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ASSOCIAÇÃO BRASILEIRA DE ENERGIA EÓLICA E NOVAS TECNOLOGIAS

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Contribution of Brazilian Association of Wind Energy and New Technologies (ABEEólica) to the COP 30 Presidency Roadmap Part I the Transition Away from Fossil Fuels in a Just, Orderly and Equitable Manner.

Part I — COP30 Presidency Roadmap for Transitioning Away from Fossil Fuels in a Just, Orderly and Equitable Manner

(a) What are the most critical barriers preventing a transition away from fossil fuels?

I. One of the most significant barriers to transitioning away is the structural problem of economic dependence on fossil fuels in many countries. Fossil fuel production and exports remain major sources of government revenue, employment and trade income, which makes rapid transitions politically and economically complex and unfeasible sometimes. In addition, energy security and affordability concerns continue to slow down the transition, particularly in countries where alternatives are not yet sufficiently scaled.

II. Recent international analysis highlights that the global energy system has entered an “age of electricity”, in which demand for power grows faster than overall energy demand, driven by electrification, digitalization, data centers and new industrial uses. This increases the urgency of expanding generation, transmission and flexibility resources, while maintaining reliability and affordability of the energy systems.

III. According to International Energy Agency (IEA), power demand is set to grow by more than 3.5% per year on average over the rest of this decade, with electricity generation from renewables, natural gas and nuclear all expanding to keep pace. By 2030, renewables and nuclear power are expected to be generating 50% of global electricity. Natural gas-fired output is also set to grow through 2030, while coal-fired generation loses ground globally as renewables expand. As a result, global carbon dioxide emissions from electricity generation are expected to remain roughly flat between now and 2030 (IEA Energy Mix, 2026).

IV. But the investment remains unevenly distributed. While global clean energy spending is rising, capital flows remain concentrated in advanced economies, and many developing countries face high financing costs, interest rates and limited access to competitive long-term capital. This imbalance risks slowing the transition and widening development gaps.

V. Besides the barriers of technological dependence, scale and investment return, another important barrier to transition is the existing fossil fuel subsidies and market distortions to favor incumbent energy systems.

VI. In the electrical sector, another challenge is the infrastructure constraints, including insufficient grid capacity, low pace of storage systems adoption, and low-carbon industrial technologies adoptions, limiting the pace at which clean alternatives can replace fossil fuels.

VII. In Brazilian case, while the power sector is already largely renewable around 80%, the critical barriers to address the transition still remain in specific sectors that consume fossil fuels (oil, coal, oil coke and natural gas) such as industry, mobility and heavy road transport and petrochemical derivates.

VIII. On this way, regional inequalities and infrastructure gaps, particularly in transmission, can constrain the scaling of renewables. It is important to emphasize that the roadmap provides clear guidelines for Emerging Markets and Developing Economies (EMDE), particularly regarding the consistency of the creation and implementation of new public policies aimed at the adoption of low-carbon technologies.

IX. Brazil has great comparative advantages, notably one of the cleanest electricity matrices in the world, with 93% of electricity generated by renewable sources in 2023 and about 50% of the total energy matrix composed of clean sources[1]. The possibility of uniting the national vocation for the use of renewable resources, such as sun and wind, with the objectives of reducing emissions and decarbonizing industrial production, made the country achieve significant advances in the political and regulatory agenda in the last five years.

X. This effort by the national and international business body has generated a valuable regulatory and legal framework for the energy transition:

- Law No. 14,948/2024: Creates the Legal Framework for Low-Carbon Hydrogen;
- Law No. 15,097/2025: Regulates the use of offshore energy potential
- Law No. 14,990/2024: Establishes the Low Carbon Emission Hydrogen Development Program (PHBC);
- Law No. 14,993/2024: Fuel of the Future Law;
- Law No. 15,042/2024: Establishes the Brazilian Greenhouse Gas Emissions Trading System (SBCE);
- Law No. 15,103/2024: Energy Transition Acceleration Program (PATEN).
- Launch of the Brazil Platform for Climate Investments and for Ecological Transformation – BIP

XI. Our experience shows that the proper management and operation of an Interconnected System, as well as the exploration of its potentialities, also depends on strengthened regulatory agencies and institutions with a trained technical staff and a contingent capable of meeting, with due legal and regulatory rigor, the demands imposed by agents, government and society, in favor of national development.

XII. The roadmap needs to pay attention to the transmission system, in addition to being a strategic point when we think about climate resilience and energy security. It is a structural solution for the safe and efficient insertion of new renewable energies, with a reduction in the curtailment for these assets.

XIII. The demand-side and supply-side perspective (electricity consumers and generators), large industries, residential, commercial and electromobility and the future green hydrogen and derivatives plants, needs strength network to enable connection, project development feasibility, and allows greater use of renewable sources throughout the country.

XIV. However, according to the IEA, the energy demand per capita is generally lower in EMDE. Many of these countries are still developing their knowledge, some suffer from a lack of universal access to energy, and most have lower average incomes and levels of ownership of energy consuming equipment than advanced economies.

[1] https://www.epe.gov.br/pt/abcdenergia/matriz-energetica-e-eletrica

XV. In this sense, the picture is a dynamic one: many countries are undergoing rapid urbanization, building infrastructure, making swift progress on access to modern energy, and seeing their economies and their demand for energy grow strongly.

(b) What potential levers exist for accelerating the implementation of the transitioning away commitment?

I. A central lever for accelerating the implementation of the commitment to transition away from fossil fuels is ensuring that clean energy systems translate structural advantages into tangible social and economic gains. In this context, we propose the concept of a **"social bonus"**: a collective gain generated when a clean, integrated, and efficient power system transforms renewable potential and scale into affordable energy for consumers, with positive impacts on income, competitiveness, and social inclusion.

II. Brazil already benefits from a largely clean and cost-competitive generation matrix. However, high end-user electricity costs highlight a key structural challenge. Addressing distortions in tariff design, excessive charges, and poorly targeted subsidies is essential to ensure that the benefits of the energy transition are effectively delivered to society. Without this, the transition risks being socially incomplete and politically unsustainable.

III. A second key lever lies in fully leveraging what can be defined as a **"green bonus":** the structural advantage a country gains by transforming a clean energy matrix into economic, environmental, and geopolitical value. In Brazil, this includes supporting industrial decarbonization, enabling new demand such as data centers, and strengthening regional supply chains linked to renewable energy.

IV. The expansion of wind energy illustrates how these levers can materialize. With a high level of local content and strong economic multiplier effects, the sector contributes to regional development, job creation, and industrial capacity building. Similar opportunities exist across other renewable sources, reinforcing the role of clean energy as a driver of inclusive growth.

V. Accelerating the transition also requires all this policy coherence. Clear alignment between energy planning, industrial policy, and climate commitment is fundamental. The roadmap needs to include also ensuring access beside competitive financing but fostering workforce qualifications and maintaining long-term visibility for investors.

VI. In this context, incentivizing fossil-based generation for new electricity-intensive activities does not enhance reliability and may instead create economic distortions, increase costs, and undermine climate objectives.

VII. Avoiding unnecessary fossil lock-in and reinforcing renewable-based solutions is therefore a key implementation lever. This includes strengthening clean energy value chains and ensuring that market signals are aligned with long-term decarbonization goals.

VIII. Brazil is uniquely positioned to demonstrate that accelerating the transition away from fossil fuels can go hand in hand with economic growth and social inclusion. Our results show a clean and competitive electrical matrix and unlocking the other potential depends on addressing structural issues such as final energy costs, subsidy design, industrial policy, and regulatory clarity. Through this, we are capable to incentivize the low carbon capital flows and technological transfer levers.

IX. To transition away commitment the countries need to expand renewable energy deployment which requires companies' knowledge-based (technology for electrification, energy storage, general grid infrastructure for onshore and offshore wind).

X. All kinds of innovation and technology are essential to ensure that low-carbon alternatives scale quickly enough to replace fossil fuels while maintaining energy security. The roadmap must incentivize instruments which can accelerate the adoption of new technologies.

XI. The most key levers of energy innovation start with partnerships, networks and matchmaking between the demand-side versus supply-side. The connective tissue of the innovation ecosystem should be strengthened, both internationally and across sectors. At a time when some traditional linkages are fraying, strong networks are crucially important for maintaining speed and efficiency.

XII. The adoption of new technologies depends on knowledge transfer between multinational companies and their subsidiaries, through skills, human capital, patent and others routine skills. The role of agencies and initiatives that connect and reduce these local distances is extremely necessary, enabling the capacities to acquire and exploit the knowledge of low carbon solutions. In the end, the roadmap is a unique platform to create, certify and stimulate the innovation fostering to EMDEs within energy sector and its customers.

XIII. At the same time, another potential levers of implementation are to intensify the countries to develop their own carbon markets which also play an important role by providing price signals that incentive emissions reductions and channel investment toward low-carbon technologies and nature-based solutions. When well designed, carbon pricing mechanisms and international carbon markets can help mobilize private finance and support cost-effective decarbonization across sectors.

XIV. In parallel, the implementation of the transition away needs a review and reforming inefficient fossil fuel subsidies, strengthening carbon accounting frameworks, and improving regulatory certainty can help create a more level playing field for clean energy investments. Targeted support for innovation, industrial decarbonization and workforce reskilling will be necessary to sustain long-term energy transformation.

(c) What roadmap experiences, best practices, and lessons learned can be shared?

I. A key lesson from recent transition strategies is that there is no single pathway applicable to all countries. Effective roadmaps or country strategies recognize the different starting points of national economies (emerging markets and developing economies), their levels of fossil fuel dependence, and their institutional and technological capabilities. Successful approaches therefore require a combination of energy transition planning with broader economic diversification strategies.

II. In this context, the road map needs to insert the ESG measurements with commitment to promoting a just energy transition that considers the country's diverse economic, social, and territorial realities, while aligning wind energy development with local needs. The Association has been advancing a set of integrated initiatives that combine regulatory analysis, knowledge production, and institutional engagement.

III. Among the main areas of work are technical contributions to the review of environmental legislation at both federal and state levels, aimed at improving the regulatory environment and ensuring legal certainty for projects, while strengthening adequate socio-environmental practices. In parallel, ABEEólica has been developing tools to measure the socio-environmental impacts of wind energy in territories, including the creation of its own index that assesses local development in areas where wind farms are located, enabling a more qualified understanding of the sector's effects on communities.

IV. Complementing these efforts, the Association has structured a platform dedicated to mapping and systematizing social projects developed by its member companies, increasing transparency and highlighting the sector's contributions to sustainable development. ABEEólica also promotes events and dialogue spaces with local stakeholders including communities, public authorities, academia, and civil society with the aim of strengthening engagement, active listening, and the joint construction of solutions.

V. Another important lesson is that transitions must be managed simultaneously on both the supply and demand sides. Our suggestions have the rationality that reducing fossil fuel production without scaling low carbon alternatives risks energy shortages and social backlash. At the same time of reducing fossil fuels the demand-side needs to be accelerated. It means inducing the electrification of industry reviewed by energy efficiency and clean fuels and results the reduce long-term fossil fuel dependence.

VI. Integrating carbon markets, industrial policy and infrastructure planning into national transition strategies has proven valuable to economy. These instruments can help mobilize investment, provide economic incentives for emissions reductions and support the development of new low-carbon value chains.

VII. The Brazil lessons in their electrical sector can help the other countries to build a electrify economy based on renewable energy and access to electricity by the society and remote communities. Universal access grants a *Social Bonus*, where nearly 99% of the population has access to interconnected power networks, ensuring energy security and competitiveness.

VIII. The Industrial development and specific to the wind sector, we were capable to develop a network of suppliers by the efforts of Brazilian Development Bank (BNDES). Its accreditation policy allowed the attract international manufacturers and develop internal knowledge capabilities to Brazilian market. In context of roadmaps, incentive the development of industrial networks by development banks with low

interest rates for grants and loans are an important strategy for low carbon technologies. These strategies must be part of this new road map which COP 30 Presidency will develop.

IX. Beside the financial incentive, our institutional efforts to regulate and operate the electrical sector built the regulation to scale up renewables and integrate them into the grid. The robust transmission corridors and planning protocols is also part of these efforts that allowed large-scale renewable penetration without losing system stability and the probability of energy be curtailed.

X. However, in the global experience renewables need a strong network backbone, forecasting, flexibility and institutional coordination. Our suggestions for the Roadmap for Transitioning Away from Fossil Fuels in a Just, Orderly and Equitable Manner are the need to pair renewable electricity with industrial and socio-economic development and institutional integration. Brazil demonstrated that clean energy could become a platform for economic competitiveness. Our energy is cheap, reliable and renewables and capable to attracted highly intensive energy industry customers (aluminum, mining, chemicals, datacenters and IA uses) and opened pathways for future green fuels and clean manufacturing. The real transition is not only generating more renewables but replacing fossil energy in final consumption.

XI. In general, the Roadmap also needs promote a flexible global framework that supports country-specific transition roadmaps, anchored in just transition principles, regulatory certainty, and integrated supply–demand strategies, while encouraging measurable socio-environmental impact assessment and the alignment of climate goals with inclusive economic development.

(d) How can a just, orderly and equitable transition reflect the diverse realities of countries?

I. A just and orderly transition must recognize that countries face very different economic structures, development needs and energy systems. While all countries share the objective of transitioning away from fossil fuels, the pace, sequencing and policy mix will necessarily vary according to national circumstances.

II. The developed ESG agenda is grounded in the understanding that a just energy transition must consider the country's regional disparities and align energy development with local realities. The Association's work integrates regulatory engagement, knowledge generation, and stakeholder dialogue to support a transition that is both inclusive and context sensitive.

III. For many developing economies, the transition must be closely linked to development priorities such as energy access for all population and remote communities, stimulating and incentivizing economic growth, industrialization and job creation. Access to affordable climate finance, technology transfer and capacity-building will therefore be essential to enable these countries to accelerate the transition without compromising development objectives.

IV. A just transition also requires a strong social dimension. This includes protecting workers and communities currently dependent on fossil fuel industries, ensuring fair distribution of costs and benefits, and creating new opportunities in emerging low-carbon sectors. Workforce reskilling, regional development policies and inclusive planning processes are key to avoiding new forms of inequality.

V. In Brazil, the just transition agenda is particularly relevant given regional disparities and the importance of both fossil fuel and renewable industries for employment and economic activity. The transition offers opportunities to generate quality jobs in sectors such as wind, solar, bioenergy and green hydrogen, while strengthening energy security and industrial competitiveness. At the same time, careful planning will be required to support workers and regions dependent on fossil fuel activities, expand infrastructure and ensure that the benefits of the transition are widely shared across society.