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Public Policy and Governance Narratives of Distributed Energy Resources in Brazil

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Abstract: Based on the policy document analysis method and a conceptual framework derived from Science and Technology Studies, this paper analyses the construction of institutionally legitimated forms of discursive limitation of energy governance in Brazil. The paper analyzes a subset of selected vital policy documents produced by regulatory bodies such as the National Energy Agency (ANEEL) and the Energy Research Office (EPE). As an insight for further research on the governance of energy policy, the paper's contribution to the debate is to bring to the fore the relevance of recasting the whole process of regulation of distributed energy in terms of an attempt to build a narrative of control over socio-technical innovation with the potential to democratize access to and use of energy services. This policy narrative's unspoken goal is to retain control of the Brazilian energy transition at the central level.

Keywords: Distributed Energy Resources; governance; socio-technical conflicts; Brazil; energy transition.

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Introduction

This paper analyses the emerging institutional narratives relative an evolving socio-technical configuration of energy in Brazil, Distributed Energy Resources (DER)[1]. In a key document the Brazilian Energy Research Bureau (*Empresa de Pesquisa Energética*) describes the increasing presence of Distributed Energy Resources (DER):

> "The recent growth, together with the characteristic of DER, indicates that the diffusion of these technologies presents a high disruptive potential, capable of profoundly transforming the electric systems that today are predominantly operated with larger generators and managed centrally " (EPE - MME, 2018, p.2)

The paper is structured as follows. After the present introduction, the methodological section ('material and methods') justifies the adoption of policy document analysis (PDA) as the main approach, guided by STS's mainstream contributions (section 3). Furthermore, the section frames PDA within the broader research context of reference to contextualize the reader and further clarify the paper's scope. As anticipated, the third section presents the conceptual underpinning of the research from the interdisciplinary area of Science and Technology Studies (STS). From STS, this work takes particular advantage of elaborations that tackle the issue of energy policy and public services, respectively; namely, Jasanoff and Kim (2013a), and Jaglin (JAGLIN, 2014) whose extensive work has emphasized the centrality of socio-technical configurations for the analysis of energy policy, as well as the embedded cultural and narrative dimensions. Section four contextualizes DER both within the actual debates on environmental and, by and large, systemic global challenges such as climate change, and illustrates for a broader non-specialized audience the relevance of DER for a transition towards a more widely spread adoption of renewable resources. The economic aspects of this transition, in particular those related to the institutional and technical regulation of the system (the issues of tariffs and meters for instance) are not only relevant, but of course absolutely central; however, as they fall beyond the scope of the paper they will not be tackled in the present work, which substantially adopts a sociological lens to analyze the transformation of the energy landscape, once again, from a specific angle and with no pretension to be exhaustive but rather in order to open a greater space to these kind of discussions. The fifth section ('The Governance of Energy Landscapes') presents a contextualization of energy governance and sets the scene for a debate on the governance of DER and its implications in terms of a potential agenda of research where the democratization of access to innovative technology in renewable energy generation might be further discussed. The sixth section discusses the findings of the PDA method, and the seventh and final section presents some concluding remarks on the implications of what previously discussed.

1 - "Distributed Energy Resources (DER) are defined as electricity generation and/or storage technologies located within the boundaries of the area of a particular distribution utility, usually connected to consumer units (behind-the-meter)" (EPE - MME, 2018, p. 2).

Materials and methods

The results presented in this paper are the outcome of the application of the method of PDA. The category documents refers not just to written material, but also to information that serves the purpose of recording social facts, events or even representations, using either cultural codes or literary conventions (ATKINSON; COFFEY, 2010). Besides their typology, documents are means of communication and, as such, they are neither "neutral" nor "transparent". On the contrary, they often serve a purpose and, willingly or not, create a particular version of reality. Like many other forms of discourse or narrative, documents are powerful tools (FOUCAULT, 2008), and may play a significant role in supporting forms of authority and legitimacy, while also opening or closing possibilities and opportunities (HALLIDAY; MARTIN, 1993). In this paper, we argue that this is also the case when analyzing energy transition policies.

The research questions of the paper concerns how DER are conceptualized at the institutional level in Brazil. This, in turn, leads to a second-order question: Which is the techno-scientific narrative the institutions at the forefront of energy governance in Brazil are adopting to incorporate DER into the policy arena. All throughout our analysis we shall try to highlight the implications the answers to these questions may have for the shaping of future socio-technical configurations in Brazil from a STS perspective. In other words, this research piece belongs to the tradition that considers policy discourse as important as laws, decrees, and more material dimensions of policy implementation, as it is elaborated in greater depth in the next section dedicated to the presentation of the conceptual framework of reference.

When analyzing texts produced by influential mass media or governmental agencies, as it is the case for energy policy documents, the literature suggests that policymakers have played a hegemonic role in the social construction of aspects or dimensions in need of intervention as well as in orientating the direction of the latter. When presenting the debate on climate change mitigation and adaptation, as well as on energy transitions (DE FREITAS; DIAS, 2017; HULME; TOYE, 2006), the media often reproduce official discourses (especially governments') and rarely analyze policy alternatives or the impact of a more diverse portfolio of given political options.

For a section on methods, defining the attribute that defines the class of documents under analysis is an essential step to be undertaken. In the present piece of research that attribute is policy. A policy is a statement of intent and, as such, it is closely linked to the action of planning for action. Policy documents are texts[2] of different classes (PRIOR, 2004). They can be printed or virtually available texts or, as it increasingly happens nowadays, visual and multimedia materials. Policy documents also have genres, such as White Papers, Acts of Parliament or, as in this paper, Planning Documents. Based on Prior (2004), the analysis concentrated on two main dimensions, the content of the document and its use and function, as well as two categories, namely the document as resource and

2 - We use this term as in linguistics and semiotics, meaning an object with a complex relationship between meaning, sense, and signifier, not in the sense of a hand-written or printed material.

the document as topic (table 1).

Table 1 - The Categorization of Content, Use & Function of Documents

Focus of Research	Document as Resource	Document as topic
Content	What is 'in' the document Content analysis Thematic analysis	How documents come into being Discourse analysis
Use & Function	How documents are used as a purpose to achieve a purpose Genre analysis	How documents function and impact in and impact on schemes of social interaction and social organization Actor Network Theory

Source: Prior, 2004.

The materials presented were selected based on the following rationale: to reveal the political and socio-technical conflicts underlying what the institutional literature presents as being mainly technical problems, particularly in the field of urban energy planning. Accordingly, the paper first selects a topic that scores high within the contemporary policy debate on both the governance of energy and energy transition in Brazil, that is, the introduction of DER in the national interconnected grid. Second, it identifies a small but critical set of policy documents representing the political and socio-technical conflicts that the paper selected as its main analytical entry point to the debate. These are the National Energy Balance 2018 from the Ministry of Mines and Energy (EPE-MME, 2018); the document on Distributed Energy Resources: Impacts on Energy Planning by the Energy Research Office of the same Ministry and the document from the National Agency for the Regulation of Electric Energy (EPE - MME, 2018), national regulation 482, initially promulgated in 2012 to regulate DER (ANEEL, 2018a).

STS and Socio-Technical Configurations: A Conceptual Framework to Understand Institutional Energy Narratives

A central tenet of STS concerns the relevance attributed to the processes by which modern societies shape their epistemic and normative understanding of the world. The notion of co-production is central here, understood not so much in the empirical sense of a bottom-up participatory process shaping policy, but rather as a dynamic whereas policy and science are assembled on the basis of material, political, symbolic and cultural forces (LATOUR, 2005). In the perspective of STS the social is a result rather than a premise and its threads (such as policy or politics, for instance) are comparable to an assemblage. Political power and the control it always exerts on the meaning of things and social change

shapes what is commonly considered as truth (JASANOFF, 2004). Therefore, adopting a STS perspective implies reading the attempt to define DER as disruptive as an exercise of power on the meaning and implications of the on-going energy transformation. To further clarify these conceptual premises, we resort to Jasanoff's work, for whom, in a world marked by a strong dynamic of standardization linked to science and technology, pluralism is essential from an epistemic and normative perspective. Here, to leave it crystal clear, we are proposing that the whole attempt to steer the significance of DER as something disruptive, hence dangerous and to be controlled, is also an attempt to tame and "domesticate" the debate. This paper adheres to Sheila Jasanoff's concern about pluralism in techno-scientific debates. and to Sylvie Jaglin's preoccupation with the way socio-technical configurations of public services are driven by top-down decision-making processes. It is based on these two main contributions that the paper sails out to chart a so far little explored route, namely, debating the socio-technical imaginaries of energy in Brazil.

Imaginaries, in Jasanoff and Kim's definition, is a term defining "collectively imagined forms of social life and social order reflected in the design and fulfilment of nation specific scientific and/or technological projects" and "(t)hough never strictly determinative of policy outcomes, sociotechnical imaginaries are powerful cultural resources that help shape social responses to innovation (JASANOFF; KIM, 2013a, p. 190). For instance, the well-known feature of the American sociotechnical imagination is that technology's benefits are seen as unbounded while risks are framed as limited and manageable.

Another key question posed by Jasanoff to those concerned with the study of power is the following: whether it does make sense any longer to assume that scientific knowledge comes into being independent of political thought and action (JASANOFF, 2004). Science and technological change are not power wise neutral when one looks at them through a STS lens. Ordering knowledge means ordering society and, with Jasanoff this paper builds on the tradition of STS in this line of analysis (KREIMER, 2007; SALTELLI; GIAMPIETRO, 2017). The latter also to say that all new socio-technical objects, such as climate change, endangered species, Covid-19 or the energy transition need the scientific community to produce a renewed effort aimed at further our understanding of how knowledge is taken up in societies. Who rules knowledge and its factual production processes rules science and technological change (i.e. producing documents that steer political decisions, influence what engineers and planners think of a specific innovation). Furthermore, ruling knowledge also affects individual and collective identities (I am in favour or against the use of solar panel or wind mills, I am willing to pay or not to further an ecologically sustainable transformation), hence legitimating as socially accepted the forms of knowledge produced by experts (JASANOFF, 2004).

On a complementary perspective, in her work on the delivery of urban services in cities of the global south, Jaglin points out how institutional critical assessment of these services has tended to emphasize the deficiencies in terms of rationed supply, unreliable provision, unequal access, difficulties in delivering a universal service and sustaining viable operators. This is in our view a very useful contribution to understand the positioning of

the Brazilian energy institutions on DER as a technocratic critique of innovation aimed at delegitimizing new understandings, innovative usages and practices that disrupt the order of a system widely recognized within the national Brazilian literature as politically concentrated (BERMANN, 2007), technically and institutionally centralized (PUERTO; SAUER, 2015) and systematically serving the interests of multinational capital (WERNER, 2019).

With Jaglin, we support the position defending a greater plurality in the delivery of vital services such as water, sanitation, and energy. This is even more urgent nowadays since energy is not only a matter of having access to electricity anymore, but to a set of energy services such as computing and connectivity that have become central for human capabilities.

Says Jaglin: "I propose a radical change in perspective, taking as a starting point not the failure of urban services and the institutions responsible for their delivery, but the vitality and multiplicity of actual delivery systems which, despite policy announcements and reforms, and notwithstanding imported models, survive and contribute to the functioning of cities. The fact is that in southern cities, services are not delivered within the framework of a uniform and integrated system, but in different ways and through a range of provisions" (JAGLIN, 2014, p. 434).

According to the same Jaglin, in cities of the global south drinking water can be supplied via a network of private taps or standpipes, by pumps or by water carriers; as much as energy can be accessed through connection to an electricity grid, by rechargeable batteries, or through a subscription service, by generator or by gas bottle. Each method of delivering an essential service is considered here as a socio-technical dispositive involving actors within a given socio-technical configuration made of tools, knowledge and values; in other words a combination of heterogeneous factors required for the production of collective goods that institutions like the Ministry of Energy and Mines and its techno-scientific bureau, EPE, need continuously influencing and reshaping in the attempt to exert the governance of an otherwise slippery reality made of undisciplined market actors and subjects, such as the consumers-producers of our paper (the prosumers) seeking solutions that maximize their well-being and/or economic utility.

This is also why we consider that even a few documents form central institutions, if they are potentially politically transforming and try to domesticate the on-going energy transformation, are relevant. When we listen to president Bolsonaro denying the importance of the Covid-19 pandemic, we do not need to bring in a scientific paper 25 to 100 interviews released by the president himself to assess the gravity of that single intervention for the future of health care policy in the country. Due to its political impact, one interview is more than enough. That is what counts and constitutes, among other factors, the essence of qualitative research, the powerful relevance of unicity and meaning.

Contextualizing Distributed Energy Resources

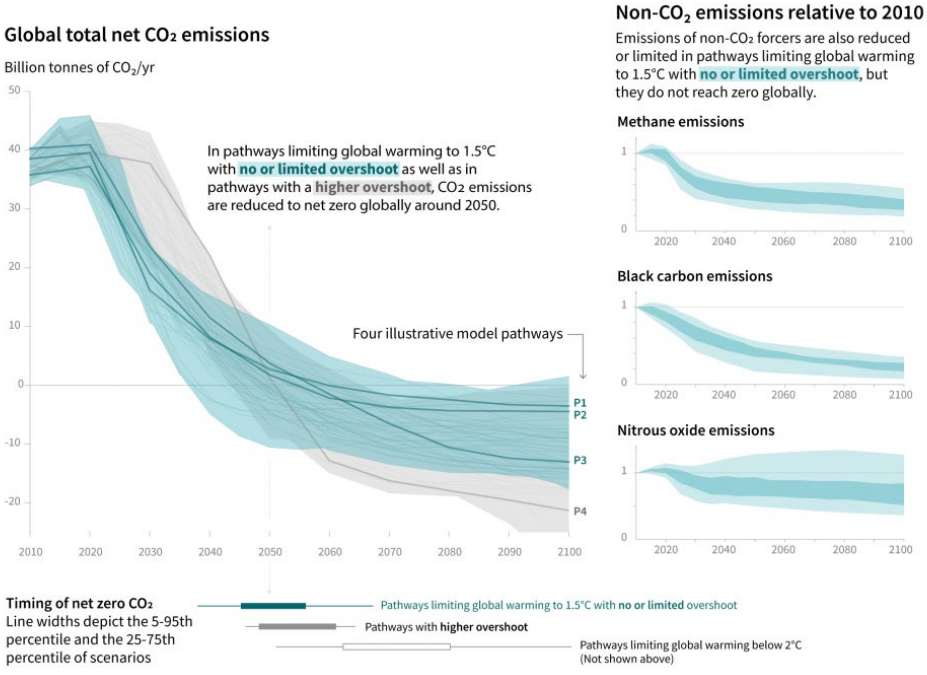
In this section we introduce the relevance of DER versus key contemporary debates related to global environmental change (GEC) such as climate change adaptation and mitigation. The planet, as well as our societies are urged for new, more plural, and just socio-technical configurations to overcome anthropogenically driven GEC; therefore, this section also sets the relevance of our paper for a broader debate that resonates both in the international and national fora.

At least in theory, there is a technically straightforward solution to the problems of air pollution, global warming and energy insecurity; this is to electrify or provide direct heath for everything; obtain the electricity and heath from only wind, water and solar power, store energy and reduce energy use (JACOBSON, 2021). Actual centralized models of energy generation come with great insecurities due to a) the dwindling reserves of fossil fuels resources, a fact which comes with the imperative need of using more complex and environmentally damaging extractive technologies that, in turn, also impact the availability of water and land with indirect negative consequences on food security and b) the reliance on centralized power and oil refineries that affect the resilience of urban and rural areas, with often incalculable impacts and risk exposure especially in urban areas due to the concentration of people and resources (JACOBSON, 2021).

According to the IPCC, "CO_2 emissions reductions that limit global warming to 1.5°C with no or limited overshoot can involve different portfolios of mitigation measures, striking different balances between lowering energy and resource intensity, rate of decarbonization, and the reliance on carbon dioxide removal" (IPCC, 2018, p.12). Nonetheless, it is clear that the importance and potential feasibility of an energy transition driven by the reduction in emission should be given priority inasmuch as the"(m)odelled pathways that limit global warming to 1.5°C with no or limited overshoot involve deep reductions in emissions of methane and black carbon (35% or more of both by 2050 relative to 2010 levels). These pathways (see figure 1) also reduce most of the cooling aerosols, which partially offsets mitigation effects for two to three decades" (…) and (…) Limiting global warming requires limiting the total cumulative global anthropogenic emissions of CO_2 since the pre-industrial period, that is, staying within a total carbon budget"; a conclusion put forward by the IPCC with a high confidence mark (IPCC, 2018, p.12).

Figure 1 - Global Emissions Pathway Characteristics

General characteristics of the evolution of anthropogenic net emissions of CO_2, and total emissions of methane, black carbon, and nitrous oxide in model pathways that limit global warming to 1.5°C with no or limited overshoot. Net emissions are defined as anthropogenic emissions reduced by anthropogenic removals. Reductions in net emissions can be achieved through different portfolios of mitigation measures illustrated in Figure SPM.3b.



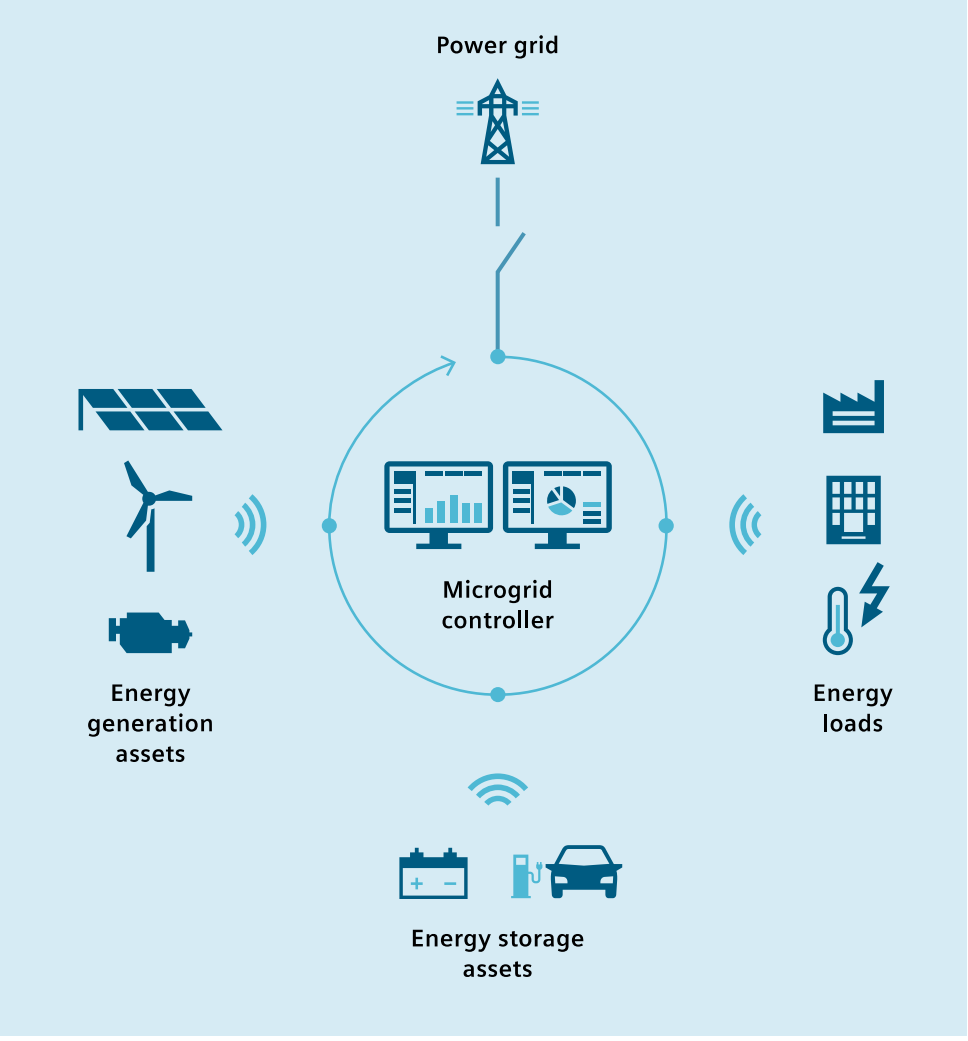
Source: IPCC, 2018.

Access to DER facilities is still restricted to those who have the resources for an initial investment (HEFFRON; MCCAULEY, 2014; SCHIRMER SOARES, 2019). Therefore debating DER it is not only an issue of technical energy transition but substantially a matter of fairness and equity too, as at least significant financial costs and trade-offs are eventually involved in their installation, maintenance and use (CASTAÑO-ROSA; SOLÍS-GUZMÁN; MARRERO, 2020; JENKINS et al., 2021; KUMAR et al., 2019).

As per figure 2 by SIEMENS, a key operational feature of DER are microgrids, which - in turn - are small energy systems, containing energy sources while being operable by consumers. In a microgrid production and consumption of energy are largely balanced. Balancing is ensured by a microgrid controller, which also untaps potentials for innovative business models. Microgrids may be connected to the power grid or operate off-grid and can cover several forms of energy (i.e., power, heat cooling). Despite being essentially a microcosm of a conventional energy system, microgrids have the potential to reduce the overall CO_2 content of the energy supply. Therefore, they are central in the

debate on the relationship between energy transition and climate change mitigation. The social and institutional capacity to keep these microgrids going and working efficiently depends on a complex system of revenue to finance specialized technical maintenance; something almost unthinkable in a favela without legal energy connections as the many that are found in Brazilian cities.

Figure 2 - Schematic Representation of a Microgrid



Source: SIEMENS, 2020, p.8.

When looked at from a broader perspective, this debate fits within the discussion on what has been termed as global energy futures. The latter will be shaped by the rate and form of investment in infrastructure over the next few years, since we are witness-

ing the beginning of an energy revolution, as we learn from mainstream scholarship (AITKEN, 2003; MILLER et al., 2015; SOVACOOL, 2016). Nonetheless, a complementary literature largely produced from or on the Global South has discussed how the transformation is not only to be seen in the commonly held sense of a transition from fossil fuels to renewables, but more in terms of its implications for and within capitalist, highly centralized and – in terms of political power - highly concentrated energy regimes (BERMANN, 2007; LUQUE-AYALA, 2014).

According to the National Energy Agency (ANEEL), the estimate in terms of final consumption from residential use indicate that DER accounts for some 60% of total consumption, after the installation of solar photovoltaic microgenerators, once compared to consumption without microgeneration technology (ANEEL, 2017). This is because most consumption occurs at times when there is no generation. like during nighttime for lack of insulation. ANEEL also estimates up to 55% the percentage of the energy injected into the network through micro-generators compared to the total exchanged; the latter as generation exceeds consumption in the period between 8 am and 4 pm. As far as commercial use is concerned, the same above cited document estimates that the final consumption is close to 27% after the installation of solar photovoltaic microgeneration when compared to the consumption without that modality (ANEEL, 2017, 2018a, 2018b).

The data on DER unveils a new socio-technical configuration in the making. Its innovative potential deploys in the possibility for households and individuals to transform their role from "consumers" to "prosumers" and the very logic of energy governance. The impacts of DER for the electricity grid, mainly from photovoltaic (PV) sources, are no longer negligible for the public-private mixed system of energy governance of the country due to impact DER have on the costs that make up the energy tariff. The elements taken into account to elaborate the electricity tariff in Brazil (composed of the total costs of operation and maintenance of the electric grid divided equally among all consumers) does not consider the unpredictability of insulation (ROSAS LUNA et al., 2019), insofar, as all renewable sources of energy it presents an intermittent and stochastic character (NOTTON et al., 2018).

Governing Distributed Energy Resources

As pointed out by Fernández, "(t)ransition to fossil fuels from biomass and the continuing socio- metabolic transition will characterize a major shift in urban energy use in developing countries. Today, fully 40 per cent of the population of developing countries burns wood as their primary fuel source" (FERNÁNDEZ, 2014, p.607). The current Brazilian energy matrix is mainly the result of a reform process to reduce dependence on oil imports (PUERTO; SAUER, 2015). The Brazilian electricity system is by far the largest in Latin America and in 2019, the total installed capacity of electric power generation in Brazil (public service plants and self-producers) reached 170,118MW (MME-EPE, 2020). According to the 2020 National Energy Balance [(base year 2019) (MME-EPE, 2020)], more than 80% of the country's electricity is derived from renewable sources (83%), and particularly from large hydroelectric plants (64, 9%), a component in which

the country is the second largest producer in the world, with 389TWh, representing 9% of world production. Table 2 below illustrate the extraordinary growth of wind and solar offer as sources of energy in the Brazilian mix, providing a complementary, quantitative ground as a support to our argument.

Table 2 - Installed Capacity of Electric Power Brazil 2015-2019 (GWh).

Year	Hydro	Thermal	Wind	Solar	Nuclear	Total
2015	91,650	39,563	**7,633**	**21**	1,990	140,858
2016	96,925	41,275	**10,124**	**24**	1,990	150,338
2017	100,275	41,628	**12,283**	**935**	1,990	157,112
2018	104,139	40,523	**14,390**	**1,798**	1,990	162,840
2019	109,058	41,219	**15,378**	**2,473**	1,990	170,118
GWh variation	17,408	1,656	**7,745**	**2,452**	0	29,260
% variation	18,9	4,1	**101,4**	**11.676**	0	20,7

Source: EPE, 2020 (authors calculations).

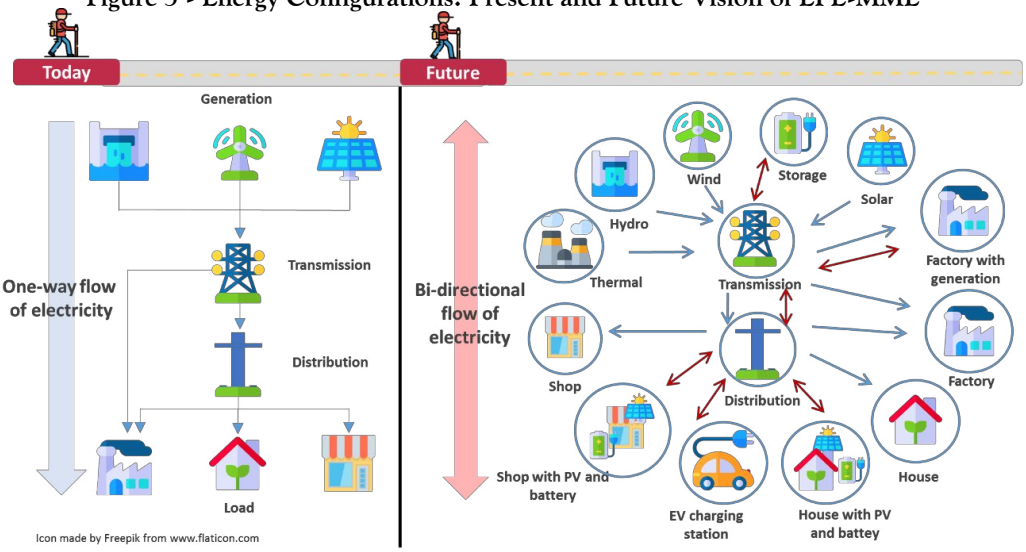
The Normative Resolution (RN) 482-2012 (updated by RN 687-2015) represents a watershed in Brazil as it reflects the interest of the State to give room to the concerns of market actors involved in the production, transmission, and distribution of energy to regulate the new modality. DER advanced considerably in terms of the spread of installations on Brazilian territory as in terms of the total installed power. Rosas Luna and colleagues conclude that "(t)he official projection of DG's growth in Brazil by 2050, prepared by EPE in 2014, is relatively modest and conservative in view of the growth potential of solar photovoltaic" (ROSAS LUNA et al., 2019, p. 489).

The latter reflects the impact DER installations are having in terms of installed power and the need for regulation felt at the institutional level. As it is especially the case for photovoltaic energy, households are accountable for the majority of installations. This peculiarity reflects two on-going processes calling already for further research. On the one hand an economic process related to the transformation of a specific market niche and, on the other hand, a broader socio-anthropological transformation whereby individuals and households become decision-making units in energy production and distribution. The latter will likely unleash a socio-technical transformation potentially leading to greater independence of those units (and the real people who make them up) in energy decisions.

Although it may appear as just another technical innovation, DER represents a politically sensible socio-technical transformation; insofar it entails several key drivers of shift in the power balance: 'the birth of the prosumer' and 'the fading of rational

planning'. This produces a counter-reaction based on the legitimating narrative of the 'homo economicus' that downplays or even bluntly ignores the implications of energy reforms and innovations in terms of social inequality and energy justice, thus prompting a 'domesticating strategy' aimed at taming and normalizing all disruptive factors. Figure 3 graphically presents the conceptualization put forward by ANEEL in 2018 at the same time of the above-mentioned discussion paper produced by EPE.

Figure 3 - Energy Configurations: Present and Future Vision of EPE-MME



Source: EPE - MME, 2018, p. 3.

1) The birth of the 'Prosumer': By choosing to install micro or mini-photovoltaic generation facilities and become a *prosumer*, individuals who formerly were consumers (and purchasers) of what others produced, transported, and eventually distributed through the electric grid starts to play a different role. Now, they actively collaborate to the production of electric energy, which is not just a technical matter, a novelty potentially relieving the cost of electricity generation and other management expenses for the country. Rather, the appropriation of DER technology by citizens is a truly political issue because these people (technically, the prosumers!) alter the power balance of economic accumulation and profit. Once empowered, they might represent a potential threat for mixed public-private configuration of powers that has been ruling energy governance in Brazil since the early nineties (PUERTO; SAUER, 2015).

2) The fading of rational planning: Within the Brazilian framework of energy regulation one of the major costs of running the electric interconnected sys-

tem on a national scale is related to the challenge of guaranteeing a constant supply in the face of a growing demand. In turn, this implies growing costs in terms of the maintenance of what fixed infrastructure is required as well as the subsidy of the whole operation on a daily basis, especially in hours when the offer exceeds the demand and, therefore, it is not met by an equal demand. In the actual energy regime (left hand side of figure 4) the system uses its embedded political regulatory power to impose on consumers the price it deems sufficient and socially acceptable in order to recover its losses and keep its revenue. Under the new scenario represented by a more open configuration (right hand side of figure 4) it emerges an issue of regulation, control, and economic behavioral discipline of the new actor (the prosumers). As the present logic of energy provision in the country is not a social but a market-based one. The problem for actors such as the Ministry of Mining and Energy, EPE and ANEEL becomes how to induce the prosumers back into a full logic of price-driven market-centered demand and offer: to tame (1), control (2) and discipline (3) become from EPE's perspective, the main challenges for the efficient introduction of DER in Brazil. They are mainly related to the electricity tariff system currently in force in the country (1 – to tame). This is because volumetric tariffs (based exclusively on kWh consumption, in the case of low voltage consumers), without time granularity and without the appropriate locational signals do not give economic signals (2 - control; and 3 - discipline) so that the diffusion of the DER is adequately valued and reverted to systemic benefits (MME-EPE, 2018, p.4).

3) Conceptualizing the 'homo oeconomicus': According to Foucault (2008) the particular notion of *homo oeconomicus* corresponds to a narrative version of the true nature of the individual as one driven by self-interest and the maximization of economic utility. The reason why this self-interested individual is a key actor in contemporary neoliberal narratives is to be found in its potential to enable a set of intertwining mechanisms and devices related to biopolitics as a form of political control. The *homo oeconomicus* operates as a mechanism to harness the force that moves its operation. The Foucauldian idea of governmentality, that is, the set of mechanisms, strategies and policies deployed to domesticate and dominate applies to the policy narrative we are analyzing here through document analysis, because it helps to understand how a narrative that transforms the complexity of people's engagement with society into an almost mono-dimensional representation, that of *homo oeconomicus*, is functional to the political goal of regulation and control pursued by the Brazilian institutions that govern energy policy. In fact, it is a representation of the individual as an agent substantially driven by self-interest (easily operationalized into the handy concept of economic utility) that allows to suppress any potential correspondence between the new emerging social subject, the prosumer, and the idea of sovereignty in the realm of energy governance. To reduce the *prosumer* to a (mere) *homo*

oeconomicus helps a centralized, substantially top-down arrangement of energy governance in Brazil to perpetuate its power. This is achieved by means of institutionalizing a metaphysical foundation (the fact that DER is an issue of administrative and economic regulation and not of rights, justice, and social entitlements). That foundation is the unquestionable truth that shall guide the legitimate exercise of politics based on an apparently politically neutral and hyper technical discourse, the one spoken through the language of engineering and economics.

4) The economic logic of governance: A substantial problem with the logic of governance of agencies such as EPE and ANEEL is that their conceptualization of the individual reduces human complexity to a narrow economic dimension, an approach derived from neoclassical economics, whereas the central notion is not that of a person but of *homo oeconomicus*, whose goal - it is normatively assumed - is to maximize the efficiency of the system through the adoption of the correct behavior. The theory of consumer choice, the theory of the firm, industrial organization, and welfare theorems all require the assumption that agents act following the scheme of individualistic rational optimization (URBINA; RUIZ-VALVERDE, 2019).

5) Taming and domesticating the disruption: Narratives, not only *about* possible, but *of* possible futures represent one of the core components of contemporary planning (ABRAM; WESZKALNYS, 2013). In the face of an ethical urge for transparency and rigor, the fact that evidence-based approaches may lead to a situation whereas scientists make excessive claims it is not a new critique and, nonetheless, the twin myths of rationality endure: "1. policy action can be predicated on the accumulation of facts and the taming of uncertainty; and 2. science has the power to provide dispassionate facts to adjudicate controversies" (SALTELLI; GIAMPIETRO, 2017, p.63). In order to legitimate on technical grounds a new regulating paradigm the ANEEL (2018b) opened a public consultation on RN No. 482 of 2012 (henceforth 482/2012), to academically back up its policy operation the agency presented some international experience with DER generation.

Discussing the governance of energy landscapes

The documental analysis of the leading institutional narratives on DER policy in Brazil has so far highlighted the prevalence of the economic and technical aspects of energy over its social dimensions. This section's objective is to contribute to illustrate the relevance of other narratives constructed on other premises that put the social dimensions of energy in the center. Energy is not only a technical issue or a traded good. It has its own life in the sense that is produced and used to transform our quality of living. Having access to energy and energy services of good quality one can rely on people to realize their own potential as human being. This social dimension of what might be defined as

the social life of energy is largely determined by the materiality of the infrastructure needed to produce, transport, and consume it and the political arrangements that shape energy policy. Those determinants are generally summarized using the term "energy landscape".

An energy landscape is a configuration of (i) materialities, such as infrastructure, smart grids and connections and (ii) social practices that tend to be recurrent and reiterative concerning those materialities, such as travelling, bathing or connecting and power relations to govern and rule the landscape and (iii) relations that exert a centripetal pressure, such as formal and informal regulatory institutions and cultural practices, all related to energy generation, distribution and consumption. As pointed out by Jaglin (2014), the socio-technical imaginary of one-size-fits-all, the heterogeneity of the demand for services and the plurality of potentially available options is reduced, as in our DER case, to almost one only option: the state decides, the market allocates, and the consumers use the services according to their capacity to pay. As in the case of both ANEEL and EPE-MME, this produces a landscape whereas the governance of energy is the domain of one or a very few top-down oriented actors.

When facing a transformation in terms of distribution and access to electricity, for example, as in the case of the progressive emergence of DER connections (as in RN 482/2012, of April 17, 2012, by ANEEL), are centrally produced imaginaries those which define the need and the obligation to comply with a set of requirements hardly attainable at the micro-social level of marginal communities or small prosumers. Brazilian consumers of electricity who could become prosumers generating their own electricity from renewable sources or that might associate within low-income communities to produce qualified forms of cogeneration and even supply of electric energy together with the possibility of generating an economic surplus to be locally redistributed are simply prevented to do so by a tight regulation.

Final considerations

The policy debate analyzed in this paper contributes to rethink the governance of energy landscapes in Brazil and recasts the whole process of regulation of distributed energy as an attempt to maintain political and socio-technical control on the strategic issue of energy transition in Brazil.

Through the analysis of the policy narratives, and using document policy analysis, the paper illustrates the twin disruptive effect represented by a) the irruption of the technological innovation represented by DER and b) the "birth" of a new subject, the prosumer. Their unplanned appearance onto the policy governance stage unveils a new type of socio-technical configuration in the making. The latter might represent an enabling factor to carve out a new role for households and individuals as active actors in

the energy transition.

Accordingly, the paper opens up a new line of research on the social dimension of energy in Brazil, conceptualizing individuals and socially organized groups not just as consumers anymore but also as empowered producers of energy. The implications of the new categorizations are potentially vast and significant for a research agenda ranging from energy economics to its policy regulation, as well as for already established discussions on social citizenship, social rights, regulations, jurisdictions and, overall, for the proposal, after Bevir (2013), of governance as a multi-jurisdictional domain.

Acronyms

ANEEL (Agência Nacional de Energia Elétrica) / (National Energy Agency)

DER (Distributed Energy Resources)

EPE (Empresa de Pesquisa Energética) / (Energy Research Office)

GD (Geração Distribuída) / (Distributed Energy Resources)

MME (Ministry of Mining and Energy)

PV (Photovoltaic)

RN (Resolução Nacional) / (National Resolution)

STS (Science and Technology Studies)

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SciELO

Narrativas de Política Pública e Governança da Energia Distribuída no Brasil

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Resumo: Com base no método de análise de documentos de política e a abordagem teoria dos Estudos da Ciência e a Tecnologia, este artigo analisa a construção de formas institucionalmente legitimadas de limitação discursiva da energia distribuída no Brasil. O artigo analisa um subconjunto de documentos centrais para a definição da política energética da energia distribuída, entre aqueles produzidos por órgãos reguladores, como a Agência Nacional de Energia Elétrica (ANEEL) e a Agência de Pesquisa Energética (EPE). Como contribuição para pesquisas futuras sobre a governança da política energética, o artigo traz à tona a relevância de reformular todo o processo de regulação da energia distribuída em termos de uma tentativa de construir uma narrativa de controle sobre as inovações técnicas com potencial para democratizar o acesso e uso dos serviços de energia. O objetivo tácito dessa narrativa política é manter o controle da transição energética brasileira no nível central.

Palavras-chave: **E**nergia distribuída; governança; conflitos sociotécnicos; Brasil; transição energética

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Andrea Lampis
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Artículo original

Resumen: Con base en el método de análisis de documentos de política y el enfoque teórico de los Estudios Sociales de la Ciencia y la Tecnología (STS por el acrónimo en inglés), este artículo analiza la construcción de formas institucionalmente legítimas de normalización discursiva de la energía distribuida en Brasil. El artículo analiza un subconjunto de documentos que se destacan como fundamentales para la definición de la política energética para de energía distribuida, incluidos aquellos elaborados por organismos reguladores como la Agencia Nacional de Energía Eléctrica (ANEEL) y la Agencia de Investigación Energética (EPE). Como contribución a la investigación futura sobre la gobernanza de la política energética, el artículo destaca la relevancia de reformular todo el proceso de regulación de la energía distribuida en términos de un intento de construir una narrativa de control sobre las innovaciones técnicas y su potencial de democratizar el acceso y el uso de los servicios energéticos. El objetivo tácito de esta narrativa política es mantener el control centralizado de la transición energética brasileña.

Palabras-clave: Energía distribuida; gobernanza; conflictos sociotécnicos; Brasil, transición energética.

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