia-mineracao-e-transformacao-mineral/pnm-2050

BUILDING A MORE RESILIENT AND PROTECTED SOCIETY

Brazil is experiencing an increasing frequency of extreme climate-related events, such as droughts, heatwaves, floods and windstorms. Although each region faces different levels of exposure, the impacts tend to be more severe in vulnerable areas, intensifying material losses and socio-economic challenges.

In this context, insurance extends beyond its traditional role of providing financial compensation and takes on a strategic position in strengthening economic and social resilience. It supports individuals, organisations and regions in prevention, response and recovery in the face of extreme events.

Despite being among the largest insurance markets in Latin America, Brazil still faces a significant protection gap and a weak insurance culture. As a result, families, businesses and communities remain more exposed to risks and less prepared to recover their assets and resume activities following adverse events.

The Protection Gap and Low Risk Perception in a Climate-Vulnerable Country

The *2025 Climate Events and Insurance Radar in Brazil*, published by the National Confederation of Insurers (CNseg), reveals significant regional inequalities in coverage for climate-related losses. Whilst the South, Southeast and Central-West regions recorded protection levels of approximately 16%, 11% and 6% respectively, the North and Northeast regions did not exceed 2%.

Between 2022 and 2024, 67 significant climate events were recorded, resulting in estimated losses of BRL 184 billion. In the first half of 2025 alone, a



Bradesco Expresso Campaign Source: More Protection and More Inclusion.

further 10 events generated an additional BRL 31 billion in losses. These figures reinforce the need to foster a culture of insurance as a tool capable of helping society adapt to and protect itself against current and future climate challenges.

Building More Resilient and Protected Regions
Creating more resilient regions depends on integrated action between governments, businesses, academia and society. In this context, insurance has become an important tool for adaptation, helping to bridge the protection gap through **prevention**, a diversified **portfolio of solutions**, and the **expansion of distribution channels**.

Prevention: The sector can act as an active partner in anticipating and managing risks. At Grupo Bradesco Seguros, initiatives such as the *"Our Climate, Your Health"* guide highlight how climate change impacts health and provide practical prevention guidance. Likewise, campaigns targeting customers in the motor and home insurance sectors help to disseminate preventive information during periods of heightened climate vulnerability.

Portfolio of Solutions: Addressing climate-related challenges requires the continuous development of solutions tailored to emerging risks. Among the initiatives undertaken by Grupo Bradesco Seguros, the following stand out:

- **Climate Event Coverage**, which resulted in BRL 70.93 million in claims payments related to flooding.
- **Weather Monitoring and Special Response Operations**, supported by more than 48 climate bulletins issued in 2025 to assist responses to five monitored extreme weather events. When activated, the operation provides policyholders with rapid assistance, guidance and dedicated support.
- **Telemedicine**, which complements these efforts by expanding access to healthcare, particularly in remote regions or situations where local infrastructure has been affected.

Distribution Channels: Extending protection to more people is essential for strengthening society's resilience. Bradesco Expresso operates through 39,441 banking agents spread across 5,550 municipalities, reaching 99.65% of the country. Combined with the work of insurance brokers, this structure helps to broaden access to information and protection. In 2026, 597 insurance brokers were trained to connect extreme weather events to the available insurance solutions before, during and after situations of vulnerability.

Building a more resilient society requires reliable information, solutions that are aligned with emerging risks, and channels capable of expanding access to protection. The insurance sector plays a strategic role in strengthening regions' capacity to adapt and supporting a more resilient future.

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Strengthening insurance awareness is one of the most effective strategies for building communities that are resilient to the impacts of climate change. Through prevention, the development of solutions tailored to emerging risks, and the expansion of channels providing access to protection, the insurance sector can help to reduce the protection gap and support a society that is better prepared to face extreme events.



THE *SECOND* "D": certifying avoided fire degradation in tropical forests

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Ecora, launched at COP30 in Belém by Bradesco, BNDES and Fundo Ecogreen, is a Brazilian carbon credit certification body and climate and carbon tech infrastructure. Aimed at high-integrity carbon credits through the latest technological advances, it develops methodologies calibrated to tropical realities, aligned with global best practices and international protocols, and subject to independent review.



A growing source of emissions

Fire is a structural driver of carbon loss in forests and savannas worldwide. In the Amazon, whose humid forests evolved under low fire frequency, the evidence is unequivocal. Brazilian Amazon fire emissions averaged 454 $MtCO_2$ per year in 2003–2015, rising to 989 $MtCO_2$ in drought years [1]. Fire-driven degradation released 791 ± 86 $MtCO_2$ across Pan-Amazonia in 2024 alone [2]. Degradation now rivals deforestation as a carbon source [3], and fire-induced tree mortality persists for years [4]. The 2026 El Niño drought brought severe smoke to Manaus.

An unoccupied methodological gap

The second "D" of REDD+, forest degradation, remains largely uncredited at project level: prevailing methodologies credit avoided deforestation but exclude fire degradation or treat it only conceptually. Savanna fire management, as practised in northern Australia, relies on early dry-season controlled burning, potentially applicable to the Brazilian Cerrado but ecologically inverse to humid tropical forests. Jurisdictional REDD+ programmes increasingly account for degradation, so projects must be nested from the outset.

Ecora's proposed fire-degradation module

Ecora intends to develop a fire-degradation module within its REDD+ methodology, running on its dMRV platform, with four components.

1. Degradation is quantified through canopy damage and tree mortality, combining satellite, lidar and field data over several years, as burned trees keep dying.
2. A climate-aware baseline, driven by an ignition and spread model incorporating drought, forest edges, roads and ignition sources, estimates expected burning each year; credits reflect expected minus observed outcomes, so wet years yield no windfall and El Niño years do not erase genuine effort.
3. Brigade operations (dispatch, response times, containment) are logged to evidence impact beyond existing public programmes.
4. Each pixel is classified as intact, fire-degraded or deforested, preventing double counting.

Ecora acts solely as certifier: it designs the module, accredits data and model providers and audits, but neither develops projects nor profits from credit sales. The baseline model must be open, versioned and reviewed by an independent scientific panel. Indigenous and community brigades, engaged through free, prior and informed consent, are central, remunerated for verified effort rather than penalised for climate-driven fires. Nesting with states, alignment with Brazil's SBCE [5] and data partnerships with INPE



and MapBiomas are prerequisites. The same infrastructure can also reduce fire-reversal risk in existing REDD+ portfolios.

Integrity before volume

A 10% reduction of the historical reference equals roughly 45 $MtCO_2$ per year, yet this is physical potential, not creditable supply: attribution, additionality, leakage and permanence must be demonstrated. At COP31, Ecora proposes a consortium of research institutions, Indigenous organisations, fire management agencies, states and (re)insurers, with a concept note and 24-month roadmap towards a draft module, independent review and a pilot.

A view from the Global South

Most crediting methodologies were conceived outside the tropics, with assumptions ill-suited to Global-South ecologies, land tenure and community governance. Credible innovation requires methodological adherence to place: approaches designed within the biomes and societies they measure, informed by Indigenous and traditional knowledge and accountable to national frameworks. Such situated legitimacy is a condition of rigour, not a concession. Avoided fire degradation is a frontier where the Global South is well placed to set, rather than receive, the standard.

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