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Energy governance in Brazil: meeting the international agreements on climate change mitigation

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CONCLUSION

At present, all nations worldwide are seeking to implement public policies at the local and global levels to address climate change. Together 192 nations have signed different agreements pledging to join efforts to control global warming. A transition from fossil fuels to alternative energy sources is essential to achieve this goal. This research sought to understand how Brazil's energy governance contributes to this international endeavour. The aim of this research was to answer the following question: to what extent current energy policies in the country are designed to comply with the international agreement to hold the increase in global average temperature below 2°C above pre-industrial levels? Empirical evidence found during this study show that Brazil is having great difficulty in renewing its energy policies to contribute effectively and urgently to the international community's efforts. As discussed in chapter 5, power relation strategies practised by interest groups and policymakers' personal behaviour are great obstacles preventing the necessary changes in the Brazilian energy sector. To make a significant contribution to climate issues, great attention must be paid in policy-making engagement and policymakers behaviour. Considering the technological aspect, energy transition in Brazil is already possible (see chapter 4). However, the lack of political will is a massive challenge to overcome. To boost renewable energy, as Rufin (2012) suggests, it is necessary to wean the incumbent industry and policymakers that reinforce the use of traditional sources of energy instead of promoting innovation in the sector. A history of corrupt practices during contract negotiations (Armjo & Rhodes, 2017) compromises projects outcome and often frighten private investors, especially foreigners. This pattern hinders the arrival of innovative technologies that Brazil needs to pursue its energy transition.

The starting point for the central research question was the corruption scandals in the country which were headlines in the news in Brazil and abroad in mid 2010s. In the centre of the scandal was Petrobras and other Brazilian companies accountable for power generation in the country. A poorly managed energy sector opposed to a bold promise – presented in the Brazilian iNDC– to lower the country's carbon emissions by 37% by 2025 and 43% by 2030, below 2005 levels (MRE, 2015), is a contradiction that needs attention. The historical occurrence of power relations strategies in the general Brazilian governance, and particularly in the energy sector was the initial baseline found in the literature to form the theoretical framework. Widely studied by many scholars, monopoly and oligopoly (Beke, 2018; Ayal, 2013; Hemphil & Wu, 2013); clientelism (Armijo & Rhodes, 2017; Gherguina & Volintiru, 2017); bossism and political capture (Macdonald, 2017; Arlen, 2016; Rhoden, 2015); crony capitalism and rent-seeking (Zywicki, 2016; Salter, 2014; Sobel & Graefe-Anderson, 2014) are the power relations strategies found most useful to ground this research.

A further and in-depth literature review directed this study to behavioural economics, a theory that uses psychology and sociology insights to understand individuals' and institutions' decision-making processes (Koch, Nafziger & Nielsen, 2014; Chetty, 2015; Samson, 2016). The first insight that behavioural economics was the right path to follow came from Pollitt & Shaorshadze (2013) with their article *The role of behavioural economics in energy and climate policy* in the *Handbook on energy and climate change* edited by Fouquet (2013). Behavioural economics offers a range of concepts (Samson, 2020) that are valuable tools to analyse individuals' behaviour and choices. A closer examination of the policymaking in the Brazilian energy sector led to the conclusion that the most applicable concepts to understand the phenomena were the following: hyperbolic discount, loss aversion, endowment effect, status quo bias, information avoidance, delusion of competence, overconfidence, and planning fallacy.

Even though Brazil is a modern liberal democracy, its political power is concentrated in the hands of small oligarchic groups which have major influence in the policy-making processes (Araujo, 2003; Morais, 2016). The oligarchic bosses exercise their power within the political realm to shape decision-making processes in their favour. This form of bossism is a practice that has occurred in Brazil since the colonisation and still influences policy outcomes. Bossism, in turn, reinforces rent-seeking and crony capitalism. Political elite elected by the people or those who hold power because of their oligarchic roots, have easy access to the financial opportunities offered by the State. This structure results in an accumulation of wealth and political power by well-connected people. In the energy sector, it determines the direction of policymaking, keeping the incumbent industry profitable and therefore, hard to change. The construction of the Belo Monte dam is an example of it (see sections 3.1 and 5.1.3). The energy sector attracts the most economic and political interest because of its enormous financial resources. To take advantage of the political and economic benefits that the energy sector provides, high-level entrepreneurs, politicians, public and private agents use different power strategies. They use these strategies to influence policies according to their interests or the groups they represent (Stattman, 2019). Such power relations strategies recurrently occur at all Brazilian political levels.

In the 1990s, Brazil went through an economic reform that led to privatisation processes, especially in strategic development areas, such as telecommunications, energy, and mining. Hereby, a control decentralisation of important Brazilian companies was expected. Instead, power accumulation was intensified, as a select group of owners divided the share capital of some of these companies (Fortes do Rego, 2017). As a result, more firms were submitted to common controlling groups. Such outcomes are common in Brazilian governance and policy-making processes. Policy choices like this one are the fuel that reinforces the ongoing power relations strategies. These practices occur in a deep-rooted way which makes pattern change a complex matter. This way of

doing politics is replicated when new energy policies are proposed, making it difficult to comply with the international agreements on climate change mitigation.

In recent years, power relations strategies have receded the country's climate governance. The political crisis that started in 2016 with the impeachment of Dilma Rousseff, led to the election of President Jair Bolsonaro, which in turn, weakened the country's environmental policies (Ferris, 2022; Observatório do Clima, 2022). Bolsonaro's government reversed many environmental regulations as a bargain to ensure power. His changes in the legislation have made it even more challenging to control GHG emissions in the country. Lula da Silva's presidency, which started on January 1st, 2023, will face great challenges to rebuilt and improve the country's conditions to cooperate with the international climate governance.

Despite recent local and international critics, Brazil holds its reputation as a green energy power. This status hinders the discussion on energy transition in the country as stakeholders in the sector stress that Brazil's energy matrix is far cleaner than other similar economy. However, data show otherwise (see figure 1) and point out that Brazil has a long way to go before being able to comply with international agreements. The Brazilian iNDC is mainly based on ending illegal deforestation, and it is believed that if this happens, the country will achieve its goal. But in recent years, deforestation has grown rather than decreased (Watson, McCarthy, Canziani, Nakicenovic & Hisas, 2019); at the same time, few changes have occurred in the energy sector. Brazil boasts of its electrical matrix because hydropower is its primary electricity source, but when it comes to the energy industry in general, hydropower represents much less than the consumption of oil and diesel (see figure 2). With Brazil's large and growing population, road transport mainly and high unemployment rates – that has led to workforce uberization, which, in turn, has increased the county's car fleet – the use of fossil fuels has a decisive weight in the economy. Considering this scenario, the

exploitation of the pre-salt oil reserves will go on for decades to come. In the face of such economic wealth, interest groups use their power relations strategies and find fertile ground to exert their influence. To comply with international climate agreements, an off-grid system of distributed wind and solar energy is needed. However, as discussed in chapter 5, an oligarchic elite controls the Brazilian energy sector keeping the use of incumbent energy sources. If political bosses from this oligarchic elite stay in control of the energy policymaking processes, it will not be possible to make the energy transition necessary to lower Brazil's CO₂ emissions.

The Brazilian constitution prohibits monopolies. Although monopolies and oligopolies do not exist in the legal form, monopolistic practices of interest groups have led to the capture of the State. As a result, policymaking permits oil and gas distribution to happen under oligopolistic control (see section 5.1.1). Petrobras dominates most exploration processes even though competition in the oil and gas exploration industry exists. However, exploration techniques are remarkably similar. The existence of competition does not make a difference if all companies work in the same way. With a monopoly of capital and power by a small number of stakeholders, monopolistic practices of exploration and distribution of energy occur. These practices are harmful to the environment and of great hindrance to an energy transition. Exploring the pre-salt oil and gas reserves also makes it challenging to develop and use alternative energy sources. Power relations strategies result in the low participation of renewable sources in the Brazilian energy matrix. Monopolistic practices delay innovation because incumbent energy companies refuse to make room for new and more efficient technologies. Dominant stakeholders have the power to suppress the participation of the clean energy industry in the Brazilian energy matrix, hindering its expansion and technological innovation. The Brazilian energy sector has shown a low rate of innovation in the use of renewable sources. The current Brazilian economic conjecture confirms Hemphill and Wu's arguments (2013) that monopolistic practices result

in long-term economic damage. It certainly hampers the achievement of the country's GHG mitigation pledges. Despite Brazil developments in the wind, solar and biofuels sector, the use of this energy sources is still below the country's generation capacity. This retardation is the result of the occurrence of power relations strategies and their effects on policymaking for the Brazilian energy sector.

Brazil is a democracy, with direct elections for president, governors, mayors, and for members of congress. The latter are responsible for the decision making and implementation of public policies. However, candidates running for office are primarily selected within the party. This selection is influenced by entrepreneurs who donate resources for the party's political campaigns. In this way, interest groups support candidates they identify with. Once elected, politicians will be loyal to their supporters by suggesting and passing laws that benefit the interests groups (Corrêa, 2019). In the energy sector, big enterprises such as construction and energy companies, and investors in incumbent energy sources, determine who will run for office. They invest in their campaigns in exchange for a public policy that favours their businesses. The Brazilians super-rich buy political influence aiming to direct public policies and benefit from them. Cuadros (2016) presents an example of it in his article *The Brazillionaire* that tells the history of Eike Batista, once the richest man in Brazil, seeking Government's help when his investments in oil and gas were in trouble. Batista had strongly financed the campaigns of Lula da Silva and the then President Dilma Rousseff. This is one of many cases of Government and private sector entanglement, extensively discussed in chapter 3.

Crony capitalism is a customary practice in Brazil and an obstacle to the energy transition. Cronyism facilitates access to decision-making processes (see section 1.5). Brazilian well-connected people invest a large part of their fortunes in politicians and teams of highly trained professionals (lobbyists, lawyers, consultants). Their goal is continuity of their business and the maintenance of the status quo (Bradshaw, 2018).

The use of this kind of power strategy slows down technological innovation and the implementation of alternative policies necessary for an energy transition in the country.

To mitigate the effects of climate change is energy transition urgently needed. In addition to investing in modern technologies, it is necessary to abandon the usual energy production and consumption practices (Rufin, 2012). This would immediately indicate a reduction in the profits of incumbent companies in the sector. Companies try to increase their profits by paying the lowest tax rates possible. In Brazil, this fashion is possible because of the customary practice of cronyism within the political realm, and it is stimulated by the short-term profit requirement of large firms' shareholders. If this practice continues, it will be difficult to implement public policies that stimulate the energy transition in the short and medium term.

In a country like Brazil, where social inequality is enormous, clientelistic practices are highly likely to occur. Due to clients' lack of resources, small gains in the short term are more valued than more meaningful results in the long run (see section 1.3). In Brazil, clientelistic practices find a fecund environment because of client's immediate interests. As a result, public policies with future outcomes do not receive the necessary attention. Since solutions to mitigate climate change now is only necessary to avoid natural catastrophes in the future, actions tend to be postponed.

Clientelism, monopolistic practices, cronyism, and rent-seeking, are historically institutionalised power relations strategies in Brazil and have great interference in the policy-making process for the Brazilian energy sector. They are detrimental for the energy transition in the country. The Brazilian State has a fundamental role in creating and implementing public policies for the sector, as well as in investing in technological innovation to make the transition happen. However, this is not possible because the State is subordinate to the private sector. As

Azevedo (2021) states, the private sector has captured the Brazilian State. Additionally, stakeholder's behaviour also compromises the development of new policies in the country. As claimed by North 1990, Lin (2011) and Gauri (2016), once the public and private agents are accustomed to thinking in a certain way about public policies, the tendency is for these individuals to continue to make decisions that lead to the same direction. The private sector has major influence on Brazilian politics. So much so that it has culminated in the capture of the State. The government has set targets to meet the international agreements to attract investments and make a good impression, but the reality is different. If the agreements to contain the global temperature below 2°C are fulfilled, fossil fuel exploration companies will suffer very severe economic losses. For this reason, the capture of the Brazilian State is unlikely to disappear. That makes the country's commitment to the international climate governance hard to fulfil.

In addition to traditional power relations strategies and equally important, is the behaviour of agents involved in both decision- and policy-making processes required to reduce the anthropogenic effect on the environment. As discussed in chapter 1 and 5, behavioural economics explains that individual's behaviour is decisive in the research, proposals, choice, implementation, and enforcement of public policies on climate change mitigation or policies on any other subject matter. Individual's limitations studied by behavioural economists such as hyperbolic discounting and loss aversion, endowment effect and status quo bias, information avoidance, delusion of competence, overconfidence and planning fallacy have been useful tools in this research for analysing policy choice in the Brazilian energy sector.

Studies in behavioural economics demonstrate that the use of heuristics results in frequent errors (Gsothbauer & Van den Bergh, 2012; Cooper, 2013). These errors happen because the impulsive and intuitive part of the brain – System 1, according to Kahneman (2003) – is used in decision making. In Brazil, politicians and public officials generally make

decisions using heuristics, which lead to systematic errors. The creation and implementation of public policy take place with little basis in scientific studies and data. Policymakers, in general, are overconfident about their ability to solve problems. However, the intuitive part of their brain leads to hasty decisions disregarding lengthy calculations, which are more likely to guarantee reliable results. The use of heuristics frequently occurs in the political realm because it reduces effort and time. On the other hand, it can cause losses at the end. When scientific data showing possible negative results are ignored, society is harmed in the long run.

By nature, individuals prefer to maintain their routine, carry on with established situations and practices in which the gain is real, or even when the gain is only the avoidance of discomfort that a change may cause. These behaviours are defined by behavioural economics as status quo bias and endowment effect (Pollitt & Shaorshadze, 2013; Samson, 2018). They are not compartment of ordinary individuals only. They are also a common behaviour of public officials, private agents, entrepreneurs, politicians, high-level decision-makers, and therefore have great influence on the decision-making processes in the creation and implementation of public policies in the Brazilian energy sector. As argued in section 5.1.3, the sector is historically run by interest groups, oligarchies that practice cronyism and rent-seeking. Due to their advantageous position, these groups have no interest in policy changes in the sector. Endowment effect and status quo bias, added to this scenario, cause the postponement of the energy transition to an even more distant future.

In Brazil, the development of the energy sector has always been a responsibility of the federal government. Despite the many privatisations conducted since the 1990s, the State is primarily accountable for the sector's management. Brazil has well-established regulatory and research agencies and trained professionals to create policies that favour energy transition. However, the executive and the

national congress are responsible for creating new policies. Decision-making positions are generally political positions, that is, indications of the government in power (Haber, 2002; Aligica & Tarko, 2014; Salter, 2014). Since public agents in elective positions or indicated by elected politicians are responsible for final decisions, it is common scientific information and data provided by energy experts to be ignored because they do not meet the interests of oligarchic groups.

Brazil is a wealthy country, especially in natural resources. Its institutions, although democratic, are still fragile. Throughout history, Brazil has suffered several economic and political crises. Between 2003 and 2014, the country experienced a significant economic improvement. However, since 2016 Brazil has been going through successive crises, both political and economic. The administration of President Jair Bolsonaro (2019-2022) proved to be a big drawback (Nature, 2022 para.2). The Coronavirus pandemic has further aggravated the crises. Beside Bolsonaro's lack of skills to run the country in all sectors, the management of the pandemic revealed his inability to lead. In the first months of his term, Bolsonaro showed not to notice the solemnity of his role as president. He was involved in diplomatic disagreements with France and Germany, especially for his disregard for environmental issues. Many of his supporters turned themselves against him as he was causing the country more harm than gain. His lack of knowledge and inadequacy for the presidency impressed the majority and many wondered how he was not removed from office. Bolsonaro surrounded himself with people who lacked the competence and ability to take on administrative functions of such responsibility. His original cabinet and even the last one – after several changes made halfway his mandate – is formed by people with low qualifications to function contentedly. Bolsonaro's government was permeated with delusion of competence behaviour as discussed in pages 133 and 134. As a result, serious mistakes were made by his ministries of economy, environment, health, education, to name a few. Wrong decisions made in any public sector have a drastic influence on the country's development in general. They

certainly influence the energy sector on which the development of a country depends. Delusion of competence in the Brazilian government has not exclusively been detected during Bolsonaro's government, but beyond doubt, this behaviour has been dramatically exacerbated by his administration.

The influence of interest groups in the election of parliamentarians and in the designation of government officials is customary in Brazil. The candidates best positioned in the election are those who receive the highest investment in their campaigns. Competence for the task is not the attribute that defines who is the best candidate. Instead, the candidate's loyalty to the group's interests is a decision factor for their supports. The financial resources for the campaign are enormous, and with the support of oligarchic forces, candidates for public office are empowered with overconfidence, while their ability to make the right decisions does not correspond to the position's demands. As argued in section 5.2.5, overconfidence has led decision-makers to successive mistakes in planning policies to favour the development of the Brazilian energy sector in the direction of an energy transition. Planning in the energy sector has been failing to develop alternative energy sources to achieve the Brazilian iNDC and to comply with international agreements. Changes in policies for the energy sector are fundamental for the reduction of GHG emissions. Since developed countries still find many obstacles in hastening the abandonment of fossil fuels, developing countries encounter even more challenges. A country like Brazil, with its historical and behavioural peculiarities, will face even greater obstacles to make the necessary changes, adapt to this new reality, and contribute to international efforts to contain global warming.

The use of power relations strategies has been customary throughout the development of the Brazilian energy sector. Since the first developmental initiatives in the country, the use of natural resources has been at the centre of disputes over power and wealth (McDonald, 2017). Studies on clientelism, monopolistic practices, cronyism, rent-seeking, state capture

are abundant. However, when looking for empirical evidence in field research, these concepts do not appear as clearly as in the literature. In the interviewees' statements, it was possible to notice a difficulty in naming these phenomena as they are called in the literature. In other words, interviewees describe the phenomena without mentioning the names given to them in the literature. In the face of this reality, researchers need to analyse the testimonies closely together with the literature, so that their hypotheses can be confirmed or not. Considering the concepts offered by behavioural economics, it is essential to take subjectivity into account in analysing the evidence. Human behaviour changes according to a vast range of variables and is therefore difficult to analyse. However, the concepts of behavioural economics selected for this research were quite recurrent during the search for empirical evidence, which facilitated the confirmation of the hypotheses presented at the beginning of this study.

The mitigation of climate change by reducing GHG emissions in the energy sector is a vital requirement in international agreements (see chapter 2). Understanding the limitations and obstacles that countries face in pursuing their energy transition is crucial. It clarifies in what stage a country is at and signals the need for even greater efforts to meet their commitments to contribute with climate governance. When a problem becomes public, it is much easier to search for solutions. Brazil is the fifth largest country in the world, the sixth country in population, the thirteenth in GHG emissions and has 60 per cent of the Amazon, the largest forest in the world, on its soil. These characteristics place Brazil in a central spot in the global climate governance. The results of Brazil's efforts to pursue its energy transition are of foremost importance to the rest of the world, whether these results are positive or negative. Brazil has been going through severe political and economic crises. The situation has worsened even more with Bolsonaro's government and the coronavirus pandemic. Understanding and monitoring the Brazilian scenario contribute to the global efforts to mitigate climate change.

This research offers a hybrid approach to understand decision making in countries with similar political and economic institutions as Brazil's. Power relations strategies, as the ones highlighted in this research occur in many other countries (Quimpo, 2009; Winters, 2013; Koziuk, Dluhopolskyi, Farion & Dluhopolska, 2018). As well as the behaviours addressed in these studies are not a Brazilian peoples' feature. This research brings valuable contribution to the studies of decision making and policy choice for the energy sector towards the energy transition that the world needs to contain global warming.

For Brazil to be able to fulfil its commitment to international agreements on climate change, the energy transition in the country must be intensified. For this to happen, strong institutions are needed. Brazil has shown a considerable improvement in its institutions since the mid-1980s. However, after the impeachment of President Dilma Rousseff and the four years term of ex-President Jair Bolsonaro, Brazilian institutions have gone through a generalized weakening which makes policy implementation difficult. In particular, the ones related to environment protection. In October 2022, Brazil elected Luis Inácio Lula da Silva president of the country again. He inaugurated his presidency on January 1st, 2023, and as he said in his speech on COP 27 in Egypt, Brazil is back in the climate change debate. His government will make efforts to mitigate global warming and to decarbonize the economy. Lula da Silva's election was a decisive factor to put the country back on track in the race for a more sustainable energy governance (Arlota, 2022; Harris and Hodgson, 2022). However, his presidency will face a strong opposition as many supporters of his predecessor, Jair Bolsonaro, have been elected or re-elected to the House of Representatives and Senate.

