energy transition

ENERGY TRANSITION IN BRAZIL

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Agora Energiewende

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MAIN MESSAGES

- In an environment of profound transformation, Brazil must develop a consistent narrative for its energy transition, which can be used as a geopolitical asset in international commercial and climate negotiations. Without its narrative, the country is subject to international narratives, with diverse interests, and may miss opportunities to add value to its economy.

- Brazil can take the lead in the international race for the energy transformation of the economy because it is already part of a low carbon energy matrix and has significant resources of low (or zero) emission for the expansion, with complementarities and that are economically competitive. The strategic use of resources will be necessary for the country to benefit from the energy transition, which may reduce the cost of energy with positive impacts for the productive sector and society in general.

- The update of the regulatory framework of the electric sector, considering the criteria of efficiency and risk allocation, will be fundamental in enabling the modernization of the electric sector, in addition to allowing the electrification of other sectors of the economy, mainly mobility and industry, making them more competitive.

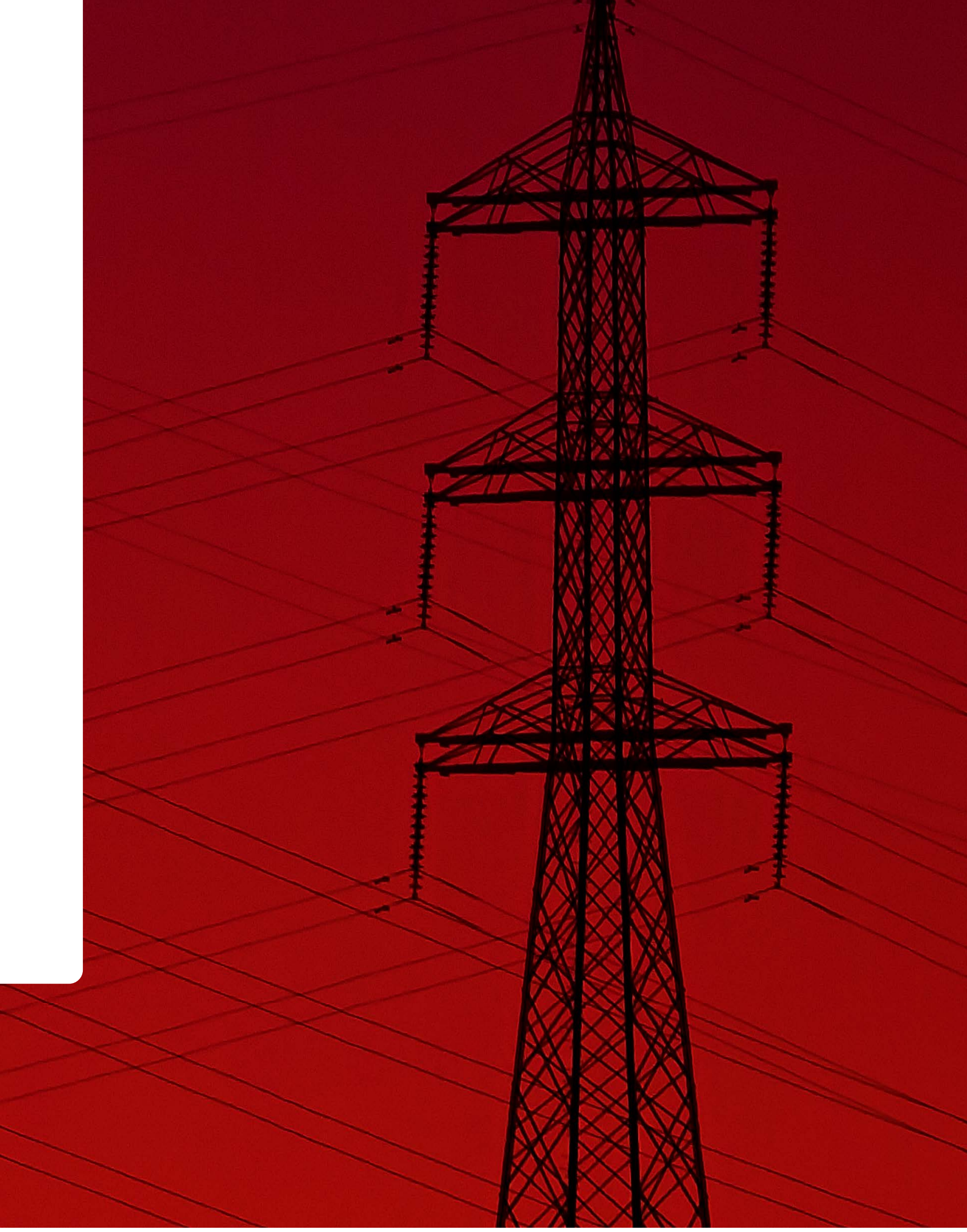
- Finding an economically efficient role for gas is fundamental to the success of the energy transition in Brazil. The availability of energy resources of low marginal cost of production and low (or zero) emission and with complementarities creates a challenge for the use of the natural gas supply in the country, especially the gas originating from the Pre-salt.

01 INTRODUCTION

The energy transition we are experiencing in the 21st century is a profound transformation in the way the world produces, transmits, distributes, and consumes energy. The redesign of energy systems in the next few decades will affect geopolitics, businesses, governments, society and individuals. More and more countries are seeking to develop their strategies to adapt – and to benefit from – this new reality.

In this context, understanding the energy transition and developing narratives suited to the particular reality of each country is fundamental so that economies take advantage of the different benefits of this process. The positioning concerning energy transition prevents countries from being adrift, by following the flow of narratives that carry the commercial interests of the other actors. A consistent narrative can be used as an instrument to tackle the priority issues for the economic development and the improvement of society's quality of life.

This document presents the contribution of E+ Energy Transition Institute to the understanding and construction of the narrative about the Brazilian energy transition, presenting its vision and suggesting principles so that the energy transition of Brazil takes place by maximizing the benefits for the country. For the Institute, by promoting competitiveness, energy, and environmental efficiency, the energy transition allows the country to have energy at lower costs. The process has other clear economic and social benefits for the industry and the country, such as job creation and greater access to services and innovation.



02 ENERGY TRANSITION IN THE WORLD

The replacement of intensive technologies in fossil fuels (such as fossil-fueled power plants and vehicles with internal combustion engines) by low carbon technologies (such as solar and wind energy and electric vehicles) has been happening at an accelerated pace in recent years. This change in pace has resulted from faster than expected reductions in the costs of the main low carbon technologies (wind, photovoltaic solar, and batteries) and an acceleration in the implementation of these technologies. The adoption of these technologies in the energy supply, known as the energy transition, has been motivated not only by energy security or by the reduction of greenhouse gas (GHG) emissions but also, more recently, by economic aspects.

Generally, the energy transition is associated with significant changes in the energy matrix, with the increase of the participation of low (or zero) emission of renewable resources, called "clean" sources. Because in most of the world the energy matrix is predominantly fossil-based, energy transition and decarbonization have become practically synonymous, especially in the electric sector. That is not the case in Brazil, which already has a predominantly renewable electric matrix.

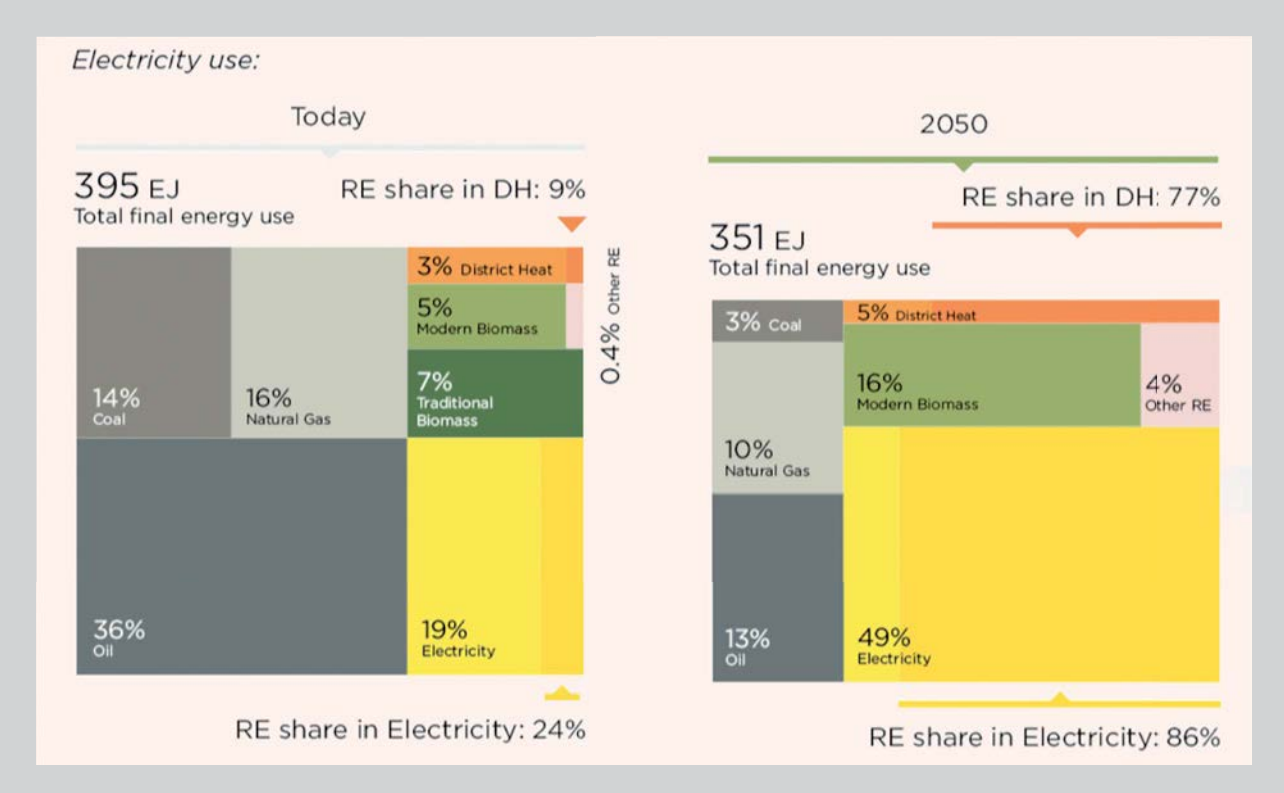
Although the energy transition is not limited to the decarbonization of the electric matrix, this process has been causing significant transformations in the industry. In particular, the technological innovations in the use of renewable resources and digitalization have allowed the decentralization of the electricity markets, transforming the geopolitical, technological, economic, and social dynamics of the production and the consumption of energy. Climate change has been added to other motivators for this process, such as economic aspects – a consequence of the fall in prices of the technologies – and behavioral and efficiency issues, as a consequence of the greater diffusion of digital solutions.

The advance in the use of renewables opens up space for a profound energy transformation of economies, with the electric sector as a starting point, and advancing to other sectors through **electrification**, including transport and industry. The electrification associated with the penetration of renewables and the increase of energy efficiency in the global matrix will be able to guarantee over 90% of the necessary reductions of emissions related to energy[1]. The trend towards electrification will cause the global demand for electricity to double in 2050, according to the McKinsey Global Institute (2019). IRENA (2019a) estimates that electricity will meet 49% of the total energy demand in the world (starting from 19% in 2018) and that 86% of this

[1] IRENA (2019)

electricity will come from renewable sources. The electrification process, in addition to decarbonizing the economy, if based on renewable electricity, makes the energy consumption more efficient, reducing the global demand for energy (Figure 1). The consequence of this process is the reduction of 20% in the demand for fossil fuels by 2030, and 60% by 2050.

Figure 1: Advance of electrification in the world energy matrix by 2050.



Source: IRENA (2019a)

Electric vehicles will potentially supply a major contribution in the reduction of emissions from the transport sector with indirect consequences to the electric system, such as the possibility of the vehicles themselves serving as energy resources of production and storage. In general, the significant growth in the use of technologies that allow the decentralized generation and storage enables the energy consumer to assume a more active role in the system, becoming a "prosumer"[2] (IRENA, 2019). **Decentralization** makes the market structure more competitive and "democratic," as long as the consumer has the appropriate market signals to actively participate in the management of its energy production and consumption.

Digitalization, which helps to optimize the operation of the system as a whole, enhances and allows all these processes. Examples are intelligent networks that integrate and manage all the elements from the generation to the end use, applications for shared services, and many other applications that are emerging at record speeds.

[2] "Prosumer" represents the "new agent" of the system, who produces, stores, and consumes energy.

THE ELECTRIC SECTOR AS A TRANSFORMATION VECTOR OF THE ECONOMY

The fall in the generation costs of wind and solar energy is currently the most notable element of the energy transition. As a result, the fall in the costs of batteries, electric vehicles, heat pumps, as well as electrolysis technologies for hydrogen production has also been observed. This deflationary trend in the costs of energy services is stable and should strengthen over the next few decades.

It is important to consider the difference in the economic profile between renewable technologies in comparison with conventional technologies, which use fossil fuels. The combustion engines and turbines for power generation, in addition to being less efficient in the conversion of energy into work, have higher operating costs. As they depend on the purchase of fuels to operate, the equipment and facilities are subject to the supply and demand conditions of these fuels, which are often linked to the international market and, therefore, subject to exchange rate risks. On the other hand, they offer regular and controllable energy generation. In the case of renewable energies, the cost of investment is predominant, while the operating costs are low. As the investment costs have been falling, renewables have been gaining ground in the energy matrix of many countries due to their competitiveness.

The growth of renewables is well-known, with complex physical, commercial and regulatory consequences for the energy industry, especially in the electric sector:

On the physical side

The increase in participation of renewables makes the operation of the electric system increasingly more complex due to its variability and the increase of the distributed generation, which is often seen as an obstacle to a successful energy transition. However, a wide range of actors and technologies are capable of complementing the variation of these resources effectively and efficiently. Besides, new solutions are occurring at an accelerated rate. Forecasting techniques and energy resources that help to accommodate this variability have been implemented, such as storage systems, quick-start power plants, plants with reservoirs, and the demand response. The appropriate remuneration of the service of flexibility and the ancillary services from existing and new resources is fundamental to ensure the resilience and efficiency of the electric system in this context. Finally, new algorithms have been developed to manage the distribution network taking into consideration the multidirectional flows because, with the decentralization, each point of the network can be both a consumer and a generator.

On the commercial side

The growing availability of energy services with zero marginal cost challenges the use of units that operate with a higher marginal cost – and that generally have a higher emission level. The consequence is a substantial risk of devaluation of these assets and, therefore, of the established contracts. Investments in new power plants must take this risk into account, which challenges the expansion of the generation using fossil fuels worldwide. In the case of countries that also need to invest in transport infrastructure to use natural gas, the amount of investment is even more significant, in addition to the risk that the assets will be obsolete within a few years.

On the regulatory side

The market designs need improvements. The resilience and effectiveness of the electrical systems in this context will depend on regulatory and market models that are capable of adequately signaling the systems' needs from the services identified by the operators and the planners. In addition to appropriately valuing services such as flexibility, the new market designs need to address the perspective of the remuneration of the generation in the context of zero production marginal cost resources, seeking to accommodate the interests of the different actors and delivering equitable and effective solutions from the point of view of society. Finally, to encourage the immediately required investments for the energy transition the contracting model must guarantee the competitiveness and attractiveness for investors. In the case of renewable electric generation, Brazil already has an efficient energy contracting model, which can be extended to other sectors in the employment of technologies in a structured process of energy transformation of the economy.

Different factors define the extent to which countries will be capable of taking advantage of the potentials of the energy transition and transforming them into benefits for their economy and society. We consider that the main aspects to take into account are:

- The availability of renewable resources and the capability to develop, implement and operate these resources efficiently;
- The ability to attract large volumes of capital at a low cost in order to assure the financing of the investments;
- Market structure and legal and regulatory framework that is capable of managing the interests of the transition to ensure an efficient result for society as a whole;
- Support from society and local communities for investments and the expansion of renewable energy sources.

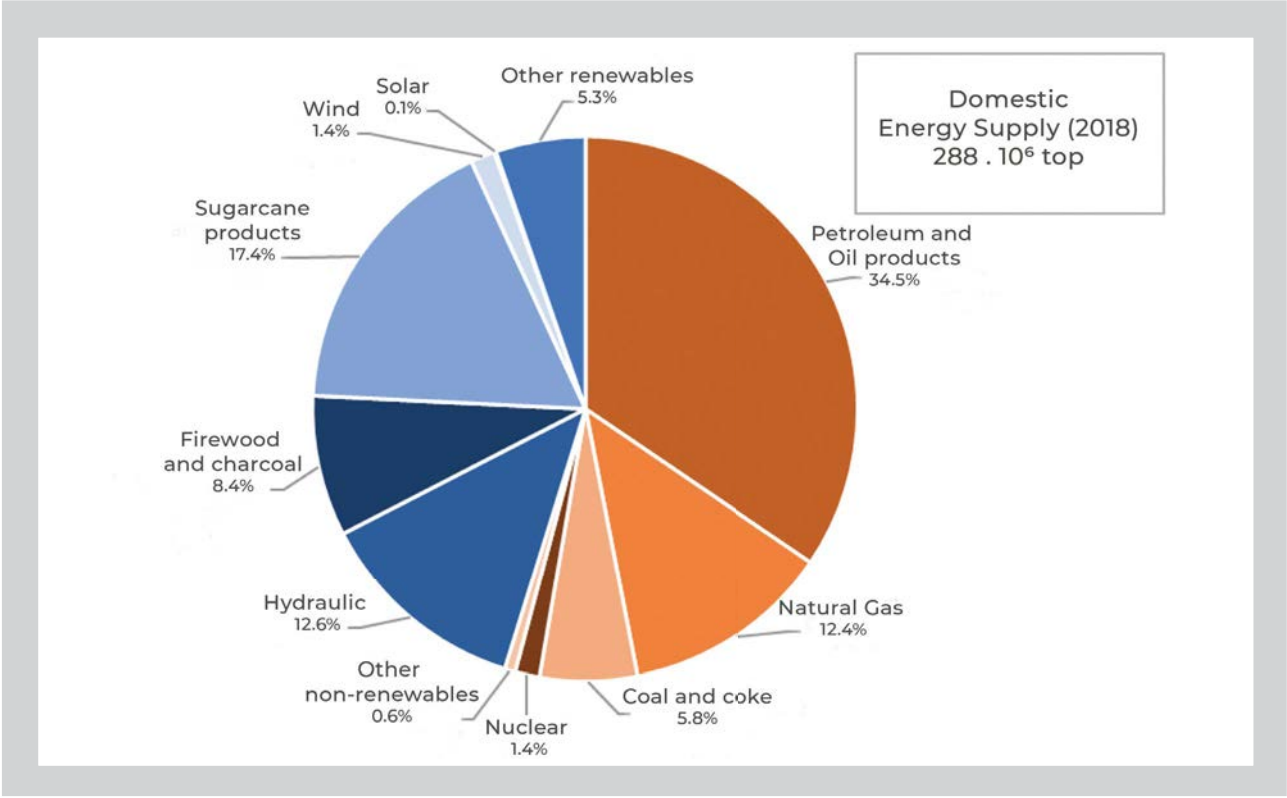
03 CONTEXT OF THE ENERGY TRANSITION IN BRAZIL

Brazil ranks ninth on the list of the world's largest energy and electricity markets. Among the major world economies, Brazil is one of the countries with the largest participation of renewable energy in its energy matrix, reaching 43% in 2017, while the world had an average of 14% and the OECD countries have 9%.

Figures 2 and 3 present the sources that compose the energy supply in Brazil and the energy consumption by sector in 2018, respectively. Oil and its by-products, intended mainly for the transport sector, have the largest share among the sources that supply the national market, with 34.4%, followed by sugar cane products (ethanol fuel and bagasse for electric generation), hydraulic energy and natural gas. As for the use of energy, industrial production and the transport of cargo and passengers account for approximately 64% of the country's energy consumption.

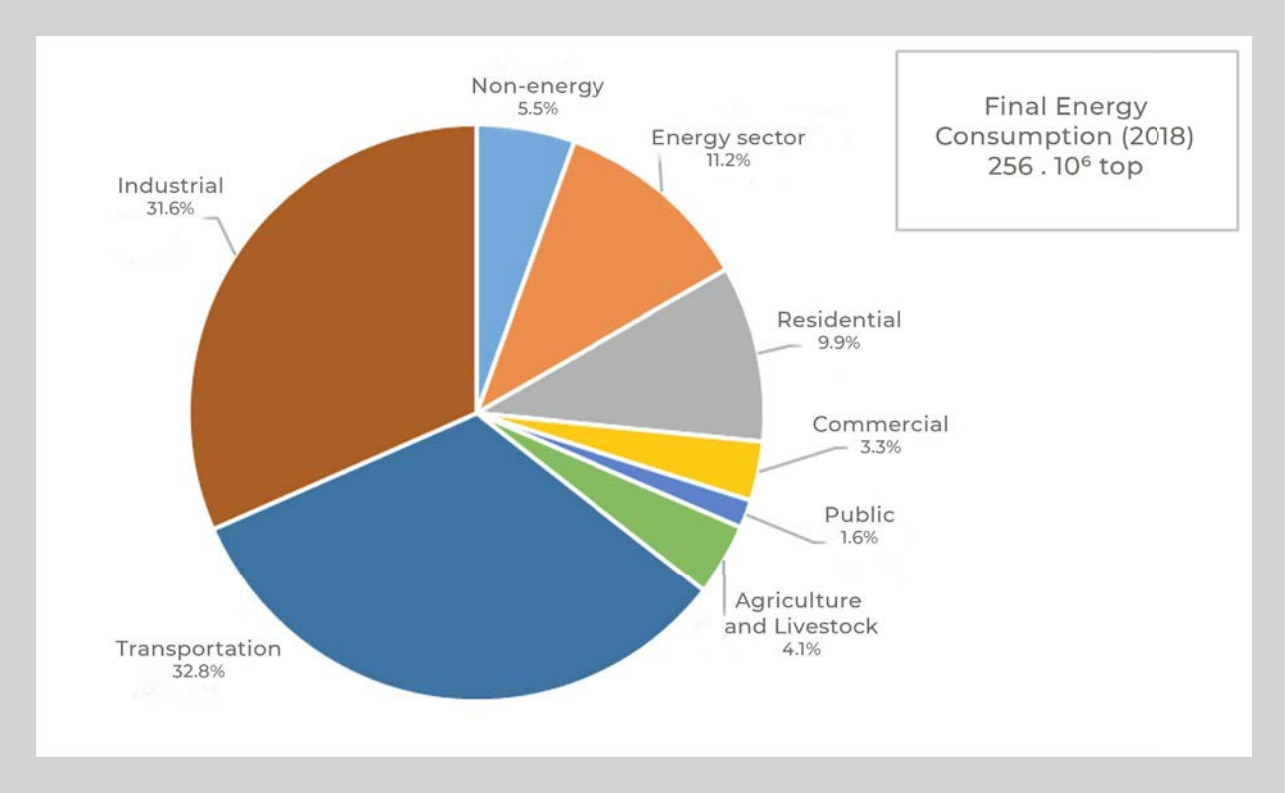
Brazil has taken relevant steps towards the decarbonization of the transport

Figure 2: Domestic energy supply in Brazil in 2018, by source.



Source: EPE (2019)

Figure 3: Final energy consumption in Brazil in 2018, by sector.



Source: EPE (2019)

sector with its national biofuel policy, RENOVABIO. Established in 2017, the policy sets national targets for the reduction of emissions for the fuel matrix for ten years, disaggregated into annual and individual targets for the fuel distributors. The distributors comply with their targets through the acquisition of CBIOs (Biofuel Decarbonization Credits), which are financial assets, traded on the stock exchange, issued by the biofuel producer from the sale (invoice). The biofuel producers are certified following the carbon intensity of their production processes so that the invoices attributed to each producer reflect their contribution to the mitigation of greenhouse gases to the fossil fuel that it replaces.

As a starting point for the discussion, this document intends to highlight, within the Brazilian context, the advantages and challenges that arise with the integration of new technologies for using renewable sources, such as wind and solar energy. It is presented here the characteristics and potentials of the Brazilian electric sector for the insertion of these sources, which have particular challenges. The adaptation of the electric sector to integrate the new renewables is a first step towards the energy transition in any system because the current paradigm shift results from the disruption of the price and efficiency of these technologies.

The Brazilian electric system is the largest in Latin America, with an installed generating capacity of 170 GW in January 2020.[3] In addition to having a transmission network of continental extensions, interconnecting a significant

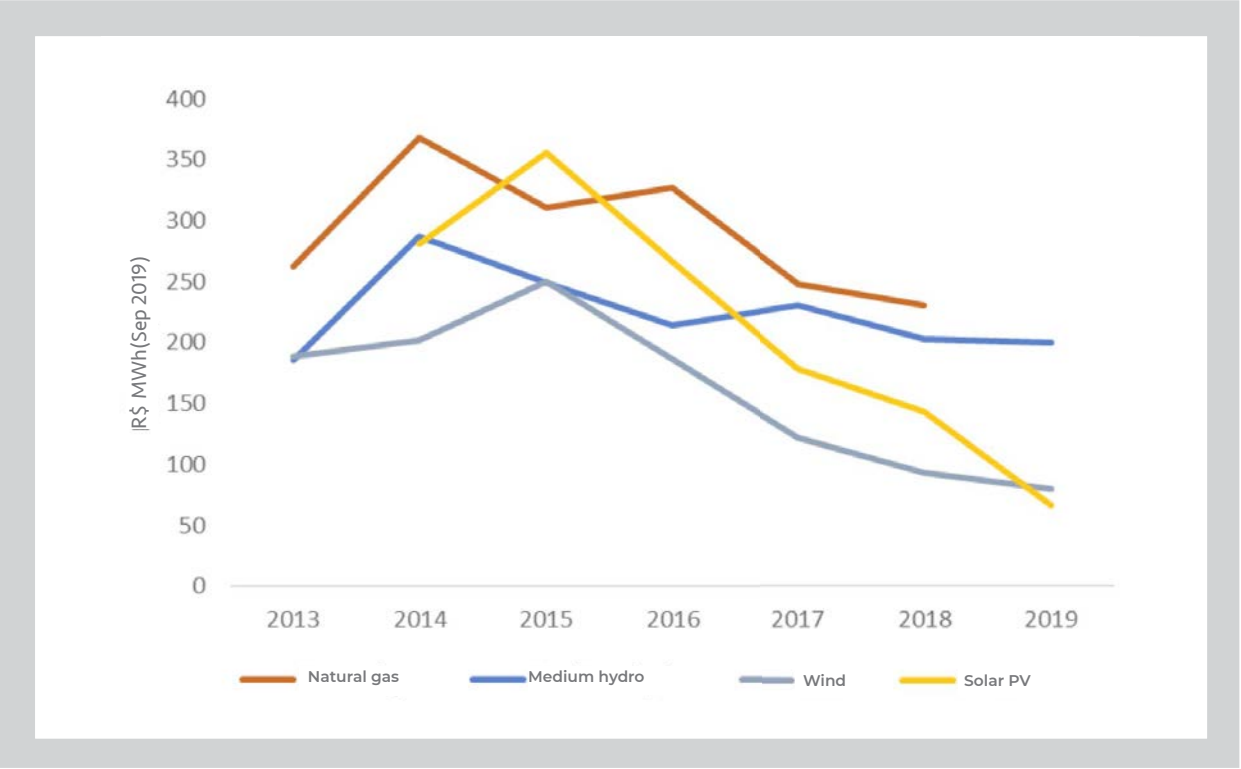
part of the national territory and taking advantage of regional synergies, the Brazilian system has a high participation of renewables. Many other countries will take decades to reach similar figures because they still have a high dependence on fossil resources and do not have the scale, quality, and diversity of renewable resources from Brazil.

Brazil starts in a privileged position in the energy transition because it currently has a renewable electric matrix, which allows it to "skip" the **decarbonization** stage of its electric matrix. The availability of energy resources to supply the growing demand is also not a concern. The diversity and profusion of the energy resources in the country are a crucial advantage in establishing its paths and guaranteeing a leading role in the energy transition.

The new renewable technologies (solar and wind) are already present in the Brazilian market with lower costs than conventional energies (Figure 4) and their participation has been growing in the electric matrix. In 2018, wind generation achieved over 48.0 TWh, with the national wind farm reaching over 14.4 GW in the same year – corresponding to 9% of the installed generating capacity in the country. The centralized photovoltaic solar energy, in turn, increased by 300% in 2018, achieving an installed capacity close to 2.0 GW (1% of the total) and a generation of 3.5 TWh. The potential use of these sources is still enormous. In the case of onshore wind energy, most of the resource is concentrated in the Northeast region, mainly in the interior of Bahia, Ceará, and Rio Grande do Norte. Rio Grande do Sul also has an important potential, with several wind farms installed, mainly on the coast. Solar energy, in turn, offers a generation potential throughout Brazil. Even the areas of least irradiation in Brazil have higher insolation than the best sites in Germany, which is one of the countries with the largest installed capacity for photovoltaic solar energy (EPE/MME, 2018).

[3] ANEEL (2020)

Figure 4: Average electricity prices at Regulated Contracting Environment (ACR) auctions by source.



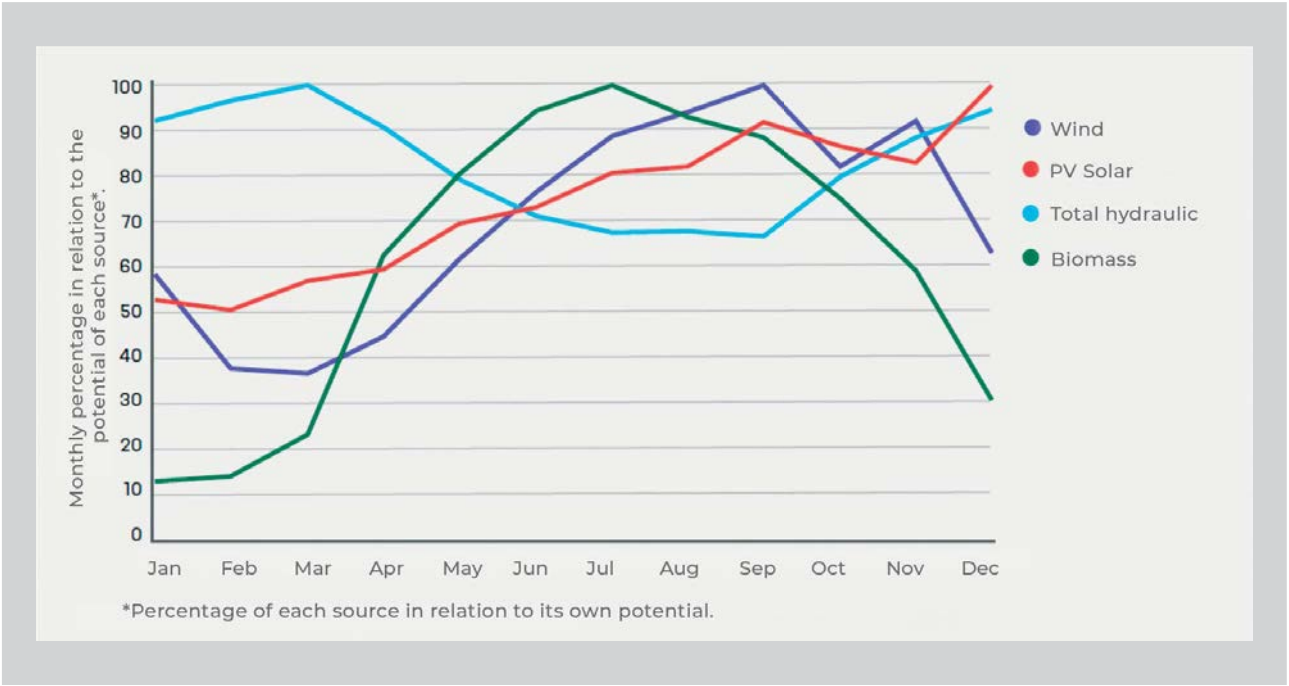
Source: own preparation with data from CCEE (2019)

The integration of new renewable sources in Brazil is favored by the extensive existing infrastructure of hydroelectric plants, many with reservoirs. Even with the significant increase of the other sources, hydroelectricity still dominates the Brazilian electric generation, representing 63.7% of the installed capacity and 74.2% of the generation in 2018 (ANEEL, 2019). The hydroelectric plants have high **flexibility** of operation and, when they possess a reservoir, they can store water to generate energy during periods when the natural variability of the resources reduces renewable generation (EPE/ MME, 2018). Although the construction of new hydroelectric plants with reservoirs has socio-environmental restrictions, the existing reservoirs still allow the penetration of significant volumes of renewable generation, accommodating its production variability without incurring significant costs for the operation of the electrical system.[4] However, for this to happen efficiently, it will be necessary to remunerate the flexibility as a service, so that the generators have an incentive to adjust their infrastructures and operations to comply with this new role. With these adjustments, it would be possible to mobilize the latent flexibility of the system and to overcome the concerns about flexibility, at least for the next fifteen years (Instituto Escolhas, 2018).

Brazil also has an extensive transmission system that connects the different regions, which makes it possible to exploit the different complementarities between the production of renewable sources, as shown in Figure 5. In addition, and most importantly, the transmission system acts as a factor of flexibility in the system, by integrating the hydroelectric production to renewables and the consumption centers.

[4] Instituto Escolhas (2018)

Figure 5: Complementarity between the renewable energy sources in Brazil in 2018.



Source: own preparation with data from EPE (2018b)

The technological development in the electricity industry has allowed the use of energy resources on a smaller scale to also become viable, promoting their use in a distributed manner. Several types of distributed energy resources are available from the system, including solar generation, demand response, electric vehicles, and energy efficiency. The existence of this distributed generation (DG) represents a new paradigm for the operation of the system, which proceeds to deal with resources within the consumption centers with other important complementarities, such as the one existing between the production of solar energy and the electric consumption derived from air conditioning. The installed capacity of photovoltaic solar DG went from almost zero in 2015 to about 2 GW by the end of 2019. However, Brazil still does not have a significant volume of demand response, electric vehicles, and energy efficiency on offer as resources to the system.

The abundance of renewable resources for electricity generation is of immense value for Brazilian society and can transform the country into an exporter of clean energy to South America, acting as an important vector for regional energy integration. To take advantage of this potential, it would be necessary to build the physical infrastructure of electricity transport between the countries, in addition to harmonizing the regulatory frameworks. On the side of the fossil resources, the growing oil production in Brazil has a high international demand with immediate liquidity. The export of this product can be a source of the financial resources that Brazil requires to finance the energy transformation that its renewable resources allow.

With the discovery of the **Pre-salt** fields in 2007, the Brazilian potential for oil and natural gas production has increased considerably. The oil production is projected to double in the coming years,

from 2.6 million barrels/day in 2018 to 5.3 million barrels/day in 2029 (EPE, 2019). The surplus oil potential places Brazil in a prominent role in the international market, being among the main countries responsible for the growth of the world supply outside OPEC,[5] along with the USA and Canada.[6] In order to make the production forecast for the next ten years feasible, it is estimated that the oil industry will need to attract investments of about R$ 2.5 trillion.[7] The challenge for natural gas is even greater. The current infrastructure for the gas flow is limited so that the use of the gas potential of the Pre-salt is conditional upon large investments in gas pipelines. As an aggravating factor, one part of the natural gas from the Pre-salt has a high CO_2 content, implying an increase in costs for its removal (EPE, 2019). The discussions raised by the government program "New Gas Market" aim to attract investments to the sector in the coming years through a series of measures, including the integration of the gas sector with the electric and industrial sectors.

The intention is that some investments will be made possible through natural gas power plants,[8] which in turn will have their economic competitiveness challenged by the renewables in conjunction with the hydroelectric plants and the transmission system. The country must, therefore, consider the best way to take advantage of the Pre-salt wealth, using it in a way to maximize its benefits in the transformation towards a more sustainable economy.

Therefore, for Brazil, the availability of resources and the current electric matrix present several advantages in relation to most countries. The significant Brazilian challenge in the energy transition of the electric sector is to make the best use of the diversity of its portfolio and to exploit economically and efficiently its possible complementarities in order to reduce its energy costs, to guarantee competitive economic development, to maintain energy security and to decrease even more GHG emissions.

5 Organization of Petroleum Exporting Countries, composed of 14 nations, including Iran, Iraq, Kuwait, Saudi Arabia, Nigeria, and Angola.

6 OPEP (2018)

7 EPE (2018)

8 MME (2019)

04 CHALLENGES OF BRAZIL IN THE ENERGY TRANSITION

The participation of low-emission renewable energies in the electric matrix, in general, is one of the indicators to assess the level of energy transition of a country, but not the only one. The energy transition involves several dimensions, related both to the physical performance of the energy sector in the country and to its level of preparation to absorb the transformations that appear in the transition scenario.

Some of the dimensions to be considered are the competitiveness of the energy costs made available to society, the environmental sustainability of the energy system, the credibility of the institutions, the governance of the sector, the business environment for innovations, and the capability to attract capital and investment. These aspects, among others, influence the capability of the countries to take advantage of the benefits of the energy transition for their economies, developing wealth and improving the society's quality of life.

The World Economic Forum (WEF), for example, has developed an index to assess the level of the energy transition of countries. According to the WEF ranking, in 2019, Brazil ranked 46th out of 115 evaluated countries, obtaining 58 of the 100 possible points. The assessment made by WEF takes into consideration the general performance of the energy sector in meeting the basic needs of the economy and society, as well as the preparation of the economy for the energy transition, considering the institutional environment, the market, the infrastructure, and the available energy resources. Although this evaluation does not represent a global consensus on the transition, the analysis of this result reveals that Brazil, even though it already has a significant renewable energy matrix, has several challenges to confront in order to take advantage of the benefits from the energy transition.

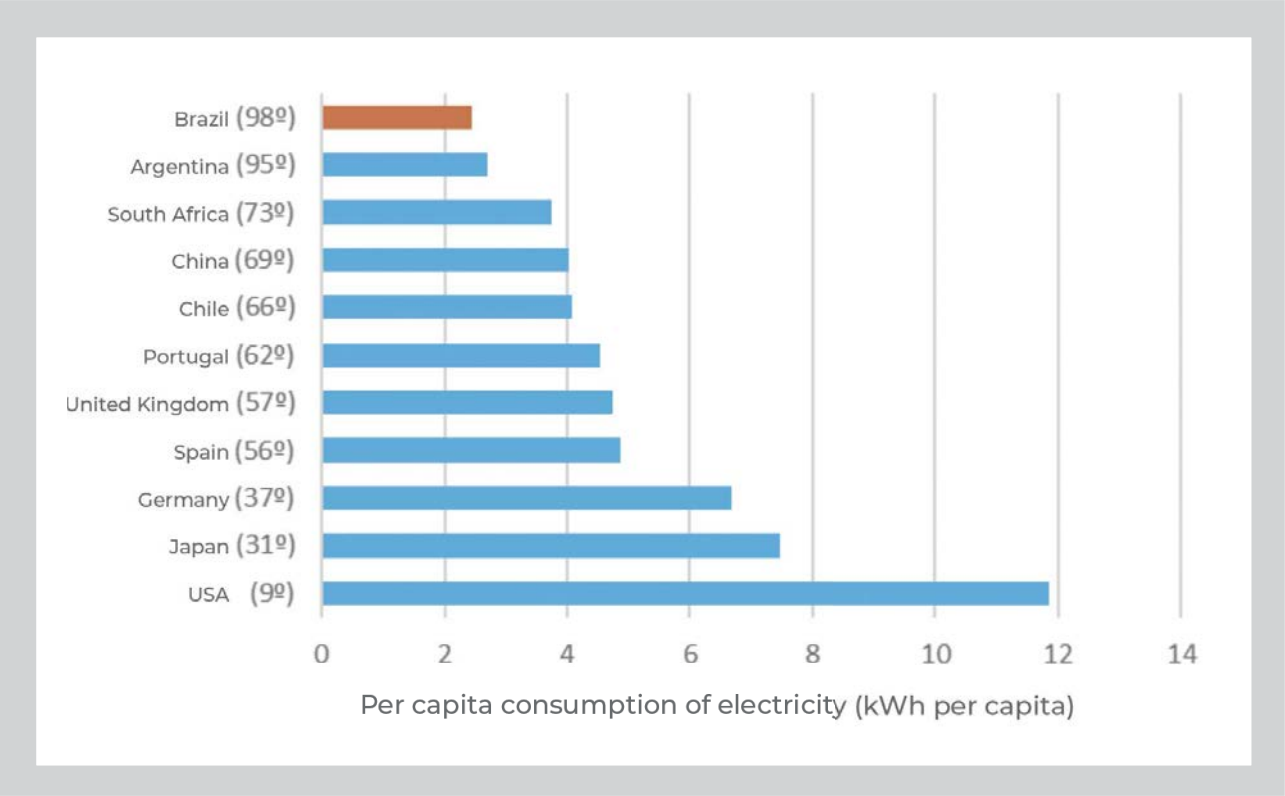
The phenomena that dictate the energy transition are the same all over the world, but their progress is a function of the decisions made in national contexts, which reflect different social and economic issues and political priorities. Each country has basic challenges and a desired future, defined by its particular context, but the context of climate change makes the decisions of each country affect the others and produces economic leadership. For this reason, the narrative of the energy transition is a geopolitical asset and can be used as such

in international negotiations, whether in climate or commercial negotiations. Brazil needs to strengthen its position in the energy transition, shifting the focus of the discussions, which are currently based on the potentialities of the current energy matrix, towards a strategic look about the energy matrix of the future.

The energy transition strategy needs to involve the current priority issues of the country. In the case of Brazil, a key point is that the transition promotes the supply of good quality energy at accessible prices to society and industry. This issue is especially challenging when considering that the demand for energy is expected to grow significantly in the coming years, as a combined result of population growth and increased per capita consumption. In addition to traditional applications of electricity, the electrification of other sectors will also contribute to the growth in electricity demand, even though it implies greater efficiency in the use of energy.

Brazil is the ninth world economy according to the IMF, but it occupies 98th place in the comparison of per capita electricity consumption (Figure 6). Making energy available at accessible prices for the population allows access to services that can lead to an improvement in the quality of life, in addition to enabling the development of several businesses. Also, the cost of energy for the industry in Brazil is one of the highest in the world, which compromises industrial competitiveness.

Figure 6: Per capita consumption of electricity in selected countries (2018).



Source: own preparation, with data from Index Mundi (2020)

Another priority issue in the current reality is to guarantee energy security in the face of extreme climate events, which have been increasing in intensity and frequency. The water crisis experienced in Brazil in 2014/2015 was an example of what could happen to the Brazilian electric system with the change in the hydrological regime, which is expected to intensify in the coming years. Another important example, which took place in California in October 2019, was the unprecedented measure of electricity power cuts, caused by the high risk of intensification of fires that were spreading throughout the state due to the fall of transmission lines due to high-speed wind gusts. Developing a more resilient electric system, with decentralization, the use of the portfolio effect of the resources, and the strengthening of regional integrations, is one of the necessary adaptations both for Brazil and other countries in the world.

To achieve this, the country needs to attract investments that are available on the international market. The International Energy Agency (IEA) estimates that a global average annual investment of US$ 3.7 trillion will be required between 2016 and 2050 to achieve the 2°C scenario of the Intergovernmental Panel on Climate Change (IPCC). The need to mobilize many funding sources for renewable energies and the public policy makers must be open to new forms of financing and innovative business models for energy companies (WEF, 2019). Brazil, although it has an abundance of energy resources, had its worst evaluation in the WEF Index in the requirement "capacity to attract capital and investments."

One of the main challenges for the energy transition in the world is the regulatory framework of the electric sector, which will be the most affected by the consequent transformation. Shaped by an industry that was originally verticalized, the current regulatory framework for the electric sector on a world level was developed in the 1990s and is based on a structure and organization of the industry that is rapidly changing. The planning, operation, and the electricity market itself, therefore, need to adapt to this new reality, so that the entire transformation resulting from the energy transition is seen as an opportunity and not as a threat to the electric system.

This is also the reality in Brazil, which needs adaptations to create a competitive environment, which is attractive to investments and that allows competition between sources, valuing their real benefits to the electric system. The ongoing reform of the Brazilian electric sector is, therefore, a unique opportunity for Brazil to create bases for its energy transition, by promoting an economically efficient system, with competitive tariffs and low carbon. To achieve this, the reform must allow the participation of all resources – centralized or distributed – in the market, guaranteeing through price signals that the economic competition between them occurs on the same bases to supply a defined energy requirement, ensuring its economically efficient insertion with tariff and social benefits.

A non-exhaustive summary of the subjects that need to be discussed in Brazil is presented below:

- Role and leadership of Brazil in the global energy markets, considering the redefinition of the world geopolitics, the resources of the country, its competence in technological development and institutional capability;
- Decarbonization or “zero net emissions” as organizing principles for business in Brazil;
- Leadership in the creation of an international carbon market and the export of environmental assets;
- Current and future possibilities of the vast conventional and unconventional reserves of oil and gas, and of the Pre-salt in the global scenario to reduce emissions and intense technological development;
- Impact of biofuels and electrification on the transport and industry sectors in Brazil;
- Modernization of the regulatory and institutional frameworks of the energy sector;
- Effects of climate change: understanding the vulnerability and management of associated risks.

In addition to the abovementioned issues, other aspects such as the creation of qualified jobs, social equity, and gender and race equality in the energy sector, for example, are fundamental to assess whether the ongoing transition is fair.

All of these points need to be taken into consideration so that Brazil can experience an effective energy transition, without neglecting the socio-economic and priority issues of the reality of the country. To achieve this, it is important to define guiding principles for the strategies and decisions related to the Brazilian energy transition, so that the country can take full advantage of the benefits of this transformation for its society and economy.

05

PRINCIPLES THAT GUIDE THE ENERGY TRANSITION IN BRAZIL

The energy transition is a complex, long, and multidisciplinary process. **E+ Institute** believes that the best way to extract value from the transition is to order the required developments within principles.

The guiding principles serve as a "compass" to provide an environment of trust, innovation, and competitiveness among agents and institutions, directed towards objectives that include technical and economic criteria and socio-environmental sustainability.

E+ Institute proposes the following principles to guide the Brazilian energy transition:

1. Low carbon electric sector as a basis for a low carbon economy;
2. Productive and allocative efficiency, from short to long term, in decision-making;
3. Transparency and participation of society in the performed acts;
4. Isonomy;
5. Innovation;
6. Prioritization of market solutions against centralized decision-making models;
7. Adaptability and flexibility of institutions, regulations, and technologies;
8. Universal access to reliable energy delivered at affordable prices;
9. Social development, with the qualification of workers for jobs in the new economy;
10. Promotion of social, race, and gender equity in the sector.

06 CONCLUSION

Brazil has several structural advantages in its process of energy transformation of the economy. The country is already part of a predominantly renewable electric matrix and has abundant and diverse low carbon resources, with complementarities and that are economically competitive. To get the maximum benefit from this transformation, however, the country needs to use its various energy resources strategically.

In a world context of climate change, the decisions of each country on its climate and energy policies affect the others. Therefore, Brazil must develop a consistent narrative for its energy transition, which can be used as a geopolitical asset in international commercial and climate negotiations. As long as it does not have its narrative, the country is subject to the narratives of other countries, with diverse interests, and may miss opportunities of adding value to its economy.

E+ Institute believes that the strategic use of resources is essential for the country to benefit from the energy transition, allowing it to reduce the cost of energy with positive impacts on the productive sector and society in general.

Finally, the starting point of the energy transition is an efficient and renewable electric sector. To create a competitive market environment, which is capable of integrating the different available resources and taking advantage of the systemic benefits, the regulatory framework of the sector needs an update. The reform of the electric sector is one of the priority points to prepare the country for this transformation, taking into consideration criteria of efficiency and risk allocation and following economic principles.

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E+ Energy Transition Institute is an independent think tank that promotes the inclusive dialogue to shape Brazilian energy transition as a vector for low emissions economic growth.

To support a scientifically sound and evidence-based discussion, E+ works with a multidisciplinary team and partners to provide knowledge and studies about technological, social and economic solutions for an effective and efficient energy transition.

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