



WORLD ECONOMIC FORUM

Stewardship Board Meeting

Shaping the Future of Energy

1. GENERAL CONTEXT

Brazil is a country with great energy potential, with a wide variety of sources. Its energy matrix is 42% renewable, being 80% renewable in the electric sector. The predominant renewable source in the country is hydroelectric but recently the growth in the expansion of wind, solar and biomass, put the country in a recognizable leadership place in the area of renewables.

All the productive chain of the energy sector, in all segments, oil and gas, electric power and biofuels, has recognized quality, notably in the areas of engineering, industry, regulation and formulation of public policies.

Despite this favorable scenario, the regulatory and business model that drives the sector for more than 15 years does not fulfill the needs of the modern world.

In fact, the sector is facing the exhaustion of this model, which has been supported over the last 15 years by government interventionism, the use of public resources to finance expansion, the misuse of state resources to achieve controversial objectives, subsidies, reserves the transfer of business costs and risks to consumers and other methods that resulted in low efficiency and high energy costs to the final consumer.

Changing the energy sector model is not a choice, but a necessity for Brazil to face the great challenges of its development and competitiveness in the global scenario, attracting investments through a favorable and efficient business environment and using the new technological scenario that will facilitate the maintenance of a low carbon matrix.

Since 2016, the country has conducted a series of structural reforms, which are being made based on principles of: (i) improving governance and processes; (ii) meritocracy in the choice of managers and teams; (iii) valuation of the contribution of each energy source to the matrix, with adequate pricing; (iv) realignment of incentives for efficiency; (v) valuation of the economic signal and consumer participation in the market; (vi) permanent dialogue with the agents, recognizing that the distributed intelligence of society is fundamental for the formulation of public policies; (vii) national solutions that make sense on the global stage, not just copying trends and creating market reserves. In this sense, a series of government programs and actions are underway to reorganize this environment, and results already obtained in recent decisions for the sector prove its inexorable transformation, especially oil and gas auctions, electric power and systems of transmission.



2. PROGRAMS AND ACTIONS FOR THE FUTURE OF ENERGY

2.1 Enhancing the Legal Framework of the Energy Sector

One of the first actions to reorganize the sector was the publication of two Public Consultations, the first one called "Principles for the Reorganization of the Power Sector" and the second, "Enhancing the Legal Framework of the Power Sector".

The proposals were built on the premise that the power sector is an important vector for the recovery of the Brazil's economic trajectory, taking into account the long-term sustainability and attention to current issues.

The consultations were an important milestone in the process of formulation specific proposals capable of turn the concepts into effective measures of modernization and economic rationalization of the power sector, offering significant improvements to the current regulatory environment.

More than 200 institutions/citizens contributed for improving the process of reorganization of the sector. Approximately 2,000 contributions were received. Two major events were held to discuss the proposals, as well as particular meetings with agents and associations.

Currently, this fruitful material is subsidizing the finalization of regulatory measures that will be presented for approval of Congress.

2.2 Privatization of Companies and Assets of Electric Energy

The government is working to democratize the capital of Eletrobras in 2018. By the project, the new company will have its capital control diluted in the Stock Exchange, where no shareholder will have more than 10% of the control block, guaranteeing to the company the private logic thus becoming a corporation with the capacity to invest and compete on an equal footing with other companies operating in the electricity market.

The privatization of the electricity sector also includes the privatization of six electricity distribution companies, located in the north and northeast of Brazil, currently under the control of Eletrobras. The privatization is expected to increase investments in its concession areas, with the improvement of the quality of the service provided.

The programs for the sale of assets of Eletrobras and Petrobras are in progress. In the case of Petrobras, its actions contemplate the public offering of BR Distribuidora's shares and interests in refineries, as well as studies that may include assets in the logistics area, such as pipelines and terminals.



2.3 Offer Expansion

Power Auctions

New energy auctions conducted in 2017 show that the improvements being implemented in the industry are creating a competitive environment for investments.

In two auctions, 4.4 GW of capacity were contracted in new plants, corresponding to a total investment of R\$ 18 billion. At this point, it is worth noting the significant contracting of renewables, with emphasis on the wind power source (1.4 GW) and a hiring of 0.57 GW of photovoltaic solar power plants, with an average discount of 56% in relation to the reference price. Brazil bought these renewables at prices around US\$ 40/MWh, compatible with those obtained in other countries, and traditional sectorial companies offered the projects.

New auctions are scheduled to occur in the first half of 2018.

Transmission System Auctions

Another successful action in this new environment is the transmission auctions.

In 2017, in two transmission auctions, contracts were signed for the construction of 12 thousand kilometers of transmission lines and the expansion of 23,548 MVA of the transformation capacity, which corresponds to a R\$ 22 billion investment. It should be noted that there was an average discount of 40% and that there was no participation of state companies in the events, proving the attractiveness of the projects to the private environment.

Two transmission auctions are planned for the year 2018, the first, with an estimated extension of 5,750 km of lines and 19,000 MVA of transformation capacity, with projected investments of R\$ 11 billion. Studies of the works of the second auction, scheduled to take place in the second half of 2018, are underway.

Exploratory Blocs of Oil and Natural Gas Auctions

Bidding rounds for oil and natural gas exploration blocks recently completed by the government will provide investments of around R\$ 510 billion over the period from 2017 to 2027 and over R\$ 320 billion in royalties.

Paralyzed since 2013, the production-sharing auctions were resumed with absolute success, providing, in two rounds of the Pre-Salt, the payment of signature bonuses in the amount of R \$ 6.15 billion reais.



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Also noteworthy is the record bonus of R\$ 3.8 billion obtained in the 14th round of concessions.

New rounds are planned for the years 2018 and 2019. There will be four bids, two in the sharing regime and two in the concession regime.

It is expected that the exploratory block auctions program will provide a broad and rapid resumption of the oil and gas industry in a sustained manner, generating multiplier effects for the rest of the Brazilian economy.

2.4 Gas To Grow

Another project of reference for the transformation of the energy sector is the Gas for Growth Program. This is a set of policies and guidelines to build the new gas market in Brazil, based on basic assumptions: (i) the adoption of good international practices; (ii) the attraction of investments; (iii) increased competition; (iv) the diversity of agents; (v) greater dynamism and access to information; (vi) the active participation of industry players; and, (vii) respect for signed contracts.

The new design should provide a greater diversity of agents in the as, liquidity and competitiveness market.

2.5 RenovaBio

RenovaBio is a program that aims to draw up a joint strategy to recognize the strategic role of all types of biofuels in the Brazilian energy matrix, both for energy security and mitigation of greenhouse gas emissions reduction.

This program aims to provide an important contribution to the fulfillment of the Brazilian Nationally Determined Contributions under the Paris Agreement, to promote the adequate expansion of biofuels in the energy matrix, with emphasis on the regularity of the fuel supply, and to ensure predictability for the fuel market, inducing gains in energy efficiency and reduction of greenhouse gas emissions in the production, commercialization and use of biofuels.

3. PREPARING THE ENERGY SECTOR OF THE FUTURE

According to the International Energy Agency – IEA, the largest share of potential emission reduction by 2050 will come from renewable sources and energy efficiency. All technologies, including carbon capture and storage, will matter in this process.

Therefore, the transition model for the energy of the future will require important complementary policies for some countries. Brazil has "today" the participation of renewables in its energy matrix that many countries aim for in decades and its



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challenge is to ensure the maintenance, or increase, of its low carbon matrix. The country has the energy resources of the future, but it needs to build efficient solutions that promote competitiveness in order to ensure a sustainable energy transition.

The integration of renewables in high baseline will be a major challenge, both on the operation side and on the economic and regulatory sides. The country's hydroelectric generation facilitates the integration of renewables, but the growing difficulty in developing new plants, especially reservoirs, will bring new challenges. The country has several concrete proposals under discussion to seek the sustainable integration of renewables, with emphasis on planning studies to allow the adequate integration of renewables in the system and recognizing the attributes of the sources in the expansion.

It is important to emphasize that the focus of the Brazilian policy of expanding the supply of energy will be renewable, but without giving up the fossil energy resources in the transition.

In another point under discussion, there is also the understanding that cities must be at the center of the transition to the energy of the future. Cities, in fact, not only boost energy demand and their environmental impacts, but also offer great opportunities to guide the global energy system towards greater sustainability.

Accelerating the deployment of clean energy technologies in the urban environment and behavioral changes among citizens can break the growth of urban primary energy use and, consequently, carbon emissions from productive activity and population growth.

Ensuring access to modern energy services for those who are currently private will continue to be a priority in Brazil. However, in view of all technological developments and the need to correctly allocate the costs of connections, it is essential to remodel the Brazilian universalization program that has already brought electricity to more than 3.3 million families, benefiting about 16 million of people in rural areas.

Distributed generation and energy storage may contribute significantly to the future energy transition model, especially if it comes with economic incentives that reward its real contribution to the system.

Another important point is the capital investment needs for the urban transport transition, with special attention to collective and individual transportation, electric or biofuels. In Brazil, this route must pass through the hybrid car of biofuel and the evaluation of the fuel cell solution using ethanol.

It is possible to glimpse in the future, in the wholesale, generation technologies with negligible variable production costs and high variability of production will be realities and, in retail, distributed energy resources, including small-scale solar, storage, response in demand and hybrid cars, biofuels, and electrical. It should be mentioned



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in the future scenario that advanced metering and bi-directional communication technologies with retail consumers will make the consumer an "active" agent.

Finally, two important initiatives of the Ministry that contribute to increasing the country's dialogue and preparation for the energy sector of the future are worth mentioning: in October 2017 Brazil became an associated country of the International Energy Agency and in January 2018, made the political decision to join the International Renewable Energy Agency. The country's participation in these two forums will place it at the center of global energy discussions, exporting and importing knowledge and action.

4. FINAL CONSIDERATIONS

Brazil has an energy potential that allows it to adopt its own strategies for the use of new renewables, especially wind, solar and bioelectricity. Disregarding this differential in the formulation of its public policies is to give up a competitive advantage for the country.

However, there is a broad assessment of the opportunities and prioritizing, with principles of efficiency, the alternatives that best fit the transition to the energy of the future.

Electricity is a driving force in the development and improvement of people's quality of life. To look for technical alternatives adhering to the geopolitical questions of the people who are currently deprived of this benefit is the first reason of the universalization, without this evaluation there is no reasonableness and efficiency.

The Brazilian experience of energy policy, especially in the field of renewable sources is successful. New technologies, new management practices, regulation and emission reduction needs, place increasing challenges on the world energy agenda.

Brazil is ready to share its experiences and discuss, together with government agencies and multilateral organizations, the transition to the energy of the future.