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

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SUMMARY

This study aims to analyse how decision-making processes take place regarding the Brazilian energy governance, particularly related to Brazil's collaboration with international agreements on climate change mitigation. The present research seeks to elucidate the extent to which Brazilian policymakers consider the country's commitments to reduce GHG emissions when implementing one or another energy policy. This investigation intends to answer the central 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? In order to answer this question, it will be necessary to find out what leads the decision-making processes in the Brazilian energy sector.

The hypothesis is that power relations strategies recurrent occurrence in the country's energy governance prevents innovative policies toward energy transition. The persistence of monopolistic and oligopolistic practices enabled by crony capitalism and rent-seeking dictates policy choices and imposes the use of established technologies, causing inertia in the Brazilian energy sector. Furthermore, the role of behaviour in policy choice investigated in behavioural economics may further elucidate that policymakers are influenced not only by political, economic and institutional challenges but also by their deep-rooted personal behaviour, which can be decisive in the decision-making processes.

This thesis results from a qualitative research carried out through a literature review of national and international studies, both primary and secondary sources. The fieldwork took place in the cities of Rio de Janeiro, São Paulo, Vitoria and Brasilia. From July 21 to August 30, 2018, the first round of interviews was conducted. The second phase of the

research was carried out remotely between 10 to 31 of July 2020. In total, ten interviews were conducted with different Brazilian professionals in the fields of energy, public policy and Behavioural economics. A semi-structured question list was used to search for evidence to answer the research question and verify the hypothesis. The interviewees were invited to try and answer fifteen questions related to the concepts that guide this research. The interviews lasted around one hour on average and were recorded to be analysed afterwards. Power relation strategies practised by interest groups and policymakers personal behaviour are the obstacles preventing the necessary changes in the Brazilian energy sector. To make a significant contribution to climate issues, improvement in policymaking and behaviour are urgently needed. Considering the technological aspect, energy transition in Brazil is already possible. However, the lack of political will is a massive obstacle to overcome. To boost renewable energy, 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.

This study is arranged as follows: the first chapter presents the theoretical framework on which this study is based. The first section explain the concept of power relations strategies and its synergy with the behavioural economics theory. The following four sections review the traditional concepts named power relations strategies for this dissertations. These strategies are monopoly and oligopoly; clientelism; bossism and political capture; crony capitalism and rent-seeking. The last section introduces the behavioural economics theory and some concepts studied by this strand of thinking. As behavioural economics comprises a great variety of concepts, a selection was made considering the prevalence of such a concept in the phenomena. The chosen concepts used in this study are hyperbolic discount, loss aversion, endowment effect, status-quo bias, information avoidance, delusion of competence, overconfidence and planning fallacy. Chapter two is divided into two sections. The first one summarises the international agreements made

on climate change mitigation. The overview starts with the first World Conference on the Human Environment in 1972 up to the United States' return to the Paris agreement. Section two outlines Brazil's five decades collaboration with the international community on climate issues and the country's attempt to comply with the global agreements. Chapter three addresses the traditional sources of energy that form the energy sector since the country's initial development in the 1930s. These sources are: hydroelectric and thermoelectric power, oil, gas and ethanol. Chapter four tackles the country's alternative energy industry and highlights the development of renewable energy sources which are: wind and solar power, biomass, second-generation ethanol, biodiesel, biogas and black liquor. Hydropower and ethanol are also considered renewable sources; however, they are presented in the previous chapter because these sources use started in the country in the 1950s and 1975s, respectively. Chapter five reveals how the concepts introduced in chapter one occur in practice. The evidence was found in the literature, videos fragments, media and most specifically, during fieldwork. Finally, the conclusion of this dissertation is presented. The findings demonstrate that Brazil's currently energy governance lacks the political will, constitutional stability and public agent's expertise to comply with the international agreements.

Since the first World Conference on the Human Environment in 1972, the United Nations has convened many times to search for solutions to protect the environment and mitigate climate change. In 1994, the 154 United Nations member States signed the United Nations Framework Convention on Climate Change (UNFCCC) to address global warming. In 1997, the assembly at the UNFCCC conference in Kyoto, Japan, approved the Kyoto Protocol, agreeing that industrialised countries were to take actions to stabilise greenhouse gases emissions. The latest and more expressive international meeting was the 21st Conference of the Parties (COP21) of the United Nations Framework Convention on Climate Change (UNFCCC). It took place in Paris in December 2015. At the conference, a new international agreement was made to carry out

initiatives worldwide for reducing the effects of climate change. In anticipation of the event, 187 states voluntarily submitted their Intended Nationally Determined Contribution (iNDC), in which countries drafted their post-2020 climate actions to be taken under the Paris agreement. The main goal of the new treaty is to hold the increase in global average temperature below 2°C above pre-industrial levels by reducing anthropogenic CO₂ emissions.

Throughout the years, Brazil has actively participated in all international gathering to discuss environmental governance. Two of the most important event organised by the UNFCCC were held in Brazil. The Brazilian government played a leading role by hosting the Earth Summit in 1992 and Rio+20 in 2012, both held in Rio de Janeiro. Brazil was also the protagonist in the Clean Development Mechanism creation under the Kyoto protocol, which was intended to foster clean development in developing countries. Two months before COP 21, Brazil submitted its iNDC. The government considered it very ambitious as it pledges to reduce GHG emissions by 37% in 2025 and 43% in 2030 below 2005 levels. However, since the iNDC submission, the country has been facing severe political and economic crises. These conjectures have worsened by the Coronavirus pandemic. Brazil's current situation indicates a dissonance with the county's pledges to reduce GHG emissions and comply with the international climate agreements.

The energy transition is one of the main targets of international agreements. In order to contain global warming, the world needs to abandon fossil fuels and expand the development and use of renewable energy sources. This research focusses on Brazil energy governance and its energy sector's conditions to put into practice the energy transition necessary to reduce GHG the country's emissions. To understand the policy choices in the Brazilian energy sector this study uses power relations strategies and Behavioural economics as frame work.

Monopolistic practices, clientelism, bossism, political capture, cronyism, rent-seeking, are power relations strategies of great hindrance to the decision-making processes in the Brazilian energy sector as they limit the country's conditions to comply with international climate agreements.

The Brazilian constitution forbids the formation of monopoly and oligopoly; however, monopolistic practices occur oftentimes in the energy sector, especially (but not only) because of the magnitude of infrastructure projects necessary to make the sector run. Market dominance in the Brazilian energy sector mostly occurs due to the influence big corporations' CEOs have on politicians. By supporting electoral campaigns for candidates to the executive and the legislative branches, construction companies' senior officials are able to influence policy outcomes.

Literature review shows that clientelism is the most common concept used to analyse power relations strategies for distributing public resources. Despite its old roots, clientelistic relations still persist in modern democracies, and it is a common practice in political realms worldwide. In Brazil, clientelism and co-optation as a form of political interaction permeate the country's political history and still endures. Large companies finance the political campaigns of candidates and parties who once in power make the arrangements that favour these companies with contracts to supply goods and services to the state. Studies show that corporations are willing to provide more funding to parties and politicians that are more efficient in delivering both contracts and desired policies. Clientelism facilitate the maintenance of incumbent energy sources.

Bossism is a way of doing politics in which oligarchic power uses its wealth to capture policymaking and influence policy outcomes for self-interest and as a wealth defence strategy. When oligarchies capture public decision-making processes, bossism manifests itself. Oligarchic

elites use their fortune to capture policymaking and assure their interests are preserved when politicians chose between one or another policy. Such decision-making environments are a threat to democratic choices. Political capture has been a habitual occurrence in the Brazilian energy governance for decades. The negotiation around the construction of the Belo Monte dam is one clear example of political capture in the sector.

Crony capitalism (also known as cronyism) is often described as the practice of appointing friends, associates and supporters to high-level posts regardless of their qualifications, while rent-seeking appears as initiatives to increase one's existing wealth without creating new wealth or benefit for society. These concepts are commonly employed as correlated since the occurrence of one often means the practice of the other. Crony capitalism and rent-seeking are also common practices in Brazil and are obstacles to the modernization of the country's energy sector.

Alongside with power relations strategies, behavioural economics theory is also useful to elucidate the decision making in the Brazilian energy governance. Behavioural economics highlights the irrational aspect of decision making. This irrationality also referred to as a behavioural failure, may be why people make choices against their long-term benefits. In order to understand the influence of Brazilian decision makers' behaviour in the energy sector policy choice, this research uses the following Behavioural economics concepts: hyperbolic discounting and loss aversion; endowment effect and status-quo bias; information avoidance; delusion of competence, overconfidence and planning fallacy.

Hyperbolic discounting leads people to a preference for small rewards that shortly occur over bigger and later benefits. Concurrently, loss aversion suggests that individuals are risk-averse when facing possible gains but opposingly risk-seeking if dealing with potential loss. Individuals are inclined to prize losses more than gains. A more specific

concept within this category is myopic loss aversion, which occurs when agents strongly focus on short term outcomes. Myopic loss aversion explain why politicians are short-sighted when making decisions. Their main drive is the possibility of re-election and not society's best interest. Evidence show that in Brazil both politician and population opt for short-term solutions. The energy governance in Brazil is based on quick solutions with lesser results rather than slow ones with better results, in the long run.

Endowment effect: individuals place extra value on goods they already own or services they already receive, disregarding their value in the market. These behaviour may represent a drawback when it comes to innovation in public policies. Simultaneously, status-quo bias is evident when individuals rather keep things the way they currently are by avoiding action or by sticking with decisions made before. Status quo bias keeps us from thinking before making choices and hold us inert despite the world's constant changes. The Brazilian energy sector has been facing challenges to change its path. The preservation of traditional structures, both institutional and technological, is often advocated by incumbent actors. The energy sector diversification must overcome status quo maintenance strategies before an energy transition can occur.

In behavioural economics, information avoidance bear on situations in which individuals choose not to acquire knowledge even when they have free access to it. Even though people can benefit from the ignorance of unpleasant information, in most cases, information avoidance leads to negative long term consequences. Information avoidance has proven to be a frequent practice in Brazilian governments, especially in the current one. The country is experiencing exceptional times in which science has often been overlooked in decision-making processes.

Delusion of competence involves peoples' deficiency in reflexive acknowledgement, either socially or pathologically, of their capability to make a decision or to function according to the requirement of a given

situation. This feature is also known as the Dunning–Kruger effect, in which low skilled people are overconfident about their cognitive ability while the highly skilled individuals are more accurate in assessing their skills. The competence of the Brazilian government has been frequently questioned. This distrust is due to the frequency in which mismanagement events occur in different periods, administrations, and sectors.

The overconfidence effect is observed when individuals' self-confidence is greater than their real performance capability. Overconfidence has been pointed as the cause of a range of destructive events (e.g. strikes, wars, litigation, business failure) when stakeholders overestimate their actual ability, performance, level of control, or chance of success. Under the overconfidence effect scope, one could observe the planning fallacy, the case when individuals underestimate the required time to accomplish a task, often disregarding prior experience. Throughout history, Brazilian governments have been the subject of public criticism concerning policy planning and implementation planning and it seems that this problem will not be solved in the coming years. These are many examples of energy policies that were unsuccessful due to the lack of efficient planning.

Power relations strategies are part of the history of the development of the Brazilian energy sector. Since the first developmental initiatives in the country, the use of the country's natural resources has been at the centre of disputes over power and wealth. Studies on clientelism, monopolistic practices, cronyism, rent-seeking, state capture are abundant. However, when looking for empirical evidence, these concepts are not mentioned as clearly as in the literature. In the interviewees' discourse, it was possible to notice a difficulty in naming the phenomena as they are called in the literature. In other words, interviewees describe the phenomena without mentioning the names that the literature gives them. In this case, the researcher needs to know how to translate the testimonies 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 evidence, which facilitated the confirmation of the hypotheses presented at the beginning of this study.

Brazil has a much diversified energy matrix. Although the generation of energy in Brazil has expanded with the use of renewable sources, most of the energy injected into the Brazilian power grid comes from traditional sources of energy. The electricity sector uses thermoelectric plants powered by fossil fuels (coal and diesel), as well as sources considered renewable (hydroelectric and nuclear energy). Large hydroelectric plants produce most of the electricity consumed in Brazil as a result of the abundance of water resources and the country's tradition of building dams. However, a change in this sector is necessary because of the environmental and social damage caused by large dams. In addition, with ongoing climate change, the risk of severe droughts resulting in a decrease in the country's water resources is great. The transport sector also makes use of renewable fuels such as ethanol. However, the most used power in the sector is fossil fuel-based. Around three-quarters of the Brazilian fleet is powered by gasoline and diesel. Due to the country's continental dimensions and its mostly road-based transport sector, a radical change in the transport sector is necessary to guarantee the reduction in Brazil's GHG emissions.

Brazil has an international reputation for its clean energy matrix. This reputation is due to the strong contribution of hydroelectric energy to the national electricity grid. With the growing consensus that large dams are not as clean as initially thought, the country's reputation is threatened. Methane emissions from large wetlands for the construction of reservoirs and other environmental and social damage demystify large dams' environmentally friendly nature. Despite the dam tradition of the

Brazilian electrical sector, the Brazilian government developed a range of policies that allowed the country's renewable energy industry into the national energy grid. The wind sector, in particular, has achieved considerable space in the Brazilian energy market. The photovoltaic energy sector was also well received in the market, although its use is greater in the private sector. In addition to these two renewable energy sources, the transportation sector has also been increasing its variety of renewable fuels with the production of second-generation biofuels, biogas from solid waste and black liquor, a fuel resulting from the cellulose industry. Brazil's energy sector is formed by a variety of energy sources, which is a good premise to lead the country to an energy transition. However, it is necessary that more robust public policies are developed and implemented so that the country can fulfil its commitments made to the international community to help and contain global warming.

Even though Brazil is a modern liberal democracy, its political power is concentrated in small oligarchic groups which have significant influence in the policy-making processes. 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 the political outcome nowadays. Bossism, in turn, reinforces rent-seeking and crony capitalism since the political elite, whether 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. The result is 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.

Power relations strategies are the cause of the low participation of renewable sources in the Brazilian energy matrix. Monopolistic practices delay innovation because the incumbent industry does not want to make room for new and more efficient products and techniques. Dominant

companies that can influence the results of the creation of public policies have the power to suppress the participation of the clean energy industry in the Brazilian energy network, which hinders its development in terms of expanding use and technological innovation.

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 and are detrimental in the search for the energy transition in the country. The State has a fundamental role in regulating and investing in technological innovation, creating and implementing public policies and regulation of the private sector to make the transition happen. However, this is not possible because the State is subordinate to the private sector. The private sector has captured the Brazilian State.

Stakeholder's behaviour also compromises the development of new policies in the country. 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. In addition to traditional power relations strategies, and equally important are the particular behaviour of agents involved in both decision- and policy-making processes required to reduce the anthropogenic effect on the environment. Behavioural economics explains that individuals behaviour are 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.

Power relation strategies practised by interest groups and policymakers personal behaviour are the obstacles preventing the necessary changes

in the Brazilian energy sector. To make a significant contribution to climate issues, improvement in policymaking and behaviour are urgently needed. Considering the technological aspect, energy transition in Brazil is already possible. However, the lack of political will is a massive obstacle to overcome. To boost renewable energy 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.

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 election of the current president, Jair Bolsonaro, Brazilian institutions have gone through a generalized weakening which makes policy implementation difficult and in particular the protection of the environment. 2022 elections was a decisive factor to put the country back on track. Similar to what happened in the United States with the election of current President Joe Biden, the election the progressive president Luiz Inácio Lula da Silva has lead Brazil to resume its climate change mitigation policies.