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

Ferraco, A.L.

CHAPTER 5
POWER RELATIONS AND INDIVIDUAL BEHAVIOUR: INFLUENCES ON ENERGY POLICYMAKING

Barbier (2013) argues that it is evidently challenging to overcome the different policy, market and institutional flaws that cause global warming and climate change. According to the author, this incompliance can be explained by the likelihood of most social institutions being hard to change. In earlier work, Barbier (2011) describes this inflexibility as 'institutional inertia', what North (1990) called 'institutional path dependence'. The Brazilian energy model has been institutionalised on an administrative, technical, and cultural level due to repetitive decision making throughout history. Path dependence, reinforced by positive returns of institutional arrangements established over time, has led the Brazilian energy sector to a lock-in and, therefore, not easily open to innovative initiatives (Ferraço, 2016). Brazil has great potential for generating renewable energy, yet its institutional apparatus is struggling to put this transition into practice. For this transition to occur, a great amount of financial resources is required, together with a strong political will. The allocation of state resources is the core around which all political relations take place. The distribution of public wealth occurs under a great deal of pressure from political and economic power relations. These power relations occur in all economic sectors and not differently in the energy sector.

Brazil has a reputation as a clean energy producer (Knodt & Piefer, 2015) because its power grid that is mainly supplied by hydro power generation. However, this source is explored through the installation of large hydroelectric plants that have great social and environmental

impacts as discussed in section 3.1. As shown in the chart in page 79 , the use of wind and solar energy has grown considerably in recent decades. However, a greater use of these sources is needed to improve the quality of the country's matrix, by limiting not only the emissions but also large dams' social and environmental impacts. Regarding the Brazilian energy matrix, there is much to be improved, especially in the transport sector, which is largely by road and therefore still requires a huge consumption of fossil fuels (ANP, 2019). This reality has been kept unchanged due to power relations strategies which maintain energy policies in the same direction. These strategies prevent the significant energy transition necessary to contain the effects of greenhouse gas emissions and hinder Brazil's effort to contribute to international climate agreements.

The energy sector requires an enormous amount of public resources to operate and therefore is a fertile environment for power relations to occur. State agents and private stakeholders relate to each other in order to guarantee their power and profit that the energy sector has to offer, which is not little. For this purpose, a variety of power relations strategies are applied. Energy policymaking is defined by stakeholders that have the ability to stay on top of these power relations.

Another important aspect that is decisive for energy policymaking – or any other policy-making process – is policymakers' individual behaviour. While power relations strategies are put into practice in a group setting and therefore, have a greater chance of being conscious, individual behaviour tends to be unconscious, which often makes it difficult to be perceived and corrected. As previously discussed, behavioural economy highlights that individuals make decision grounded in habits, preconception, simplified practical rules, and personal experiences. It also indicates that people make decisions too fast and have problems tuning short- and long-term interests. Furthermore, this strand of thinking claims that actors are highly influenced by emotional factors and the choices of those they socialise with.

Behavioural economics theory provides an array of concepts that can be applied in a numerous environment in order to understand policymaking. Certain behaviours in policymaking for the Brazilian energy sector can be explained by the selected behavioural economics concepts presented in chapter one.

This chapter presents empirical evidence found through a literature review and interviews that were conducted during this research. The chapter is divided into two parts: the first one presents evidence of how the power relations strategies implicate in the policymaking for the Brazilian energy sector. The second part shows how policymakers' behaviour influences energy governance in Brazil.

Brazil has been having challenging times. President Dilma Rousseff's second term in office (2011-2016), her impeachment and her succession by her vice president already signalled a period of economic instability and therefore policies towards an energy transition have been delayed. Under the government of President Jair Bolsonaro, the challenges increased even more. "His term in office has been disastrous for science, the environment, the people of Brazil and the world" (Nature, 2022 para.2). Due to Bolsonaro' policies, actions and discourse, Brazil has become a Global Pariah (Rubens Recupero[53] in interview to Carrança, 2002). Journalist Reinaldo Azevedo[54] states that "the Bolsonaro government is so absurd and does not know the concept of verisimilitude. Someone would say: this is unbelievable, do not put it in your column, no one will believe it" (2022, 30:20). Some evidence presented in this chapter may be perceived as unbelievable and even anecdotal, but it does represent the exceptional times experienced in Brazil during Bolsonaro's presidency.

[53] Brazilian professor, lawyer, diplomat, and writer. He was Minister of Finance, Environment and Articulation of Actions in the Legal Amazon (1992-1995). Secretary General of the United Nations Conference on Trade and Development (1995-2004).

[54] Brazilian political journalist, broadcaster, and writer. Currently, Azevedo is a columnist for the *Folha de São Paulo* newspaper.

5.1 Power relations strategies in the Brazilian energy sector

In a young democracy, as is the case of Brazil, transfer of public resources commonly occurs through power relations strategies. In different forms, these strategies are great instruments for forming political and economic monopolies which infringe capitalist justice (Velásquez, 2013). Monopolistic practices foster clientelism and rent-seeking, with the capture of the state as a result. When politicians rule on behalf of incumbent enterprises to the detriment their constituents, the capture of policymaking is occurring (Oxfam, 2014 and 2018; Beke, 2018). This kind of power relations strategies are used to define the outcomes of public policies in many economic sectors and benefit respective elites. These phenomena are also observed in the Brazilian energy sector.

This section will address these power relations strategies in the following subsections: monopolistic practices despite de law; clientelism; a usual strategy; and political capture shaping policymaking. Bossism, patronage, pork barrel, vote-buying, bid-rigging, rent-seeking, crony capitalism are also types of power relations strategies. These concepts will be mentioned disorderly throughout the subsections as they occur intertwiningly. In an attempt to verify the extent to which these strategies alter the Brazilian energy sector's policy outcomes, empirical evidence in which these tactics appear will be provided, sometimes concurrently and even perceived as equivalent.

5.1.1 Monopolistic practices despite the law

For almost five decades, the Brazilian oil industry has been a monopoly of the State exercised by Petrobras since its creation in 1953. With the administrative reforms of the 1990s and policies strongly based on privatisations of Fernando Henrique Cardoso's government (1995-2003), Petrobras adopted a strategy of gradually opening up to private firms into the market as well as partnerships between the state company

and private enterprises. Nowadays, the Brazilian oil sector is an open-marked model with Petrobras as the main power holder. Concerning the exploration of the pre-salt oil reserves and politicians' willingness to make good use of them, Rufin (2012), as if predicting the future, highlighted the challenges that the sector would have to face. The author draws attention to Brazil's highly fragmented parliament, where well-intentioned parties compete with many others that are mere "patronage machines" formed by old-school politicians who negotiate their parliamentary votes for their own profit and interests. This kind of politicians' switches parties according to more profitable rent-seeking opportunities. Furthermore, the author argues that such an environment allows technocrats and high-level bureaucrats to control a great deal of public resources, which are very attractive to private-sector executives eager to gain or maintain monopolistic license to exploit these resources. This scenario has traditionally contributed to marked dominance by favoured enterprises.

> Executive-legislative collusion has left policymaking in Brazil subject to strong influence from organised interest groups. For example, successive presidents appointed political cronies to key directorships in the oil giant Petrobras so that they could award contracts to well-connected companies in exchange for bribes (Mello & Spektor, 2018: 120).

The State wants to profit from the country's oil reserves, and most private companies will do what it takes to have a share of these resources. With such powerful interests at stake, the explorations of the pre-salt reserves are certain now and, in the future, even if it is opposed to the Brazilian iNDC, which proposes a considerable reduction in the country's carbon emissions. In this respect Larissa Araujo Rodrigues[55] says:

> The private sector is dictating the rules in the energy sector. Although Petrobras is a state-owned company, half of it belongs to private capital.

[55] Portfolio Manager at *Instituto Escolhas* of sustainable development.

> Petrobras has grown and invested a lot in technologies and its professionals. The company will not stop its activities because it has an especially important role, in numbers, in people, in the economy. The government will not renounce what Petrobras represents for the country (interview with author, July 2020).

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. Marcelo Lima[56] testifies:

> monopoly is prohibited in Brazil, but there is an unspoken agreement. Not necessarily on the existence of a company's monopoly but the acceptance of the big capital's monopoly. Big companies win the concession of big projects to exploit the country's natural resources, as is the case of the exploration of the pre-salt, hydroelectric, coal, etc. This interest also occurs in the renewables sector. This model of large, centralised plants, this development model of concentration itself, justifies the realisation of large projects requiring a high concentration of capital. This model maintains the power of these large companies. That is an example of how the state/finance nexus works. These great financial monopolies capture Congress to pass their desired policies (interview with author, July 2020).

> From a structural point of view, there are no monopolies and oligopolies, but when most concessions for the realisation of infrastructure projects are granted to the same companies –such as Odebrecht, OAS, Camargo Corrêa– the question arises: Isn't that a monopoly? Contracts are paid with public money from Brazilian society, usually through loans granted by BNDES at very low-interest rates. Isn't that a monopoly? One has to be very naive to believe that the constitution is being respected (Rodrigo Flora Calili,[57] interview with author, July 2018).

[56] Climate & Energy Campaigner at Greenpeace Brazil.

[57] Assistant professor of the Graduate Programme in Metrology and the Master programme of Urban and Environmental Engineering at PUC-Rio.

Hemphill and Wu (2013) explain that exclusionary schemes –such as those that occur in Brazil– often are not the result of oligopoly's careful, calculated plan but rather occur through firm's customary practices. An exclusionary scheme can emerge from simply replicating leading companies' actions by following monopolist's strategies before its divestiture or by keeping new groups out. Monopolistic and oligopolistic practices may have contributed to the failure of the 2004 National Programme of Production and Use of Biodiesel (PNPB in Portuguese). The project had social sustainability as one of its pillars was designed to favour the inclusion of family farming, especially in the north and northeast of the country, in biodiesel production. However, Stattman's (2019) study on biofuel governance in Brazil shows evidence that "developments in the ethanol and biodiesel sector are primarily driven by agri-business and energy industry linked to Ministry of Agriculture and Ministry of Energy and Petrobras, respectively" (p. 34). The researcher states that biodiesel governance occurs according to the interests of state and non-state actors, and their logic is "an emphasis on quantity, a neglect of crop diversity and regional spreading, power with the large scale (energy and agricultural) producers rather than with small scale family business, and a preference of energy security above environmental sustainability of energy sources" (p. 35).

Monopolistic practices also occur in the energy transmission and distribution sector. Brazil's economic growth in the late 1970s resulted in strong demand for electricity. State-owned companies were created to meet this demand, and several regional electric monopolies emerged. From 1980 onwards, the favourable context for the development of the sector fell apart, and at the end of the decade, the electricity sector became a limiting bottleneck for the country's economic growth. The concessionaires did not have the resources to finance the system expansion to meet growing energy demand adequately. In the second half of the 1990s, after long debates, the electric market's reform was implemented, and competition was adopted as the core of the new

electric market. However, monopoly management of the national grid (transmission and distribution) was preserved. Currently, this scenario has a strong influence on policy creation and implementation. The distributed generation model is already regulated in Brazil, and it facilitates access to renewable energy such as solar and wind, and it is a start towards energy transition. However, it encounters strong resistance from distribution companies that greatly influence the policymaking for the sector. According to Marcelo Lima, the reasoning behind this resistance is that if everyone becomes an energy producer, customers will be lost, and companies will go out of business. To avoid this, companies press the government to delay the implementation of distributed generation model. Lima states that researchers in the field believe that this pressure would happen in the future, when half or at least a quarter of the population was producing their own energy, when the change in the system would be more significant. However, there has currently been fierce lobbying, and a change in regulation has already been projected under the pressure of energy distribution companies to make the system unfeasible. On this matter, Marcelo Lima states:

> the distributed generation model would be ideal because energy is generated close to consumption which makes it cheaper. There are many possible mechanisms to accomplish this model as the government encourage it by implementing social projects like *Minha Casa, Minha Vida*,[58] in which the houses have solar generation systems already installed. Nowadays, it is possible for the excess energy produced to be returned to the grid at the same price as the energy purchased, which is very fair because what is generated in excess becomes a credit to be used later in a 1 to 1 ratio. However, the biggest obstacle to this initiative is the large distributors that were privatised and became oligopolies. An example of it is Enel Distribution São Paulo, former state-owned Eletropaulo. They want to sell a certain amount of energy for 1 *real* and

[58] *The Minha Casa, Minha Vida* is a federal housing programme launched in March 2009 by the Lula da Silva government. The programme subsidises house or apartment acquisition by families with an income of up to 1.8 thousand *reais* and facilitates the conditions of access to the property for families with an income of up to 7 thousand *reais* (PMCMV, Law no 11.977, July 7, 2009).

> buy the excess for 40 cents, which is a 60% difference in the value of the same energy. They claim that people use the network, the wires, and that has a cost. They want to charge the consumer for this. Today, it is possible to recover the initial investment in the purchase of photovoltaic panels in 2 years, so it is worth it, but if the value of the excess energy falls by 60%, the investment will only return in 10 years, then it is no longer worth investing in a photovoltaic system. Energy development is no longer in the public interest; it is not to solve society's challenges but rather to serve the private interests of shareholders. Public services do not serve the public interest because they are managed by private interests (interview with author, July 2020).

Bradshaw (2018) corroborate with Lima's statement as she argues that distribution companies in Brazil have claimed that distributed generation would bring financial instability to them. For that reason, they have been strongly resistant to the updating of net-metering regulations that took place in 2015. According to them, the net-metering connections to the grid has been unfairly paid for.

In order to promote the energy transition required to decrease carbon emission in Brazil, Rufin (2012) suggests that the country needs to ditch its protected monopoly and develop instead an internationally competitive energy cluster. However, in other to accomplish it, it is necessary to get rid of traditional politicians eager to convey funds straight to their bank accounts, benefiting their supports along the way. "Pure rent-seeking of this kind will take resources away and allocate it to uses of very little economic value" (p. 596). Furthermore, Rufin states:

> we should not forget that many private-sector managers, both domestic and foreign, would be delighted to consolidate or obtain monopolistic positions that would ensure them a comfortable life. All too often, the desire to build national champions and new clusters in Brazil has resulted in the creation of protected, market-dominant positions for privileged companies at the expense of Brazilian consumers and other sectors of the economy (2012: 596).

As discussed in section 1.2 of this study's framework, monopolies and oligopolies are harmful to both economy and democracy. When large enterprises and politicians are intertwined and operate different important businesses simultaneously, competition is obstructed in economic and democratic matters (Ayal, 2013). Monopolistic practices are the roots of structural corruption. Lobby strategies are used to buy off politicians and top-level officials to establish trusts (Dunne, 1995; Machado, 2015; Beke, 2018).

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. According to Corrêa (2019), the business lobby in the National Congress makes frequent use of the so-called "parliamentary fronts".[59] There are parliamentary fronts for all sectors of the political sphere. Related to the energy sector, there is a variety of parliamentary front, such as the ones in defence of renewable energies or in favour of energy efficiency. There is the biodiesel mixed parliamentary front and even one on behalf of mineral coal – defended by deputies from coal-producing regions and who feel obliged to meet their voters' expectations – despite the environmental harm caused by coal use. There is also a front for the sustainable development of petroleum and renewable energies, organised by the Brazilian Petroleum Institute (IBP) and, another parliamentary front representing the sugar-energy sector, strongly encouraged by the Sugarcane Industry Union (Única). Undeniably, parliamentary fronts are instruments that unite business lobby and political parties in a space where a common language is spoken: the defence of both personal and group interests. With regard to the energy sector, the three most important projects being currently

[59] Parliamentary fronts are informal and nonpartisan groups that work on behalf of a cause or interest to the group. They have no official power according to the *House of Representatives' statute*. However, depending on the organisation's degree, they can be mobilised to defend or attack a particular cause (Corrêa, 2019).

negotiated in the national Congress are the modernisation of the electricity sector (which resulted in the privatisation of the Eletrobras System), the expansion of the free market for electric energy and the new commercial model for natural gas.

In June 2021, the Brazilian Congress approved the provisional measure proposed by Bolsonaro for the privatization of Eletrobras. The government guarantees that the sale of the company should reduce the value of the electricity bill next year by 5% to 7% and will still bring a profit of 100 billion *reais* to the public coffers (Carrança, 2021). However, the electricity sector is going through a crisis because of the drought caused by climate change. As the Brazilian electric system is 61% dependent on hydroelectric power, water scarcity also generates energy scarcity. It is at this juncture that the government decided to privatize Eletrobras. According to ONS, at the beginning of 2021, the lack of rainfall led to the highest increase in thermoelectric energy use since January 2015 (G1, 2021). Since October 2020, the Bolsonaro government started operating thermoelectric plants, including those powered by diesel, to make up for the deficit in the electricity sector. Thermoelectric energy is not only more polluting but also has a high operating cost. As a result, Aneel announced in March 2021 a 52% increase in the energy tariff. The Provisional measure 1032-C/2021, (also called Eletrobras MP), includes clauses that guarantee the expansion of thermoelectric power plants in the country. It also facilitates the contracting expansion of small hydropower plants (PCHs in Portuguese). Concerning Eletrobras privatization bill and its eight megawatts thermal gas plants requirement, Duvivier[60] states:

> Our electrical system urgently needs planning and organization. Countries worldwide are moving towards an energy transition in search of cleaner and more sustainable energy to deal with the urgent crisis of climate change. The consensus is to reduce the dependence on

[60] Brazilian actor, comedian, screenwriter, and writer. Considered one of the most important voices in Brazil's political commentary, Gregorio Duvivier hosts Greg News, a weekly TV programme broadcasted on HBO.

> thermoelectric power plants, but Brazil is doing the opposite. Despite the country's almost infinite potential to generate solar and wind energy, which are not only clean but are getting cheaper and cheaper, Brazil is going against the grain using more and more thermoelectric plants (2021, 13:44).

This policy is very damaging to the Brazilian iNDC pledges because the privatization of Eletrobras could increase CO_2 emissions in the Brazilian electricity sector by 25% (IEMA, 2021).

The Eletrobras MP had not been enough discussed before being passed by Congress. According to deputy Alessandro Molon, the opposition had only 24 hours to decide between the vote against or in favour of the proposal (*O Globo*, 2021). That happened because provisional measures are processed more quickly in Congress. That is why it is common for deputies and senators to take advantage of these characteristics of MPs to include in the main text amendments to approve projects in their interests or those of their supporters. According to Duvivier (2021), the provisional measure for the privatization of Eletrobras has been amended to guarantee the contracting of gas-fired thermoelectric plants to increase energy generation in the country, benefiting the businessman Carlos Suarez, a former partner of the OAS company. Suarez is one of the richest men in the country and is known as the gas man. He is also the owner of Brasil PCH, a company that has 13 PCHs under its umbrella.[61] During the voting session for the Eletrobras MP, deputy Glauber Braga questioned deputy Elmar Nascimento, MP's rapporteur, about his contact with Suarez. According to Braga, the entrepreneur directly participated in the text articulation for the approval of the MP. Braga's claims have been confirmed by Nascimento himself. About this fact, Duvivier (2021) emphasizes: “the Brazilian state is often captured by those who have the financial power (…) now, thanks to the privatization

[61] According to Duvivier (2021), others interested in hiring PCHs are several politicians and businessmen from Mato Grosso do Sul state. Several parliamentarians own PCHs. Small hydropower plants cause less environmental impact but have high generation costs.

of Eletrobras, we will have less state and more oligarchies controlling our energy" (2021: 35).

Currently, 2/3 of the politicians elected for the national Congress are liberal professionals and entrepreneurs (DIAP, 2019). The fact that the Congress is formed mostly by representatives of the market can be decisive for the Brazilian energy sector's policies outcome. In this regard, Marcelo Lima comments: "it is the manifestation of the power of money within the estate/finance nexus. In order to continue reproducing benefits for private capital, it is necessary to put people into the policy-making process" (interview with author, July 2020).

Larissa Araujo Rodrigues, when asked if she believes that market representatives in the parliament are able to influence policymaking, answers:

> that is for sure. This statement is valid for all the laws that are being discussed in Congress today. Since 2006 when I started to work with energy, I do not see much change. All I saw of change was negative, unfortunately. Especially when it comes to the big sectors such as oil. In the case of the solar energy industry, which is exceedingly small, Congress makes it so difficult to approve anything that benefits this sector. Especially the distribution companies, which are always working to prevent the incentive laws from passing. It is very difficult to approve anything that facilitates the development of the solar energy sector (interview with author, July 2020).

Indeed, there are no state initiatives for the solar source in Brazil, although this source generates electricity cheaper than all fossil sources, biomass thermoelectric, and small hydroelectric plants. With the little public incentive, prices negotiated at auctions have almost halved in four years. This was possible thanks to gains in scale, improved technology, and increased efficiency. Brazil really needs to wake up to this opportunity, since the initiatives so far are still timid (Sauaia, 2018).

The second section of the framework chapter bring up a discussion about the influence of monopolistic practices on innovation. Schmitz (2012), Hemphill & Wu (2013), Ayal (2013), and Beke (2013) highlight that the domination of anti-competitive market by large players retard innovation. Monopolistic practices obstruct the introduction of *higher-quality* and *lower-cost* alternative options. To supress social loss, it is necessary to foster competition and innovation. According to Sandro Yamamoto:

> the Brazilian State misses the opportunity to implement innovative technologies. It is necessary to renew the electrical sector. We do not yet have legislation to use storage systems, as is already the case in Chile. If the legislation is ready, even if the State does not take the initiative, the market is in charge of implementing it, as in the case of wind and solar, which today are already competitive in the market. This occurred at the private sector initiative and not because of the State's concern with environmental issues or putting its iNDC into practice (interview with author, July 2018).

Larissa Araujo Rodrigues confirms Yamamoto statement and adds on:

> the development of wind and solar energy in Brazil occurs due to the private sector and not at the government's initiative. The government only takes advantage of this development as it gives the country a good image. So, it is possible to infer that the private sector is dictating the agenda and not the government. And on both sides of the table, because nowadays, the private sector is claiming that Brazil needs to protect the Amazon. At the same time, who is behind deforestation is the local agribusiness sector. The current government is in the role of service provider for these companies (interview with author, July 2020).

These testimonies corroborate the study by Diniz (2018) in which he analyses the corporate chain of 719 wind farms. His study found that from the total, 483 have exclusively private partners and that the other 236 plants have the State as a partner. "The results show that most of the wind generation projects implemented in the country during the last ten

years were conducted by the private sector" (Diniz, 2018: 233). In the case of solar energy, between 2012 and 2018, its generation grew from 7 MW to more than 2,300 MW and raised more than ten billion *reais* in new private investments. Miklos (2019) predicts that the country's photovoltaic panel industry will attract 100 billion *reais* in new private investments by 2030.

According to Guilherme Moraes de Lima,[62] the country finds it difficult to break the pattern of using fossil fuels and large hydroelectric plants in its energy sector. To explain this difficulty, he suggests the concept of *capitalismo de laços* that characterises the "model of capitalism practised in Brazil in which the state is shared, hijacked by interest groups. As a result, subsidy policies prevail, for example, via BNDES. It is a mutually beneficial model for public and private agents" (interview with the author in July 2018).

Coined by Sergio Lazzarini[63] in 2010, the concept *capitalismo de laços* means

> a negative relationship between the private sector (companies) and the public sector. Large monopolies with great economic power that end up having a major influence on the government, and that influence often occurs through lobbying, campaign financing, through acts of corruption. This influence ends up causing the government to favour these groups by strengthening them even more. So, it is a vicious circle in which the powerful win and the population, in general, is at the margin of this process (Nakabashi, 2019).

When the State overlooks its role and opportunities to function as developer and regulator in such an important sector for the country's development, as is the case of the energy sector, private agents of the market will use any possible tactics to gain control and spread their

[62] Founder and director at Ponto Futuro - Inteligência Analítica e Comportamental.
[63] Doctor of Business Administration from John M. Olin School of Business, Washington University, Associate professor at Insper.

monopolistic practices. In such an environment, the general population will pay a price much higher than public services and natural resources are worth.

As explained in detail in the second section of chapter one, the creation and maintenance of monopolies and oligopolies contributes to keeping control of resources in the hands of a small group. Despite the Brazilian legislation inhibiting the creation of monopolistic groups, the Brazilian energy sector faces problems caused by the restriction of public policies to expand the use of new energy sources, which is imposed by a centralized decision-making power. The political influence of small groups is significantly strong, which prevents the expansion of government support to market segments willing to develop and implement modern technologies for the generation and distribution of cleaner and more sustainable energy. Monopolistic practices are one of the great challenges to be overcome for Brazil to be able to intensify its energy governance in the direction of the transition to minimize the effects of global warming.

5.1.2 Clientelism: a usual strategy

The literature review present in chapter one shows that clientelism is the most common power relations strategy for distributing public resources. Despite their 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 (Carvalho, 1997) and still endures. Clientelistic practices occur throughout all Brazilian municipalities in diverse ways, adjusting local policies for public resources distribution. It goes beyond local politics, reaching as far as the federal government (Silva, 2017).

Large construction companies direct or indirectly involved with the energy sector, finance the political campaigns of candidates and their

parties, who once in power, make the arrangements that favour these companies with contracts to supply goods and services to the state. The campaign fund is used in clientelistic practices for vote-buying and guarantees victory at the polls. After the elections, elected representatives continue to facilitate the hiring of these same companies that supported them. This cycle of campaign financing, clientelism, election and hiring repeats in Brazil every two years when elections at the federal and state level alternately take place. Clientelistic practices also occur within the administration in power itself as the head of the executive branch offers funding for local reforms, especially in infrastructure, to parliament members in order to pass certain bills. In turn, infrastructure reforms are a useful way to keep voters for the next election at the state level. A recent example of clientelistic politics financing was the Odebrecht scandal. The company was diverting large sums of money into party campaign slush funds, known as "caixa 2".[64] Odebrecht is a major construction company partaker in many large-scale infrastructure projects in Brazil, such as the Belo Monte Dam, Petrochemical Complex of Rio de Janeiro (Comperj), nuclear power plants 1, 2, and 3, among many other enterprises. Odebrecht benefited enormously from these contracts, whereas politicians used bribes to boost their election campaigns. "Here, a synergy is formed between one economic sector and political elites, both of whom gain from ensuring there is no effective rule of law" (Pearce, 2018: 11). Another recently uncovered caixa 2 scheme involved Braskem, a petrochemical company that is an affiliate of Odebrecht. The former chief executive and shareholder of the Brazilian petrochemical, Jose Carlos Grubisich, was arrested in New York because of corruption and bribery that the US Justice Department has charged him with (Trager, 2019). According to the proceedings filed in the Brooklyn office of the United States District Court Eastern District of New York:

[64] Caixa 2 is an illegal financial practice that consists of not recording certain in or out monetary transactions, creating a parallel fund. From an electoral perspective, they consist of cash donated to electoral campaigns that are not declared to the electoral courts (Castilhos, 2018). Declared campaign resources would be called Caixa 1.

> Between approximately 2002 and 2014, Braskem, together with Odebrecht, certain Braskem and Odebrecht employees and agents and other co-conspirators, engaged in a massive bribery scheme that resulted in the diversion of approximately $250 million of Braskem's funds into a secret slush fund, and the subsequent use of that slush fund to pay bribes to government officials, political parties and others in Brazil to obtain and retain business (the United States of America v. Jose Carlos Grubisich, 2019: 5).

The infrastructure sector in Brazil is dominated by family-owned companies: Andrade Gutierrez, Camargo Corrêa, Odebrecht, Queiroz Galvão – founded in the 1950s – and OAS established in the 1970s. Some powerful families have strong control over the country's economy and politics and have contributed to Brazil's long history of clientelism, patronage and regionalist politics (Kuijpers, 2013). Campaign funding has become a notable form of corruption in many Latin American countries. Clientelistic networks of state patronage present in the dictatorial regimes turned into suitable electoral campaigns support when democratic elections were established. Profitable business opportunities have arisen not through free competition but via elite networks, illicit financial flow, and favoured access to contracts for the supply of goods and services. Big corporations, such as the Brazilian Odebrecht, has been accused of funding numerous election campaigns and bribing government officials and politicians in Brazil, Argentina, Colombia, Dominican Republic, Ecuador, Guatemala, Mexico, Panama, Peru, and Venezuela (Pearce, 2018).

Armijo and Rhodes (2017) state that Brazilian infrastructure reforms are impregnated with clientelism throughout history and across all federation levels. In fact, since 2014, nearly every leading Brazilian construction company has been involved in the Car Wash scandal. "The former CEO of construction firm Andrade Gutierrez[65] told a judge that his

[65] Andrade Gutierrez operates in the energy sector through Cemig (Companhia Energética de Minas Gerais S.A.) and Santo Antônio Energy. The latter is the commercial organization

firm conceptualised bribes to public officials as an ordinary cost of doing business; bribes were included in the project budget and calculated by a formula like that used for executive bonuses" (Armijo and Rhodes, 2017: 241). Up to now, Federal Prosecution Service (Ministério Público Federal, MPF in Portuguese) has conducted 181 prosecution processes charging CEO's, contractors, politicians, executives, et cetera., for participating in irregular campaign financing and bribe schemes between 2003-2012 in negotiation for public-work contracts. These facts lead to the conclusion that these major firms have captured the state. Politicians who resort to clientelistic practices are eager to be funded by those companies interested in both grant a contract and define policymaking. In their study about campaign donations and government contracts in Brazil, Boas, Hidalgo & Richardson (2014) corroborate that campaign contributors are rewarded with contracts for public infrastructure contracts. Figueiredo (2016) relates to the same study to conclude that the capture of the State by economic groups is categorically related to the continuously increasing campaign costs[66] as well as to the proportional increase of donations value. Campaign funds provide the opportunity for elites to capture the government as their campaign contributions are linked to policies of their choices.

Campaign funds are crucial for political parties and governments during the elections and subsequently. They are the resources needed to secure the votes of poor and deprived people and the politicians' means for remaining in power. Desposato (2002), in his studies on vote-buying in Brazil, argues that Brazilian state governments have a great deal of power due to the country's federalist system. Governors hold a significant degree of power as resources distributions are ruled at the state level. Consequently, deputies trade support for the legislative

behind the hydroelectric plant of the same name located on the Madeira River, in the state of Rondônia which Andrade Gutiérrez built in consortium with other constructions companies, among them Odebrecht.

[66] According to Figueiredo (2016), since the late 1980s, when democracy was re-established in Brazil, the Brazilian candidate-centred electoral system has contributed to increasingly expensive and highly competitive elections.

agenda of the executive branch to obtain resources to please their own constituencies and supporters. The author claims that legislative members use their power to approve or reject bills to secure their capability to deliver public goods –paving roads, electricity provision, health facilities – and private goods such as profitable infrastructure contracts or undemanding well-paying jobs for campaign contributors and supporters. State governors' resources control states' legislative delegations to the National Congress. Different interests and political positions between both States and States governors may influence deputies' positions, which in turn, divide the congress and effects policymaking.

The currency of exchange for clientelistic relations is the allocation of public resources. Private resources (formerly public as it comes from public contracts) in form of campaign financing are used to win votes. Once elected, politicians facilitate government contracts for large companies that have funded their campaigns. Overpriced infrastructure projects are conducted and paid for with public funds, which return to politicians in form of bribes.

Clientelistic practices in Brazil occur at distinct levels of the political scenario. They are strategies for maintaining power that can be used top-down, bottom-up and even horizontally. Top-down relationships occur between candidates and voters. In contrast, bottom-up agreements are made on the amount of funding destined for candidates in exchange for benefits distribution to campaign supporters. After the election, the relationships may take a horizontal form in which both politicians and supporters agree and benefit from their winning campaign. According to Figueiredo (2016), Brazilian studies on private campaign financing provide enough empirical evidence that corporations are willing to provide more funding to parties and politicians that are more efficient in delivering both contracts and desired policies.

Stokes (2012) uses Desposato's article mentioned above in order to draw attention to the *Institutional consequences of clientelism*. The author highlights how clientelism affects political parties' performance within legislative bodies. Indeed, Desposato's study published in 2002, in which he compares the Brazilian state of Piauí and Brasília (the federal district), demonstrates that parties that have voters support by providing public goods show legislative cohesion. For instance, party members vote coherently when taking part in roll-call votes (the case of Brasilia). On the other hand, in Piauí, where parties commonly use clientelistic strategies (resources distribution within a private network) to win votes, Desposato's study reveals less cohesion when politicians participate in the legislative process. This lack of cohesion has important consequences to policymaking throughout all Brazilian governance levels and sectors.

Desposato highlights the importance of the executive branch on the state level in the Brazilian political realm. "Many decisions about the distribution of resources are made at the state level" (2002: 2). In this regard, in an attempt to understand the policymaking concerning the explorations of the pre-salt oil reserves and royalties' revenue distribution, Queiroz-Stein[67] argues that federalism was a relevant factor in the process. He states that the Brazilian constitution determines the autonomy of all federated entities and, therefore, there is significant pressure for decentralization by the subnational entities. According to him, the autonomy of subnational units

> empowers governors and mayors a lot, and so there are many agents with much power. This also applies to the national Congress, which is formed by a large number of parties with the capacity to alter the result of parliamentary voting. Nowadays, the number of most influential parties in the national parliament reaches 11 to 13, with which it is necessary to negotiate in order to approve any regulation. This division shapes the form of the negotiation. It is necessary to share power among parties, mayors, governors. Power is excessively decentralised and

[67] Member of the research group Transformation and Sustainability Governance in South American Bioeconomies (SABio).

> fragmented, which ends up being the element of fragility at the moment of policymaking. The need to comply with quite different and sometimes contradictory interests generates a wavering decision making (interview with author, July 2020).

This fragmentation mentioned by Queiroz-Stein illustrates the coalitional presidentialism, the political model prevailing in Brazil since 1988. The term was coined by the Brazilian political scientist Sérgio Abranches in his article *Coalition Presidentialism: The Brazilian institutional dilemma* (1988). According to the scientist, coalitional presidentialism in Brazil is a political system built from the combination of extensive and heterogeneous federalism, open list proportional representation, a multiparty system, bicameralism, and a strong and minority presidency (Abranches, 2019). Mello & Spektor (2018) state that the Brazilian

> multiparty presidentialism's addiction to corrupt and rent-seeking practices has important consequences for the regulatory environment and the overall relationship between companies and the state. As firms devote more of their energies and capital to securing advantageous deals through government connections, more of their revenue will come from rent-seeking and less from improvements in productivity (p. 124).

Pereira, Bertholini & Raile (2016) studied coalition management and governing costs using Brazil as a case study. The authors argue that there was a higher governmental cost during the PT governments. PT administrations formed an ideologically quite heterogeneous coalition that included conservatives, liberals, and progressives and, therefore, quite different from the relatively centre-right homogeneous coalition during the FHC presidency. Moreover, during Lula's first term, Government costs increased dramatically, most of which went to his own party. Especially pork (or pork barrel) related costs have increased considerably. One important example was the *mensalão* scandal.[68]

[68]*Mensalão* was an illegal political financing scheme organised by the Workers Party (PT) to corrupt Congress members to guarantee support for the government. The *mensalão*

Armijo and Rhodes (2017) suggest that Brazil's average governance costs is higher than in most fellow countries, whereas policy predictability is low. Given that every administration must distribute benefits in order to form a coalition, government costs increase. As a result, political clientelism occurs and funds allocation criteria is rather partisan than pragmatic. Such an environment is tempting to political capture by local elites.

Clientelism is an old practice in Brazil (Carvalho, 1997) and its use as a strategy for the division of State resources and spreads across all levels of government and economic sectors. As discussed extensively in section 1.3 of the first chapter, the practice of clientelism occurs at the bottom of the political process, among voters and candidates for local government, as well as at the highest level of the federal government (Guerguina & Volintiru, 2017). Funding for political campaigns is the biggest corridor for financial resources. Great political campaigns supporters as construction companies use clientelism as strategy to elect politicians that are willing to help them to benefit from State resources. These strategies strongly influence the policy choice and, in the case of the energy sector, undermine Brazil's effort to comply with the international agreements on climate change mitigation.

5.1.3 Political capture shaping policymaking

Clientelism and political capture are major threats to democratic accountability mechanisms since they prevent the government from implementing public policies that meet citizens' needs. Bardhan & Mookherjee (2012) call attention to the difference between these two concepts as they are often muddled when used to describe one or another phenomenon. According to them, clientelism occurs when

happened between 2003 and 2004 during the first term of Lula's presidency. The scheme was made public in 2005 when Roberto Jefferson, a former deputy and then president of the PTB, denounced the existence of a monthly payment to PP and PL deputies in exchange for supporting the Lula government.

political parties and governments make strategic transfers to poor and disadvantaged groups in order to guarantee their votes and consolidate political power accordingly. On the other hand, political capture happens when "underlying socio-economic inequality translates into higher implicit welfare weights assigned to wealthier and more powerful classes in policymaking and implementation" (Bardham & Mookherjee, 2012: 2). The authors highlight that clientelism oftentimes is typified by the transference of 'inferior' consumption goods to constituencies, while capture is mostly characterised by the transference of 'superior' production goods to local elites. For the purpose of this study, power strategies involving campaign funding will be regarded as clientelism, while the use of resources to obtain and maintain public contracts will be considered political capture.

Almeida and Zagaris (2015) draw attention to the occurrence of political capture in the Petrobras corruption scandal. According to the authors, testimonies given to prosecutors of the Car Wash operation have demonstrated that political parties had control over Petrobras' board of directors. Throughout history, the company's board of directors has been designated by the Brazilian presidency office. From 2003 forward, nominations to the board were controlled by the then-president Lula da Silva's Workers Party (PT) and other two parties – the Brazilian Democratic Movement Party (PMDB) and the Progressive Party (PP) – which formed Lula's administration's political coalition. According to witnesses, winning bidders had to compulsorily add an average of 3 per cent on top of the costs for every service provided. This sum was called 'political adjustment'. The authors state that under this scheme known as *Petrolão*,[69] Petrobras employees of lower ranking were also able to accumulate millions of dollars paid by the contracted companies as bribe in return for their contract with the company. From 2003 to 2013, up to USD 200 million was diverted from Petrobras' contracts. The money was

[69] Petrolão and mensalão were major corruption scandals that occurred within Brazilian politics between 2003 and 2013. Schemes involving numerous Brazilian politicians and businessmen facilitated the diversion of public money, kickbacks, and money laundering.

used to help finance 2010's election campaigns that elected Dilma Rousseff. On the matter of the corruption scandals investigated by the Car Wash operation Azevedo states:

> there was, there is, and there will be ingrained corruption in the country, and it must be permanently combated. The Brazilian state was and is captured by corporations, by private interests. Politicians end up having to relate to it; they are part of it because many of those who take over the State also run for office or have representation in the parliament. Therefore, the work of fighting corruption must be permanent (2021, 10: 58).

An evident model of political capture takes place when elites organise both into business associations and form their own parliamentary fronts. In Brazil, this is the case of the farming front, knowns as 'ruralists', which in 2015 used its influence to reduce primary forests protection under Brazil's Forestry Code (Oxfam, 2016). Former federal deputy Tereza Cristina, who is praised for her good coordination at the farming front, is the current minister for agriculture and, therefore, is one of the National Energy Policy Council members. Related to the energy sector, nine parliamentary fronts – with goals varying from the development of renewable energy source up to the increase of coal use – are currently working in national Congress in order to assure policy outcome that suits their interests (Corrêa, 2019).

Political capture has been a habitual occurrence in the energy sector for decades. The negotiation around the construction of the Belo Monte dam is evidence of political capture in the sector. The capture of policymaking occurred throughout its approval process, which took more than three decades. Different administrations have dealt with big corporations' influence around the negotiations to implement the biggest and most expensive hydropower dam ever built in Brazil. The companies that took part in the Norte Energy consortium to build Belo Monte benefited from many government funds. Hochstetler & Tranjan (2016) analysed BNDES' loan contracts from 2002-2012. Their results show that 82% of the total

electricity contracts were granted to small hydroelectric dams and wind power plants. However, they represent only 20% of the lending fund agreed during that decade. On the other hand, the authors found that the largest loan was for constructing the Belo Monte dam, which was much larger than all those projects together.

> Belo Monte is an extremely large project that will not produce the amount of energy promised. As it is a run-of-river plant, the generation of energy is minimal during the dry season. In the end, it is a project to give contracts to large companies and generate the resources (bribes) that are used to finance political campaigns and elect governments who perpetuate this practice, generating a vicious circle (Rodrigo Flora Calili, interview with author, July 2018).

Despite the negative socio-environmental effects that large dams cause, big companies that lead the electricity market continue to design new hydroelectric plants in the country. The government is meant to be a regulator of the entire process, but it is lenient instead. As a result, the practice of bossism occurs. Well-connected large company CEOs have access to top government officials and are able to influence policy outcome that benefits their businesses. Despite the classified nature of such negotiations, much information has been disclosed. At least five companies linked to the Norte Energy consortium have been investigated[70] by the Car Wash operation for bribe payment to federal government agents in exchange for being favoured and winning the auction for the concession of the Belo Monte dam. Evidence shows that large constructions companies determine the direction of policies in the

[70] Through the Car Wash operation, the federal public prosecution service filed charges against former senator Edison Lobão, his son, Márcio Lobão, and four other people for their involvement in a corruption scheme in the Belo Monte dam construction contract. As a result of this scheme, the Consortium companies have committed themselves to make bribe payments of about 1% of the value of the contract to politicians from the Workers' Party (PT) and the Brazilian Democratic Movement (MDB). Between 2011 and 2014, illicit payments were made in the amount of R $ 2.8 million *reais.* For details go to http://www.mpf.mp.br/grandes-casos/lava-jato/entenda-o-caso/curitiba/acoes/processo-penal-100

energy sector (Kuijpers, 2013; Boas, Hidalgo & Richardson, 2014; Armijo & Rhodes, 2017; Pearce, 2018). On this matter Larissa Araujo Rodrigues testifies:

> I do believe there is a process of government capture by private interests. Looking at big projects in hydro energy and oil and gas in Brazil, you see that before the projects go through regulatory agencies like ANEEL or ANP, they go through the National Council of Energy Policy (CNPE),[71] which is an executive body. The executive signs these big projects, so there is a capture of that part of the executive (interview with author, July 2020).

Marcelo Lima also agrees that there is a capture of capital over the state. According to him, State officials' decisions are in response to intense pressure from those who finance them and therefore are responsible for perpetuating the current (and others) government in power. It is common for large companies to elect politicians who approve policies that benefit these companies. At present, there is this pressure to privatise the entire natural gas production process, which is originally Petrobras' domain. The market highly appreciates this kind of policy because it generates financial speculation. It is believed that natural gas will save the Brazilian electrical matrix because this source covers the intermittency of solar and wind power. Marcelo Lima states:

> there is pressure on the Amazon Forest on several fronts, including energy. Here comes the state/finance nexus that David Harvey[72] talks about. As in the United States, where it is possible for the Treasury Secretary to come from Wall Street. In Brazil, the current minister of economy Paulo Guedes is one of the BTG Pactual investment bank

[71] The CNPE is composed of ten ministers of the government in office and the Brazilian Energy research Agency president. For details go to http://www.mme.gov.br/web/guest/conselhos-e-comites/cnpe/relacao-de-integrantes-do-cnpe

[72] David Harvey is a well-known academic and author who affirms the existence of a state-financed nexus that runs the state. According to him, the mass of capital is managed not by the state alone but in collaboration with financial institutions, both national and international. Furthermore, the author argues that the state-finance nexus enables the financial sector to control the whole economic system (Harvey, 2019).

> founders, which also operates in the energy market. Paulo Guedes does his role of serving capital very well because of his origins. BTG Pactual bank, also investigated by Car Wash operation,[73] has a large portfolio of investments in natural gas. It is no coincidence that Guedes is working on urgent basis for the privatisation of companies in the natural gas sector.[74] Lobbyists argue that natural gas can be easily turned on and off according to the need. However, they do not mention that it is an expensive procedure, and therefore it is left on consistently. It turns out that the megawatt-hour of gas is more expensive than the megawatt-hour of solar and wind energy. That difference is paid by the consumer (interview with author, July 2020).

An event that corroborates Marcelo Lima's concerns about the pressure on the Amazon took place in the plenary session of the 2019 World Economic Forum in Davos, Switzerland, during an encounter[75] between the American ex-vice president and environmentalist Al Gore and the Brazilian president Jair Bolsonaro. On Al Gore's comment, "we are all very concerned with the Amazon; it is something that touches me deeply", the Brazilian president responded, exposing his economic point of view on the subject: "we have a lot of wealth in the Amazon, and we would like to explore that wealth with the United States" (Vetter, 2019, 01:18:40).

[73] On August 23, 2019, a search and seizure operation was carried out at addresses linked to Bank BTG Pactual. The measures aimed at obtaining evidence concerning two different Car Wash investigation fronts: possible wrongdoing involving the Petrobras sale of assets in Africa to the bank. Another investigation front deals with a possible bribe transfer agreement to guarantee privileges to Bank BTG Pactual in Petrobras' rigs project for the pre-salt explorations. For details go to http://www.mpf.mp.br/grandes-casos/lava-jato/linha-do-tempo

[74] In 2019, the first year of Guedes in office, three Petrobras subsidiaries were privatised: Liquigás, a liquefied gas distributor; TAG (Transportadora Associada de Gás), which operates in the natural gas sector; and BR Distribuidora, a gas station chain.

[75] The encounter can be seen in the documentary The Forum by director Marcus Vetter. For the related fragment, go to https://youtu.be/CPpH7FRFcY0

Ricardo Baitelo[76] associates the current government's decisions to its belief in the neoliberal-related administration model, which includes privatisation, deregulation, and free-market capitalism. In his words:

> the current government follows the precepts of the neoliberal economy like no other. The government stated that it intended to make a ten-year energy plan that would serve the market's interest. As the government realises that wind and solar sources are offering a better price, the government tends to revise the auction rules and, at some point, will modify the rules to guarantee this space for the thermoelectric plants in the energy mix. The new 10-year plan clearly ensures a larger space for pre-salt's natural gas (interview with author, July 2020).

Another case of political capture that has been brought to public scrutiny was the negotiations around the construction of the Petrochemical Complex of Rio de Janeiro (Comperj), one of Petrobras refining units that would be expanded in 2008. As one of the world's largest oil companies, Petrobras invests billions of dollars a year in contracts to enlarge its operation capacity. "In 2010, Petrobras' international initial public offering (IPO) raised $70 billion, briefly elevating Petrobras to the world's fourth-largest firm. Petrobras used its ample financing to fund several poorly justified mega-projects, of which the most notable was Comperj" (Armijo & Rhodes, 2017: 237). To implement such a big project, companies are welcome to present their proposals in fair market competition. However, at least since 1998, a group of contractor companies switched from competition to collaboration. It formed a so-called 'club' constituted by sixteen firms, namely: Odebrecht, UTC, OAS, Camargo Corrêa, Queiroz Galvão, Mendes Junior, Andrade Gutierrez, Galvão Engenharia, Iesa, Engevix, Toyo Setal, Techint, Promon, MPE, Skanska e GDK S.A. Another six companies also participated in fraud: Alusa, Fidens, Jaraguá Equipamentos, Tomé Engenharia, Construcap e Carioca Engenharia (Ministério Público Federal, 2018). The cartel, a selected group of high-ranking executives, took part in bid-rigging

[76] Technical Specialist at Brazilian Photovoltaic Solar Energy Association – ABSOLAR.

schemes. The group decided in advance which of the firms would win a specific bid. A deceitful competition was set up, enabling the chosen winner to charge much higher fees than it would occur in a free market. Petrobras officials collaborate with the scheme by allowing overpriced contracts in exchange for bribes (Segal, 2015).

Not surprisingly, occurrences such as the swindle around the construction of Belo Monte and Comperj have been considered great scandals and strongly criticised. However, Kitschelt (2000) argues that privileged access to government contracts or procurement opportunities as a reward for electoral campaign support are very common clientelistic practices. It occurs not only within state-owned or regulated companies, but it also stretches the reach of party patronage into private capitalist enterprises, especially in economic sectors whom the state is the major customer, such as civil engineering/construction. In such an environment, political capture is most likely to occur.

State capture is a strategy of wealth defence. 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. Winters (2011) states that oligarchs know that democracy represents potential risks to their wealth. On the other hand, they lean on the near veto they hold over threats to wealth accumulation. Rodrigo Flora Calili states:

> Every Brazilian citizen knows that this relationship between the government and lobbyists exists. Every Brazilian with a minimum of education understands that this happens. I have been a little distrustful of how to end it and the corruption that comes with it. Likewise, I doubt the possibilities of putting an end to these oligarchies that have been in the government for years perpetuating this system. I still do not see hope. To change this paradigm, heavy investment in basic education is necessary, which despite the advances in recent years, is still poor. It is even necessary for the change in the paradigm in decision making when choosing government officials, which, in turn, will define public policies

> to be implemented in the energy sector but also in any other policy-making processes (interview with author, July 2018).

In 2011, the International Forum on Globalization (IFG) published *Outing the Oligarchy*, *a special report* in which a list of billionaires who benefit from today's climate crisis is presented. Among these wealthy oligarchs is Eike Batista, once Brazilian richest man, and a remarkable example of a crony capitalist – as his fortune is the result of his relationship with government officials (Cuadros, 2016) – has been investigated under the car wash operation. In 2018, Batista was sentenced to thirty years in prison for crimes of active corruption and money laundering because of his participation in a scheme of bribes paid to the then governor of Rio de Janeiro, Sérgio Cabral, who is also sent to prison. According to the sentence, he transferred US$ 16.5 million to the former governor's criminal scheme. In May 2019, the Brazilian Securities and Exchange Commission ordered Batista to pay a 130.7 million dollars fine for the crime of insider trading. Batista was found guilty of trading shares of OGX oil and gas in possession of inside information. The lawsuit started in 2014 and investigated whether Batista, as OGX controlling shareholder and board of director's chairperson, made a profit on privileged information, selling or buying the company's shares, before important decisions were disclosed to the market. In fact, when OGX started having financial problems due to drilling challenges, Batista met with former president Lula da Silva and the then-president Dilma Rousseff, hopping for their support as he had plentifully contributed to their presidential campaigns (Cuadros, 2016). According to Koziuk:

> Crony capitalism is understood as a capitalist economy in which business success depends on personal relationships between businesspersons and government officials. Such connections are actively used in developing economies to obtain licenses, subsidies, and state orders on beneficial terms, violating formal and informal rules (2018: 114).

Crony systems rest on those personal connections. Agreements are reliable during the term of that particular government. As soon as the officeholders are replaced, those personal connections break, offending the agreed privilege for certain groups.

> For this reason, economic agents under crony systems, including the politically connected, will operate with short time horizons. This causes cronies to demand high rates of return, even for projects that have short maturities. It may, in fact, completely discourage long-term investing (Haber, 2002: 16).

Pearce (2018), in her paper E*lites and Violence in Latin America*, analyses how far the rich in Latin America are responsible for the logic behind violence reproduction amongst the poorest. According to the author, oligarchic elites provided with power, social status, and wealth are strong political actors who operate to defend their affluence. In Latin America, the construction sector in particular, makes huge profits from contracts with the State. Odebrecht benefited enormously from these contracts, whereas politicians used bribes to boost their election campaigns. "Here, a synergy is formed between one economic sector and political elites, both of whom gain from ensuring there is no effective rule of law" (Pearce, 2018: 11). The author wonders how far these elites are willing to go to win and protect those contracts and draw further attention to human rights violations by mining and energy companies in Latin America. One example is the murder of Bertha Caceres in 2016. She was the leading activist against the Agua Zarca dam in Honduras. In 2018 David Castillo Mejia was arrested and accused of being the mastermind behind the murder. He was the executive president of Desarrollos Energéticos SA, DESA, and the contractor building the dam. Another violent act concerning dam construction in Latin America was the killing of the Peruvian Hitler Rojas Gonzales, vice-president of Yagén Defence Front, which has been fighting the construction of Chadin 2, 600 MW hydroelectric power plant on the Maranon River in Peru, the main source of the Amazon River. The dam would flood an area of 32.5 Km^2, a region with many villages, vast croplands, and valleys rich in biodiversity. The

dam would be run by AC Energia, a subsidiary of Odebrecht. According to Hill (2016), even though the Chadin 2 is not mentioned in the sentence, the question remains whether Rojas Gonzales's opposition to the dam project played a role in his death. He was killed right after he was elected mayor. The connection between Rojas Gonzales's death and Chadin 2 is doubtful; however, his killer, Alejandro Rodrigues García, was the local contact concerning logistics issues and also a guide for the company's representatives. Odebrecht contradicts this information and states to have no connection with the murderer (Hill, 2016). According to Grandez et al. (2020), it has been found that the grant awarded to A. C. Energía for the development of the Chadín 2 has resulted in a cause of forfeiture by not starting works according to the work schedule. Odebrecht has not prioritised the development of the projects in the short term. In fact, the company is selling several assets due to serious cases of corruption in which it has been implicated. Eventually, the Economic Operations Committee of the National Interconnected System (COES) has found that there is an energy surplus in Peru, and the development of such a large dam is not seen as an urgent topic in an economically viable way.

> In Latin America, the defence of property and income still requires elite agency and shapes its oligarchic elites' priorities. There is no external guarantor in the State. Rather, there are individuals to lobby and suborn in a context where the rule of law is weak, public security underfunded, and its agents corruptible. In addition, the emergence of illegal rent-seeking and trafficking has opened new routes to rapid wealth accumulation (Pearce, 2018: 12).

Oxfam (2017) published *An economy for the 99%*, a briefing paper in which the contemporary economic model's unfairness is denounced. Their study shows that many of the super-rich use their power, prestige, and relations to influence political circles and to ensure that the rules favour them. An example of it is the Brazilian movement RenovaBR, a group supported by entrepreneurs, whom the most prominent is the star television presenter Luciano Huck. The movement elected seventeen of the 120 Candidates launched for legislative assemblies and national

Congress in the 2018 elections. Another example is the Support Programme for the Development of Public Leadership, sponsored by the foundation created by the second richest man in Brazil, Jorge Paulo Leman. He is Co-founder of 3G Capital, a global investment firm that holds 10.07% of the preferred shares in Eletrobras, a major Brazilian electricity company whose privatisation is one of the priorities of Paulo Guedes, Brazil's current economy minister.

Furthermore, Oxfam condemn millionaires who finance think tanks and universities to affect political and economic perspectives according to their self-centred false premises, such as: natural resources are limitless, the state's role should be minimised, companies need to maximise their profits, et cetera. In Brazil's case, Oxfam censures billionaires who lobby to reduce taxes and use their fortunes to help buy the political results they want, influencing elections and policymaking. Some of the Brazilian super-rich in São Paulo prefer to go to work by helicopter in order to avoid the traffic jams and infrastructure problems common to the city.

As previously discussed in the chapter 1, section 1.4, state capture takes place through the action of oligarchic groups that use their financial resources to influence decision-making processes (Rhoden, 2015; López García, 2017). Large construction companies linked directly or indirectly to the Brazilian energy sector belong to very prominent families that for decades, have influenced the politics in the country and, consequently, have the power to determine the direction of policymaking (Armijo and Rhodes, 2017). Their wealth was built by their participation in bidding processes to provide services to the State. In most cases, the State is their biggest client and therefore its biggest source of income. The energy transition necessary to lower CO2 emission levels implies a new business model, which costs a lot of financial investment. Companies that are in the market today see no benefit in facilitating this transition and therefore use all their influence and resources to control policy choices (Azevedo, 2021). State capture is a great obstacle for the implementation

of more effective policies to contribute with the international efforts to reduce greenhouse gas emissions.

Power relations strategies such as monopolistic practices, clientelism, political capture, as well as bossism, patronage, pork barrel, vote-buying, bid-rigging, rent-seeking, crony capitalism have been recurrently used in Brazil since the beginning of local political relations and decision-making processes. Varying in extent, frequency and results, these strategies have shaped public policies according to the wishes of those who use them. Politicians, bureaucrats, oligarchies, businesspeople who use these power strategies defend their wealth and traditional economic development model which is based on unsustainable exploitation of natural resources. These strategies are strong obstacles to be overcome in the effort for an energy transition. On this matter, the Brazilian government will have to make major change in the way policymaking occur in order to effectively comply with the international agreements on climate governance.

Furthermore, the choices for public policies that keep the usual business going are related to the behaviour of individuals involved in decision-making processes. Behavioural economics theory is an important instrument to analyse these behaviours and indicate why one or more policies are formulated and implemented. The following section presents evidence that policymaking for the Brazilian energy sector is influenced by personal behaviour of decision-makers.

5.2 Individual behaviour and decision-making processes

Behavioural economics opposes the rational characteristics of the neoclassic expected utility model and turns to psychology and sociology insights to comprehend peoples' and organizations' decision-making processes. Since the arising of behavioural economics theory in the 1980s, several studies have shown evidence that common behaviour

deviation and cognitive limitations affect individual's choices (Gsottbauer & Van den Bergh, 2012; Berggren, 2012; Ainslie, 2015; Samson, 2018; Emmerling & Rooders, 2020). Section 1.6 presents a detailed discussion on this subject matter. The current section brings evidence of such behaviour deviation and cognitive limitations and how they affect the choices in the Brazilian energy governance.

Behavioural economics provides various concepts that can be used as tools to explain why one or another decision is made. To respond the main question of this research –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? – the following concepts are used: hyperbolic discounting and loss aversion; endowment effect and status quo bias; information avoidance; delusion of competence; and overconfidence and planning fallacy. As discussed in chapter one, these concepts define individuals' behaviour which can lead to inadequate decisions concerning Brazil's efforts to comply with the international agreements on climate change mitigation. These concepts selected to investigate the phenomenon describe behaviours such as: preference for small and short-term rewards over bigger ones in the future (Pollitt and Shaorshadze, 2013); focus on short term outcomes (Samson, 2018); unwillingness to change daily routine and habits (Cooper, 2013; Lin, 2011); reluctance to acquire knowledge (Wilson, 2020); deficiency in reflexive acknowledgement (Feld et al, 2015), self-overestimation of ability (Moore & Healy, 2008); misjudgement of the amount of time and resources required to finish a project (Kahneman & Tversky, 1979).

5.2.1 Hyperbolic discounting and loss aversion

Hyperbolic discounting defines people's far-sighted behaviour when making choices if both costs and benefits occur in the future but make short-sighted decisions if rewards occur in the present. In other words, it indicates a preference for small short-term rewards over bigger but

later ones. Hyperbolic discounting can be associated with loss aversion, a concept that explains that individuals are risk-averse when choices indicate potential gains but contrarily risk-seeking when facing possible loss. A branch of this concept, myopic loss aversion, arise when actors are highly focused on short term results. Like in any other policy choice domain, these behavioural phenomena also occur in decision-making processes in the energy sector as a result of stakeholders' political interactions. This research has found evidence of behaviours related to hyperbolic discounting and loss aversion in different spheres and circumstances in Brazil. This evidence can be observed in Desposato's study published in 2002, which draws attention to constituencies' demand for private versus public goods and politicians' response to it. His research was extended to five Brazilian states: Bahia, Piauí, São Paulo, Rio Grande do Sul, and the Federal District (see Appendix 2). Even though the author confirms the great differences between the states in terms of income, education, and development, he argues that voters in Bahia and Piauí, which are needier, are not more likely to exchange their votes for private goods than voters from the other states. The chances that high-income voters would vote in exchange for private goods is the same; the only difference is that the price for their vote is higher than the ones from the low-income population. Besides, there is hardly a candidate willing to pay their price. According to Desposato, the reason voters are more willing to vote in exchange for private goods rather than public goods is the value they put in short-term rewards. Low-income forces voters to discount future utility from public goods programmes. As a result, they appreciate more immediate private goods than future public ones. High-income voters are also prone to value quick return over later benefits. However, "marginalised voters *might* trade their votes for a basket of food, for example. But this same basket of rice and beans has little value for a high-income voter" (Desposato, 2002: 20).

The preference for short-term rewards is also a characteristic of career politicians in Brazil who are especially prone to engage in political actions that may help them to hold power. They put their effort in policy-

making processes or relations that give them a certain assurance of re-election or any kind of high-paying political office job. Politicians in Brazil are often accused of implementing policies, especially infrastructure projects, in order to convince their constituencies to vote for them. Often these projects are of low quality, poorly executed and intended to show short-term results –often within four years which is the length of a term of office. Bardham (2012) draws attention to the connection between such clientelistic behaviour and the preference for short-term benefits.

> Strategic transfers made by political parties and governments to poor and disadvantaged groups as a means of securing their votes, in an effort to consolidate political power, provide an appearance of successful pro-poor targeting of public services. But they usually come at the expense of long-term development since they create biases towards private transfer programmes with short-term payoffs at the expense of public goods or private benefits of a long-run nature, such as education or health (p. 2).

On his analysis about a study on economics and religion in Brazil,[77] Ghiraldelli (2019a) argues that there is in the country an enormous difficulty in politically educating its population because of the politicians' short-term thinking. Left-wing parties have turned their focus on short-term goals exactly like right-wing parties and want to resolve the country's crises through elections. Candidates approach churches to get votes, but they do not work to educate the population politically after being elected. The result is that, after the election, voters still lacking political discernment, are unable to choose their representatives according to projects that meet their needs, voting once again without political awareness.

Analysing social inequality and violence in Brazil, Bugalho[78] (2020a) speculates how progressive politicians could convince their voters that

[77] For the study, go to https://bibliotecadigital.fgv.br/dspace/handle/10438/25709

[78] Philosopher and writer. Specialist in Literature and History. Fellow of the Royal Society of Arts.

public policies to solve the problem of violence cannot be short-term but long-term. According to Bugalho, affirming that solutions will only be possible in the long run has no electoral appeal, and for this reason, politicians think about their terms of office, that is, what they can do within a four-year term. Furthermore, the writer states that it is challenging for a politician to convince the population of the benefits of long-term projects, which tend to be a state project and not just a government one.

This evidence found in different contexts show that the preference for short-term rewards is a prevalent characteristic of Brazilian policymaking and policy choice. As long-term results are unlikely to be achieved – shown by the country's customary difficulties in creating and implementing long-term public policies (Carpes, 2006; Oliveira, 2007; Hochstetler & Tranjan, 2016; Lopes, Martins & Miranda, 2019) – loss aversion also become a widespread feature when it comes to decision making. One is prone to think about how fast benefits can be achieved – regardless of how big and profitable it is – as long as the risk of haven no benefit at all is avoided. These characteristics of decision-making processes in Brazil extend to the energy sector. Hochstetler & Tranjan (2016), when studying host communities' resistance to specific electricity projects, found evidence that the construction of fossil fuel plants, which are responsible for higher greenhouse gas emission rates, find less opposition than wind and small hydropower plants, commonly regarded as clean and sustainable. The authors infer that communities focus more on local and short-term impacts than those that may occur in the long run. According to Guilherme Moraes de Lima:

> It is very difficult for people to make sacrifices in the present –even because of costs or economic efficiency– focusing on future gains. The few moments when the issue of sustainability comes up are in moments of threat of price or supply crisis. Only then people have the willpower to at least redeem and be efficient in their energy consumption. Furthermore, it seems to me that this is not a concern nor a priority for

> public officials and the country's leadership (interview with author, July 2018).

Since de 1980s Brazil has been implementing public policies in order to improve the country's energy efficiency. In 1984, Inmetro (National Institute of Metrology Standardization and Industrial Quality) launched its labelling programme to regulate energy efficiency of electrical equipment and Procel (national programme for the conservation of electrical energy) was created in 1985 to promote the efficient use of electricity and combat its waste. After the power rationing imposed on consumers in 2001, the government sanctioned Law 10.295-2001, which deals with energy efficiency. This law establishes minimum levels of efficiency and forces the industry to produce more efficient electrical equipment. The consumer, in turn, chooses which product to buy.

> Although it has always been thought that people rather pay for low price equipment's than efficient ones, nowadays this is no longer confirmed, because the most efficient devices are no longer as expensive as they used to be. In any case, if the consumer chooses not to pay for the most efficient device, he will certainly pay the difference in the electricity bill, which will eventually be more expensive (Samira Sana Fernandes de Sousa,[79] interview with author, August 2018).

However, the country's economy does not allow the Brazilian population, in general, to opt for the most efficient equipment. Choices are made according to the conditions of the moment; that is to say, consumers buy the cheapest product that most of the time is the one of lower quality and efficiency. If at the time of purchase, one can save one hundred *reais*, for example, one benefits from this immediate saving. The problem of increasing expenses with the electricity bill is dealt with afterwards. Generally, people make choices that best serve them in the here and now, even if the gain is greater in the future. This is a classic example that occurs mainly because of the majority of the Brazilian population's

[79] General Coordinator for Energy Efficiency at the Brazilian Ministry of Mines and Energy.

purchasing power. Samira Sana Fernandes de Sousa says that this way of making decisions is also recurrent in the energy sector.

> Yes, this way of thinking determines considerably the choices made. Regarding energy efficiency, this is a reality. Officials in office think much more about what is possible to carry out in a government term of four years and not in what the country can improve in 30 or 50 years, which are the planning horizons that we work in. We, the technicians, think more about policies for the long term, but the government in office implements rather policies that favour their administration within their four-year mandates (interview with author, August 2018).

Rodrigo Flora Calili corroborates Sousa's statement:

> There is no long-term investment. All policies that the government defines have a fixed term of four years. Politicians are not thinking about the long term. They want to win the next election and thus perpetuate the same politicians with the same egocentric mentality. They do not think about benefits globally; they do not think about the population; they only think about themselves, about diverting public money and corruption schemes (interview with author, July 2018).

These statements show that in Brazil both politician and population opt for short-term solutions. When asked if energy governance in Brazil is based on quick solutions with lesser results rather than slow ones with better results, in the long run, Larissa Araujo Rodrigues corroborates:

> yes, with certainty, because who gives the final call is CNPE, a body composed of government ministers who make government policy, not state ones. A minister can stay in office for at least four years (if he is not fired earlier) and at most eight years. One term, or even two, is a short amount of time, therefore their performance must be immediate. There is no state policy (long-term) for the energy sector. That is why the sector continues to do business as usual, and the private sector benefits from it" (interview with author, July 2020).

This is the result of a long history of short-term policy-making processes in the sector. During the first term of President Cardoso, a major restructure of the electricity system took place. By 1998, sixteen distribution companies were sold; another three energy companies had been prepared to be partially or totally privatised. Also, ANEEL had organised public auctions to sell the license for new hydropower plants and transmission lines. Nevertheless, no organisation took responsibility for long-term planning and policy management for the system as a whole (Oliveira, 2007). Since 2006, the Brazilian energy research company publishes its decennial energy expansion planning, which focuses on long term solution for the energy sector. However, it is not put into practice due to frequent professional's turnover. According to Sandro Yamamoto,[80]

> the planning on paper is well elaborated, but it turns out not being put into practice because people move from one organization to another too quickly, in this way, the person who would execute the planning leaves without implementing it. Another person with other interests assumes the role, and the planning ends up not being executed (interview with author, July 2018).

This negligence regarding long-term planning seems to be a recurring issue as companies and institutions point out the absence of medium and long-term policies for fuel supply in the country, including biofuels' role (MME, 2017).

As of 2011, the government implemented a price control policy for gasoline and diesel in order to artificially keep them below the foreign market and reduce inflationary pressures. A negative effect of this policy was the gradual loss of competitiveness of ethanol in relation to gasoline, in addition to causing an increasing financial fragility in both sectors (Bistafa, Gurgel & Paltsev, 2016). In other words, domestic sales of ethanol decreased while sales of gasoline increased considerably. Added

[80] Technical, regulatory and infrastructure Coordinator at ABEEólica: - Brazilian Wind Energy Association.

to this scenario was the high debt rates of producers. The result was one of the biggest crises suffered by the Brazilian ethanol industry in the last decades. Queiroz-Stein calls this price control policy a "short-term imprudent" decision. This strategy was part of the then-president Dilma Rousseff plan of action, which main objective was to eliminate (or at least minimise) rent-seeking activities around the country's public debt. These practices were regarded as a systematic means of capital accumulation which occurs since the early 1980s (Bastos, 2017). In the short term, the plan improved some social indicators but quickly led the country to uncertainty, high inflation, and low growth. Dilma's attempt to lower interest rates by artificially containing energy and gasoline prices without cutting public spending went awry, and as a result, inflation initially dampened, returned with greater force later on (Coronato, Freitas & Utsumi, 2015). On this conjuncture Guilherme Moraes de Lima comments:

> The literature shows that a person is twice as impacted by a loss than by an equivalent-sized gain. So, when one is in a position to make decisions in public policies choice – which fundamentally are decisions on the allocation of resources and economic incentives (by which some will lose, and others will win) – there is a tendency, an irresistible incentive for politicians or policymakers – with a short mandate – to push any losses beyond the horizon of their mandates. At some point, when the situation becomes unsustainable, the bill is passed on to the consumers (interview with author, July 2018).

The creation and implementation of public policies within a period of four years are common in all sectors of governance in Brazil. Considered electoral policies, they aim to convince voters to re-elect the same politicians and keep them in office for a second term. In the energy sector, these short-term policies are not applicable, as the realization of projects for the modernization of the sector requires a lot of time and large investments. An energy transition in Brazil will only be possible when governments move in the direction of long-term policymaking. Given the current preference for short-term policies, the country will be late in the

race for the much-needed energy transition to be conducted by all countries around the globe.

5.2.2 Endowment effect and status quo bias

Another two aspects of people's behaviour that affect their decision-making processes are known as endowment effect and status quo bias. These behaviours may be a hindrance when it comes to the creation and implementation of public policies. Endowment effect implies that individuals stick to their routine and habits and are not open to innovation. Status quo bias suggests that actors rather keep things the way they are by avoiding action or persisting with the previous choices.

Regarding the Brazilian energy sector, endowment effect and status quo bias have been inhibiting initiatives towards increasing the use of more sustainable energy sources. Larissa Araujo Rodrigues illustrates this scenario by saying:

> Brazil is not taking measures to enable the energy transition. It is business as usual. Because the Brazilian energy matrix has a large share of hydroelectric power, the government uses this as propaganda. Nothing has changed after the submission of the country's iNDC to the UNFCCC. There is, in fact, an increase in the share of wind and solar sources and even biomass. However, traditional non-renewable sources are also increasing. The national energy plan indicates that 80% of investments are in oil and oil products and not in renewable energy. This is the current energy policy in Brazil. Because it is believed that the share of renewables is already quite high compared to the rest of the world, the policy is to maintain these numbers and continue with investments in the exploration of pre-salt oil reserves (interview with author, July 2020).

Queiroz- stein (2019) draws attention to the importance of analysing socio-technical regimes to facilitate coordination between actors and sustain certain economic and social achievement. These regimes, which are structured systems dependent on technological standards and

institutional arrangements, may hinder the development of innovative technologies and policies for the energy sector. The author claims that:

> from a political economy perspective, regimes are considered the locus of established practices with associated rules, which enable or constrain incumbent actors' actions. These incumbent actors favour regimes' existence and act in their defence, which is one of the lock-in mechanisms that act to prevent transitions or ensure that changes are incremental, without abrupt changes in trajectory (Queiroz-Stein, 2019:13).

An empirical manifestation of his statement has occurred in the Brazilian energy sector's not far past. The electricity reforms in the late 1990s in Brazil was designed to foster different energy sources other than hydro. However, the urge to diversify the system was not strong enough to neutralise the traditional hydropower industry. As a result, the political practice that fosters and hold on to hydro energy was incorporated by the new regulatory structure. According to Bradshaw, the electrocrats[81] (engineers and policymakers) had their own interest in maintaining the prevailing system, "the political and technical characteristics of the existing hydropower system shape the deployment of new technologies and serve as a defence for the status quo" (2018: 84). Nowadays, the support of hydropower is still strong. Carlos Alexandre Principe Pires, current director of the Energy Development Department of the Ministry of Mines and Energy, argues that hydroelectric power plants have a vital role in the Brazilian electrical system because of its fundamental differential, which is its capacity for energy storage through water reservoirs. He considers biased the debate around social and environmental impact caused by large hydroelectric dams and its contribution to GHG emission:

[81] Bradshaw (2018) names electrocrats government officials who had graduated from predominately engineering university programmes stimulated during the prosperous years of hydroelectricity development in Brazil.

> this discussion was created to draw attention to the wind and solar sources. The lobby will always exist; in fact, there are associations such as ABEEólica and Absolar only because there is a need for lobbying (interview with author, August 2018).

In 2001 severe droughts reduced the water levels of dam's reservoirs resulting in an energy crisis. That was the push political actors and technocrats needed to amend the electricity supply system. Policies were created to favour the renewable energy markets. Since then, solar and wind energy has been growing considerably. However, the intermittency of these technologies has been a common argument to affirm that "hydropower should still maintain a higher value in the energy system. In fact, the electricity industry sees the value of wind power as an "add-on" to the existing system" (Bradshaw, 2018: 101). And indeed, Carlos Alexandre Principe Pires corroborates:

> nowadays, it is impossible to expand *ad aeternum* wind and solar parks without having the backup of large reservoirs because the wind source generates energy only 40% of the time and the solar source even less, only 20% as long. It means that the rest of the time is necessary to have another system to accumulate energy to meet the country's demand (interview with author, August 2018).

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. Petrobras' criticisms of the RenovaBio programme in 2017 demonstrate this reality. Petrobras points out that the RenovaBio programme would be in disagreement with the Brazil fuel programme also launched in 2017 by MME, which aims to attract foreign investments to the refining sector of petroleum-based fuels. According to Lorenzi and Andrade (2019), the ethanol industry and Petrobras compete for their representativeness within the Brazilian environmental and energy policymaking. Petrobras defends the maintenance of the

current dynamics while the sugar and ethanol sector insists on the need for new incentives to achieve the iNDC goals. According to Larissa Araujo Rodrigues:

> oil companies were born as oil companies, so they continue to do what they have always done. Petrobras innovated a lot to reach the pre-salt, but it is an innovation in the same operation area. It does not expand to other areas of energy exploration. To achieve an energy transition, oil companies should become energy companies. Petrobras could go through this transformation since it already has investments in biofuels and renewable energy, but this investment is minimal. Because it does not make a profit like oil exploitation does (interview with author, July 2020).

Interviewees for this research, when asked whether incumbents actors opt for traditional energy sources because of a certain apprehension towards innovation or their tendency to maintain status quo, confirm this hypothesis. Marcelo Lima says:

> it is certainly a project in terms of maintaining the status quo because today the projects are centralised. Large projects are the ones more capable of mobilising capital and exponential profit, and there is where the market is concentrated. Few large companies have this capacity to do bulky things and expand profit, and therefore it is easier for them to maintain the monopoly (interview with author, July 2020).

Larissa Araujo Rodrigues adds:

> maintenance of the status quo is exactly what it is. It is not the fear of taking risks but more a perception that the future will not change much. Despite this discussion on energy transition, in Brazil, 80% of the investments still are on oil exploration, and in the world, the big oil companies are still growing. They still have billionaire investment plans in the sector. Companies do not see the need to change if it is still working. In the end the decision is economical. From a list of projects, the money goes to the one that gives the most financial return. This

reality makes the transition more difficult (interview with author, July 2020).

Brazil has a compelling reputation for using green energy (Knodt & Piefer, 2015). This is due to the enormous potential for hydro energy in the country. The development of technology for the use of water resources began in the middle of the last century. From the 1970s onwards, grew the use of hydroelectric plants in the country's electricity grid. Many companies have become giants in the sector and also very influential in the political realm (Kuijpers, 2013; Boas, Hidalgo & Richardson, 2014; Armijo & Rhodes, 2017; Pearce, 2018). Also in the 1970s, the development of the oil sector made Petrobras one of the largest oil companies in the world. Despite the Brazilian government still being the largest shareholder, Petrobras is a mixed capital company with a great share of private capital, which has strong influence in the decision-making processes (Guan, 2010: Leão, 2017; Olim, Mensah, and Yamachita, 2018). The Brazilian oil sector is very profitable, even more so after the discovery of the pre-salt oil fields in 2006. Despite the growth of the wind, solar and biofuel sectors, the incumbent hydroelectric and oil sectors are the ones that most strongly influence energy policies in Brazil, not to mention the strong lobby of the thermoelectric sector (Duvivier, 2021). It took many decades and huge investments to develop these sectors. The actors benefiting from the financial, social, and political profits of this development will not facilitate its replacement by a new business paradigm.

5.2.3 Information avoidance

One more common decision-making aspect that behavioural economics draws attention to rests on the fact that individuals choose not to acquire knowledge even when they have free access to it. This behaviour is known as information avoidance. Unawareness of troublesome information can be beneficial. However, it may lead to negative consequences in the long run. According to Samson (2018), information

avoidance prevents people from having the knowledge that may be useful for their decision-making processes.

A recent case of information avoidance in the Brazilian political scenario took place in July 2019 when the country's president Jair Bolsonaro accused the National Institute of Space research (Inpe) of overestimating deforestation in the Amazon. Bolsonaro declared that data "doesn't relate to the reality" after Inpe released satellite statistics showing that over 1000 km^4 of the forest had been cut down in the first two weeks of July, which means a rise of 68% in comparison with the whole month of July the year before. The institute sustained the data's accuracy in 95%, so did other scientific Brazilian institutions (BBC, 2019). Despite that, President Bolsonaro dismissed Ricardo Galvão, director of the institute since 2016, an engineer, physicist with more than 40 years of experience as a professor and scientist. After his dismissal, Galvão was named one of the ten most influential people in science in 2019 by the English journal *Nature*.

Information avoidance has proven to be a frequent practice in the current government. As of July 13, a year after firing the head of INPE, Minister Marcos Pontes (Ministry of science and technology) dismissed Lubia Vinhas from her position as general coordinator of Earth Observation at the same institute. The researcher was responsible for both departments, DETER and PRODES, which are systems for monitoring deforestation in the Amazon. The dismissals' circumstances are similar: they happened shortly after INPE released alarming data on forest destruction, which displeased the federal government. By voiding and denying scientific information, Bolsonaro's administration intends to circumvent criticism by Brazilian and foreign investors and businesspeople against its environmental policy (ClimaInfo Intitute, July 14, 2020).

According to Queiroz-Stein, the country is experiencing 'exceptional times' in which science has often been overlooked in decision-making processes:

> Although the energy sector has very consolidated bureaucracies, as is the case with Petrobras, MME, ANP, at the same time, they are always somewhat obscure when it comes to decision
> making. Questions remain: where does the influence come from? What is the level of autonomy of these agencies? (Interview with author, July 2020).

Larissa Araujo Rodrigues agrees and stresses that there is an exceptionally large gap between career professionals who work with energy and the positions indicated by the executive to work in the sector. According to her, the technicians who work in agencies such as ANP, ANEEL, and EPE are very competent. These people who make careers in this field are responsible for research and technical notes and do their best, so that information with a good quality reaches the hands of the people who make the final decision, which in this case is the CNPE, an executive council formed by ministers who have no technical knowledge but do have the decision-making power. She states:

> the big agreements are signed at the end within the executive. Decisions are not made merely based on technical criteria at ministerial level. At that level, large entrepreneurs influence decisions. Sometimes a technical study can even be the basis for a political decision. If it is the case, it is even better, but often technical information is ignored (interview with author, July 2020).

Brazil has built a good reputation for the use of renewable energy. Data from the Brazilian electricity matrix show that hydroelectric energy (61.0%) is the most used, followed by wind energy (8.7%) and biomass (8.5%) (ANEEL/Absolar, 2019). However, when looking at the Brazilian

energy mix as a whole – including the transport sector[82]– the use of fossil fuels is greater than renewable sources, 53,9% and 46,1% respectively (MME, 2020). A quick Google search shows that data on the electricity matrix is more plentiful than that on the energy mix. Often charts named *Brazilian Energy Mix* show data on electricity mix. As a result, the percentage related to hydropower use appears more frequently than the ones on the use of fossil fuels. This evidence is remarkable but not necessarily a sign of information avoidance. However, it could lead to misleading conclusions.

Another piece of information that is worth looking at is the use of biomass in Brazil. SIGA data show that biomass use as an energy source in Brazil does not directly contribute to the Brazilian energy grid. In fact, biomass energy is generated by the company's plants for their own consumption, which, in turn, do not use (totally or partially) the energy from the national grid. From 573 plants listed on SIGA, none has the status of public service providers for electricity generation (PS)[83]. In the electricity matrix charts, biomass appears as the third most used energy in Brazil. However, this source does not inject energy into the grid. By generating their energy from biomass, companies spare energy from the grid and other sources. Nevertheless, biomass does not contribute directly to the Brazilian electricity grid.

Every ten-year planning released by the MME – that guides the policies in the energy sector – shows that Brazil's energy supply grows with concern to the criteria of sustainability, reliability, and efficiency. For example, in the planning for the electricity sector, it is well defined how the electrical matrix will be composed in 10 years. Water, wind, and solar sources are well represented in the planning. According to Sandro Yamamoto, his colleagues and himself at ABEEólica participate in the

[82] Data from the National Agency of Petroleum, Natural Gas and Biofuels (2019) show that ethanol's contribution rate to the country's transport fuel market in 2018 was 18,9% against 76,7% of fossil-based fuel and a small share of 4,4% of biodiesel.

[83] See chart Brazilian biomass power generation capacity on the section Biomass, 4.3 *supra*.

debate that the matrix should be diversified and sustainable. However, he states: "When it comes to the real energy supply, we note that the amount of energy generated does not match with the planning" (interview with the author, July 2018). This discrepancy happens because the installed plants do not deliver the amount of energy corresponding to their initial generation potential. Old plants lose their yield over the years due to a series of factors. In the case of hydroelectric plants, not only the machinery ages but the reservoir no longer stores the same amount of water as at the beginning because of the diversified use of water, siltation, or both. The planning is done according to the plants' initial generating capacity. As this capacity is no longer real, the demand resulted in not being met as expected. As a result, thermoelectric plants are used to supply the energy deficit, which, in turn, results in more expensive bills –paid by consumers– and more polluting energy, says Yamamoto. This scenario demonstrates that the correct information about the real generation capacity is unknown, either due to information avoidance or simply due to poor management in the sector. Either way, this misinformation results in the initial planning not being conducted, which, in turn, affects the percentage of clean and sustainable energy injected into the Brazilian energy grid.

Brazil has good facilities and qualified professionals for research and development on energy. However, universities and research institutes are occasionally consulted and often ignored, especially when the data provided is not aligned with the political interests of decision makers (Ferraço, 2016). In recent years there has been a decrease in investments in the R&D sector (Neri, 2021), and as never before in the history of the country, scientific information was avoided during the government of President Jair Bolsonaro (Roque, 2020; ClimaInfo Intitute, 2020). To meet the commitments made with the international community on climate change mitigation, Brazil needs to increase investment in science. In addition to this, it is necessary to align research progress and the decision-making process. Only then can effective climate policies be implemented.

5.2.4 Delusion of competence

Behavioural economics theory defines delusion of competence as the deficiency in reflexive acknowledgement regarding one's own capability to make decisions or to function in order to fulfil requirements. Also known as the Dunning-Kruger effect, it suggests that low skilled people are overconfident about their cognitive ability to perform well, whereas highly skilled individuals are more careful when estimating their own skills.

In the Brazilian political realm, especially in recent years, actors often found themselves in circumstances which behavioural economists would call "behaviour deviation and cognitive limitations." A recent example of it happened in a meeting with diplomats of the Secretariat for National Sovereignty and Citizenship Affairs in August 2019, the then Minister of Foreign Affairs Ernesto Araujo[84] – in a clear case of illusion of competence in addition to information avoidance – made the following statement: "I do not believe in global warming. See, I went to Rome in May when I experienced a severe cold wave. This shows how the theories of global warming are wrong." The journalist and cartoonist Mauricio Ricardo Quirino commented on the chancellor's speech:

> he is a person absolutely incapable for the position he occupies and that illustrates the Dunning-Kruger effect, which is when a person tends to believe that he (idiot) is right and who is right is stupid. One tends to be convinced that is smarter than others (2019, 07: 30).

According to Quirino, a diplomat should not comment on a subject about which he has no in-depth knowledge. The scientific community considers

[84] In 2018, when the then-elected President Jair Bolsonaro appointed Ernesto Araujo to the post of minister of foreign affairs, both retired and on duty diplomats published a manifest stating that the president's candidate was unprepared to assume the post of chancellor minister: "we were led to make this statement given the gravity, not to mention the ridiculousness, of some of the nominee's manifestations, which deeply embarrass us, when they do not offend Brazil itself" (Brasil de Fato, 2018).

his argument to be a common mistake as it confuses weather with climate. The fact that it is more or less cold in a given location at any given time does not refute the existence of global warming, which has already been proven globally through a complex computational study of temperature averages around the world and for long periods.

Another recent case that questions the competence of the current Brazilian government in the energy sector was the blackout in the State of Amapá. Journalist Bob Fernandes (2020) comments: "the blackouts of Amapá illuminate the abyssal incompetence of President Bolsonaro to manage the government" (2020, 01:08). On November 03, 2020, the state of Amapá in the extreme north of Brazil suffered a blackout that lasted 22 days. The blackout occurred due to heavy rain and an explosion followed by a fire that damaged the three local generators. The lack of energy affected thirteen of the sixteen municipalities in the State of Amapá, generating many demonstrations, chaos, lack of water, increased violence. LMTE[85] (Macapá Power Transmission Lines), the company responsible for the distribution of energy in the State, when requested by MME to restore energy, affirmed that it did not have the personnel and equipment necessary to restore the system. It culminated in the state company Norte Energia having the responsibility to solve the problem. Amapá's electrical system has always been supported by hydroelectric energy from the Tucurui dam. However, the solution found was less sustainable. Fuel-powered thermoelectric generators have been provided until the problem is definitively solved. In this regard, Bob Fernandes says that the crisis in the distribution of energy in Amapá exposes not only the mismanagement of the current government but also the problems of the neoliberal policy that is being practised in the country. He warns that the privatisation of state-owned companies is not

[85] The company was created by the Spanish energy company Isolux Corsan. In 2008 LMTE won the auction for power transmission in the Brazilian state of Amapá for 30 years. Since then, Isolux started to face financial problems and, in 2016, entered a judicial reorganisation process. At the end of 2019, the company sold the LMTE concessionaire to the Gemini Energy company, which is controlled by Starboard Asset, a fund specialised in managing holdings in financial difficulties.

necessarily the salvation that many believe. He also states that Gemini Energy, the company that bought LMTE from Isolux Corsan, has the same short-term profit philosophy as the investment fund Starboard Asset. "There are those who call these funds vulture funds. They certainly know why they give such a necrophagous name to an investment fund" (2020, 04:18). This occurrence in Manaus is only one of many examples of lack of ability to manage public policies for the Brazilian energy sector.

Brazil has not been able to stand out in the solar energy international scenario, which is the case of India, Turkey, and China, for example. According to Samira Sana Fernandes de Sousa, Brazil had many research projects before China took the lead as a photovoltaic panel supplier. "The projects did not take off because there was no government investment, and then China comes with its prices, and nobody can compete." Rodrigo Sauaia (2018), Absolar's executive president, states that unlike Brazil, China has a central government that is very efficient in making decisions. "When they decide on a policy, its implementation is fast" (para. 8). India developed a national plan for the promotion of solar energy that includes large plants but also the generation in industries, public buildings, commercial facilities, and residences. In the Indian plan, the energy generated is contracted by the government but through the market. The goal is to reduce its dependence on coal and fossil fuels. As most of the Indian population still does not have access to electricity, solar energy systems with batteries are being installed all over the country. Turkey has followed a similar path and implemented a policy of financial incentives to generate solar energy. Today, five years later, Turkey is the sixth European country in the generation of solar energy. Brazil has adopted the compensation system[86] which tends to be less attractive as it does not offer direct financial incentives.

[86] The Electric Energy compensation system came into force in 2012 when ANEEL enacted its Normative Resolution 482 with the rules for distributed generation. This system works as an "exchange" between the private generator's energy and the energy from the grid. All surplus energy generated by the consumer's solar system is injected into the network and granted to the distributor as a loan. This energy then goes back to the consumer in the form of energy credits –with a 60-month usage validity– which are used to compensate for that

Brazil was expected to become self-sufficient in fossil fuels with the discovery of pre-salt[87] oil reserves in 2006, since Petrobras has the technology to explore the discovered oil fields and also to transform crude oil into gasoline and gas Natural. In July 2019, philosopher Paulo Ghiraldelli Junior (2019b) and politician Ciro Gomes (2019) warned about the illogical policy of exporting oil and importing oil derivatives. Both question the neoliberal policy of the current government that intends to privatise Petrobras refineries. According to them, Petrobras' facilities are paralysed and contributing to the increase in unemployment in the country. They argue that Brazil has a large amount of oil in its territory and is able to extract it and that national refineries can process Brazilian oil and produce its derivatives to sufficiently meet the country's demand. The lack of logic in this policy is that it stops the refineries' activities and then import gasoline and natural gas from the USA. In addition to increasing public spending because of the exchange rate difference between the dollar and the *real*, this policy makes the Brazilian population pay a high price for oil products. According to Sindipetro (2019), this policy is an attempt to dismantle Petrobras to privatise it in the future. Eight refineries are in the planning for the first two phases of privatisation, and it puts thousands of jobs in the oil sector at risk.

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. Rufin (2012), draws attention to the preparation to host the

energy that was consumed from the grid in times when the local system generates no or little energy, as occurs at night or on cloudy and rainy days (ANEEL, 2012).

[87] It is important to note that the pre-salt exploration does not contribute to meeting the goals of the Brazilian iNDC. However, the import and export policy practised by the current government mentioned above, which allows the exploitation of Brazilian petroleum by foreign companies, not only contributes to the global increase in GHG emissions but still prevents Brazil from producing its own wealth, which could be used to help the country invest in its own energy transition in the future.

World Cup in 2014 when government-owned airport operator, Infraero, showed "inability" to make the necessary improvement to the country's airport in time for the event. To solve the problem, the then leftist and pro-state-centred government of Dilma Rousseff was forced to turn to the private sector for assistance. Concerning the energy sector, Rufin states that great investment is needed to expand energy sources in Brazil, which will only be possible through a partnership with the national and international private sectors. "Despite the huge size and capacity of the Brazilian state, it lacks the technology, organisational capacity, and capital to simultaneously accomplish all that is needed" (Rufin, 2012: 597).

The energy sector is a network industry and therefore requires high initial investments with long-term returns. As such, it is an unattractive activity for the private sector. Consequently, the State becomes the main provider and regulator of this service and therefore, has the duty to provide a structure in itself or mechanisms that promote this attractiveness. In order to execute both tasks, it is necessary to have an adequate physical structure, a support mechanism aimed at the private sector and a careful budget planning. In developing countries, such as Brazil, it is common to have a difference between the financial resources planned by the government for a given project and the effective value of the investments made. This variation in values occurs due to governmental and bureaucratic inefficiencies that generate contractual instability. Poorly prepared bid notices, for example, are subject to multiple interpretations since they do not clearly address important points of the contract. Another key factor is the delay in payments to contractors and suppliers. As they know from experience that a delay will occur, they incorporate in advance extra value for payment delay to their job, good and service. These are some of the reasons that make projects more expensive. In addition, lobbies and favour exchange practices between political parties and companies are also often the cause of diversion of investments (IPEA, 2010).

These events not far in the past are only a few examples of the delusion of competence phenomenon. Unfortunately, they are not characteristics of the current government only. Lack of competence in Brazilian governance goes far back in Brazilian history. Alcoforado (2019) states that Brazil still faces problems –such as corruption, cronyism, and highly influential lobby– that started in the colonial period. The attempts to overcome these problems were weakened by the overthrow of the worker's party in 2016; the repression of social movements; and policy choices against the working class. "The inability of the Brazilian government and political institutions in general, to offer effective responses to overcome the economic crisis that has affected the nation since 2014 and its powerlessness to repress widespread corruption has contributed to the advance of fascism as a solution to the country's problems" (p. 1). According to the author, to overcome the economic crisis that affects Brazil, it is necessary to replace the neoliberal economic model that benefits the market and has been devastating the Brazilian economy since 1990, especially after 2014. In the energy sector, the privatisation of the oil and gas refining, distribution, and transportation sectors within Petrobras benefits international capital. With the privatisation of oil fields originally under Petrobras' control, foreign production increased from 8.3% in 2011 to 26.5% in 2018 (Gauto, 2019). With the auctions planned by the current government, this growth tends to continue.

According to Doria[88] (2020), "during the military dictatorship, there was not only corruption but also incompetence. The military likes to say that it has administrative competence, but they do not." According to the journalist, at the end of the military government in 1985, they surrendered the country, submerged in a deep economic crisis, with a hyperinflation that democracy took almost ten years to resolve. At that time, the level of children in primary school age outside school was so high that it took 15 years for democracy to restore this deficit. After 35

88 Journalist, writer, and speaker. Columnist for CBN Broadcasting and newspapers *O Globo* and *Estadão*.

years, those memories have been lost, and the military is back within Bolsonaro's government. While the country is suffering from the greatest pandemic of the century, a general office as minister of healthy is unable even to spend the Ministry's annual budget. Doria calls attention to the importance of a good team. He argues that the previous PSDB and PT governments had a dedicated team. Party people who understood health, education, environment, et cetera. "Bolsonaro was elected without having a party or team. He turned to the military, and they do not know how to govern" (2020: 08:00). According to him, it seems that

> the objective of Bolsonaro's government is the destruction of everything that the New Republic created.[89] Today, the Ministry of Education is the opposite of what it was over the past 35 years; the minister of the environment works to dismantle environmental regulation. This government does not care about the environment when the world's leading capitalists are overly concerned about the environment. This government does not believe in science in a world where economics, science and technology are completely intertwined (2020: 02: 16).

The writer Henry Bugalho associates the election of President Bolsonaro with the mob rule concept[90] which occurs "when the angry mob chooses an authoritarian ruler who is not the most competent, but the one who screams the most. That is exactly what happened in Bolsonaro's election. The population voted for a highly incompetent, populist politician who does not know how to govern" (2020b, 01: 28) The author draws attention to the fact that Bolsonaro had an unimpressive career as a deputy of the parliament's passive clergy for almost 30 years without any executive experience in public management. Despite that, he has been

89 The New Republic is a term used to describe the period in Brazilian government and politics that started on March 15, 1985, when civilians recover the federal government's leading after twenty-one years of military dictatorship.

90 Also known as ochlocracy, the term illustrates the mob's rule or mass and its power that influence governments. "In the absence of democracy and the engagement of its actors, ochlocracy mimics itself in a willingness to appear as a democracy. Relying on demagogues and dictators, ochlocracy contains *democratic illusion*, where the *ochlos* (scum) is trying to show up like *demos* (political people)" (Hasanović, 2012: 61).

elevated to the post of president of the country. Once elected, Bolsonaro had to form his cabinet, which would be very technical as he had promised during his campaign. Bugalho relates Bolsonaro's cabinet formation to the Dunning-Kruger effect:

> Because he is incompetent, he is unable to recognise the incompetence of those he chooses to assist him in the government. He has no capacity to recognise what is technical and what is not. The result is a government of technically incompetent ministers who are faithful to the president's ideology, as is the case with of the Ministry of Education, Ministry of Economic, the Ministry of the Environment, the Ministry of Foreign Affairs, et cetera (Bugalho, 2020b, 07:20).

Furthermore, Bugalho states that this practice is not exclusive to the current administration as public positions in Brazilian governments have always been used as political plum.

Guilherme Moraes de Lima[91] states that Brazil would have good conditions to implement policies in the direction of an energy transition using off-grid solutions. However, he believes that there is no social and political organisation for this to happen. "It is not possible to dissociate this (energy transition) from the rest of the public policy discussion that begins with the state's model and the type of government that we want to have." While in other countries, the State has a role of a regulator in defence of the people's interests, this does not seem to be the case in Brazil.

> The state's role in Brazil is an unresolved thing, and this influences political discussion in general. In health, education and in all other sectors, the state must be a leader, a regulator, an executor. In Brazil, most politicians' discussions are usually at a very shallow level (Guilherme Moraes de Lima, interview with author, July 2018).

[91] In interview with author, July 2018.

According to de Lima, this superficial level is related to the unpreparedness of politicians in general. About President Jair Bolsonaro, he says: "I do not think he has the capacity to raise the discussion around the implementation of appropriate public policies for the country. This is not an optimistic statement, but it is not possible to pretend that things are different." Not only President Bolsonaro has been the target of much criticism, but also his cabinet members. Guilherme de Queiroz-Stein condemns the lack of skills of Bolsonaro's choices to form his administration: "the incompetence of the current government is saving us: imagine if they were competent in implementing their senseless ideas" (interview with author, July 2020).

The statements presented above may lead one to think that they do not represent the Brazilian conjuncture. It is true that the Bolsonaro government is exceptionally ideological, following the global trend of the growth of far-right ideologies (Guimarães and Oliveira e Silva, 2021). It is also true that public policies aligned with the international effort to mitigate climate change were not a priority in his government (Roque, 2020). However, as mentioned in prior sections, the elevated level of clientelism, crony capitalism and a general capture of the state -which are historically recurrent phenomena- lead elected politicians to appoint allies, campaign supporters and their friends to positions and jobs they are often unqualified for (Haber, 2002; Aligica & Tarko, 2014; Salter, 2014). In this way, decision-making processes end up contaminated by incompetent actors who are incapable of making the most efficient choices. As long as this is the profile of decision makers within energy governance in Brazil, effective policies for the fulfilment of international agreements will be delayed.

5.2.5 Overconfidence effect and planning fallacy

Overconfidence effect and planning fallacy are also concepts applied within behavioural economics to understand individuals' actions. Overconfidence effect reflects individuals' overestimation of their own

performance capability. Frequently the planning fallacy phenomenon falls within the scope of the overconfidence effect. Overconfident actors, when planning, could commit planning fallacy as they underestimate the time necessary to finish a project. In the Brazilian energy sector, these phenomena have occurred too frequently throughout history. The nuclear agreement between Brazil and the then East German is an example in which overconfidence occurred. The collaboration between the two countries aimed to project Brazil as a civilian nuclear power, expanding its geopolitical leadership in Latin America. However, "the deal included megalomaniac aspects, many controversial technical details and a financial cost unbearable for a developing country" (Wrobel, 2017: 286). Diplomats negotiated the project under the military government's command while the scientific community was marginalised from the decision-making process. The transfer of technology was one of the characteristics of the agreement. However, the Brazilian government did not give training and education the necessary priority. This neglect has contributed to the failure of the agreement. "To create a capacity to absorb the German know-how and build up an autonomous industrial basis required a much greater investment in education and training" (Wrobel, 2017: 287). According to Carpes (2006), the scientific community at the time and members of CNEN complained about the lack of continued strategic planning. Originally, the Brazil-Germany agreement would be responsible for eight nuclear reactors, but only two were accomplished. Nowadays, the energy expansion planning in Brazil is still unreliable. According to Samira Sana Fernandes de Sousa, national energy planning includes the construction of new nuclear thermoelectric plants.[92] However, so far, only two are in operation (Angra 1 and 2), and one is under construction (Angra 3). "It is not because it is in the planning that it will necessarily be carried out" she said. Another example of a failure in planning, according to Sousa, is the case of the interconnection of Roraima's electrical system to the

[92] In 2015 the then Minister of Mines and Energy, Eduardo Braga, predicted 12 new plants by 2050, four of them by 2030 and eight in the next 20 years. For details, go to https://www.ipen.br/portal_por/portal/interna.php?secaoid=40&campo=2387

national power grid. “This interconnection should have already been made. In the State of Roraima, energy generation is almost completely by diesel, except for a portion generated by interconnection with Venezuela” (interview with author, august 2018).

Problems concerning strategic planning appears to be recurrent in the Brazilian energy sector. Guilherme Soares de Lima states:

> In the case of energy policy or the lack of it, there is a previous problem: the definition of which development model is intended for Brazil. An economic development model that determines first what is the role of the state in implementing this model. This planning is not clearly defined starting from investments or what role Brazil wants to play in the generation of renewable energy, such as wind and solar sources. Brazil has a privileged condition to not only be a generator but to be a developer of technology for renewable energy generation. It is necessary to define strategies in advance, which does not happen (interview with author, July 2018).

In her interview for this research, Samira Sana Fernandes de Sousa (2018) reported: “one thing that many of my co-workers and I think is that the sector lacks a more strategic vision. The ruler in office only wants to think about his term in office; he does not think about a strategy to the country, where the country wants to arrive in 2050 or 2100, for instance”. The professor of the civil engineering and environment department at the Pontifical Catholic University (PUC / Rio de Janeiro), Tácio Mauro Pereira de Campos, ratifies[93] the testimony of Sousa: “from the energy policy point of view, the country is in disarray, and the prospect is terrible. This is mainly due to the lack of planning and investment”. The professor points out that he is well aware of the performance of Light, a private company responsible for the energy supply in the state of Rio de Janeiro. According to him, the company’s geotechnical sector has only three trained employees to ensure the smooth operation of the seven plants that generate the energy

[93] Interview with author, July 2018.

distributed by Light. He argues: “there are no personnel, no incentive, everything is abandoned”. The lack of personnel to attend any emergency that may occur, as was the previously mentioned case in the State of Amapá, is also a problem in other states of the federation.

Another planning failure example occurred regarding the introduction of wind energy to the Brazilian national grid. The first wind energy fields contracted in the auctions of 2009, 2010 and 2011 were almost ready in 2012. However, there were no transmission lines to connect the wind parks to the SIN (National Interconnected Systems). According to the Brazilian legislation, the auctions for energy generation and transmission lines projects are held separately. This feature of the law generates a mismatch in the schedule if the government does not pay attention to this issue. At that time, while the wind farms were being built, the project for the extension of the transmission lines was not planned to be completed simultaneously. When the government contracts energy projects, the structure for connecting these projects to the national grid must be expanded at the same time. Usually, the term to build such a structure is, on average, two years. However, the wind farms contacted at those auctions were built in areas far from the demand centres, and therefore, the transmission lines would take longer to be built. This scenario caused an inevitable delay. According to Jannuzzi (2014), this caused monetary loss for the state and the population because the companies awarded a contract for the energy generation to the central grid must be paid anyway. Eventually, you pay for energy that is not being used (as cited in Ferraço, 2016: 66).

Planning has also proved inadequate for the effective development of alternative energy sources. Lorenzi and Andrade (2019), in their study on second-generation ethanol (E2G) in Brazil, demonstrate that planning anticipated a result that had no real conditions to be achieved. In 2011, the National Bank for Economic and Social Development and the Financing Agency for Studies and Projects launched the BNDES-Finep Plan to Support Innovation in the Energy and Sugar-Chemical Sectors

(Paiss in Portuguese). The authors state that this programme has enabled companies such as GranBio, Raízen, Odebrecht Agroindustrial and the Centre for Technology Canavieira (CTC) to start their research programmes for the development and production of the E2G on a commercial scale. According to them "the forecast was that E2G would become a significant part of the national energy matrix and revolutionise the sugar-energy sector" (p. 3). The expectation was for the construction of more than ten E2G plants to start operating by 2025. However, eight years after the launch of Paiss, only one pilot plant (CTC) and two commercial-scale plants were built (GranBio and Raízen). In addition, none of the production goals or expectations was met. Several problems caused major shutdowns at these plants, resulting in production below 10% of capacity in all years of operation. In 2015, Granbio projected to produce 9.84 million litres of E2G. However, it is estimated that only 1 million litters were produced due to problems with the pre-treatment phase. Raízen also faced the same problems, which led the company to cancel its initial plan to build seven more plants after E2G production costs reached the first generation ethanol level. "The first expectations and promises for E2G in Brazil were precipitated, promising too much too soon (...) current expectations point out that E2G should become a paradigm in the sugar-energy sector from 2030" (Lorenzi & Andrade, 2019: 14).

To strengthen the biodiesel industry, the Brazilian government launched in 2004 the National Programme of Production and Use of Biodiesel (PNPB in Portuguese). The initiative was intended to foster sustainable production and use of biodiesel and at the same time promote social inclusion. For that reason, the north and northeast regions should be prioritised as well as family farming and castor beans as raw material. Despite this policy, most biodiesel production in the early years of PNPB (2005-2009) occurred in the centre-west and south regions, and soybeans from large producers were predominant. According to Stattman (2019), the government associated PNPB implementation difficulties with the biodiesel companies' lack of support, experience, and

agricultural knowledge with assisting family farmers. On the other hand, family farmers had small-arable land and limited knowledge of biodiesel crops. Once more, planning and implementation appear to be in discordance. The PNPB have been conducted without the required conditions, which led to its poor results.

These are some energy policy examples that were unsuccessful due to the lack of efficient planning. Throughout history, Brazilian governance has been the subject of public criticism concerning policy planning and implementation. Moreover, it seems that this problem will not be solved in the coming years. Ricardo Baitelo shows great concern about the newest National Energy Plan (PNE2050) published on October 09, 2020. He argues that the plan limits the expected growth of wind and solar energy sources, conditioning it to the expansion of thermoelectric plants. Also, the plan gives the impression of opposing the expansion of hydroelectric plants in the Amazon with the expansion of the nuclear energy programme. In other words, if it is not allowed to expand hydroelectric plants in the Amazon region, the solution will be to introduce 20 Gigawatt of thermoelectric. Furthermore, Baitelo states his distrust in the PNE2050:

> the government does not want to commit to planning. EPE, under the current government's command, is responsible for the research and the planning. The plan has been rewritten several times. It was supposed to be released in 2014, but it was cancelled. In 2016 the calculations were already completely obsolete. Then they launched fragmentary reports with some premises. And now they launched this plan in a hurry. It seems an incomplete plan (interview with author, July 2020).

Overconfidence and planning fallacy are common occurrences across all administration sectors in Brazil. Concerning Brazil's commitment to the international climate agreements, their incidence in the energy sector needs to be addressed.

Changes in the energy sector are imperative to curb global warming. The entire world is looking for solutions for a transition from fossil fuels to renewable energy sources. Brazil is also in this search and has already taken steps in this direction. However, Brazil faces serious obstacles to implementing energy policies conducive to this transition. Power relations strategies such as monopolistic practices, clientelism and the political capture, as shown in the first part of this last chapter, effect decision-making processes shaping the policies for the sector. These power relations strategies exert a force contrary to changes needed since their influence on policymakers is extraordinarily strong. The State is responsible for directing the energy sector. Its capture limits innovation and development towards an energy transition in the country. In addition to these power relations strategies, the behaviour of actors involved in decision-making processes is of great significance when choosing one or other policy. The aspects of behavioural economics theory: hyperbolic discounting and loss aversion; endowment effect and status quo bias; information avoidance; delusion of competence, overconfidence, and planning fallacy, explain how individual behaviour affect policy choices. The second part of this final chapter shows evidence of how these behaviours interfere with the decision-making processes. Both, power relations strategies and policy makers' behaviour are major obstacles that the Brazilian energy sector needs to overcome in order to implement an energy transition and thus be able to comply with international agreements to mitigate climate change.