

## The electricity policy debate in Brazil's economic epistemic community: the 1945-1964 period\*

### *O debate da política de energia elétrica na comunidade epistêmica econômica brasileira: o período 1945-1964*

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**Resumo:** Este artigo analisa a evolução do pensamento sobre a política de energia elétrica na comunidade epistêmica econômica brasileira, de 1945 a 1964, enfocando o tema do planejamento da expansão da oferta de energia elétrica, a questão do IED *vs.* propriedade estatal e a relação entre o crescimento da oferta de energia elétrica e a inflação. Nesse período, o debate econômico envolveu dois principais grandes campos concorrentes, um de cunho monetarista e ortodoxo e outro desenvolvimentista e estruturalista. Essa divisão binária também esteve presente no debate sobre a política de eletricidade. Argumenta-se que, embora tenha havido certo grau de convergência entre os dois campos na questão do planejamento, nos outros dois temas centrais a divergência foi a tônica. Não obstante, apesar da marcada divisão em relação ao tema da política de eletricidade, as condições políticas e econômicas favoreceram a experimentação de políticas com uma postura pragmática que combinava características de estados e mercados – e, portanto, as visões dos dois campos –, mesmo após o golpe de 1964, quando o debate havia sido quase totalmente neutralizado.

**Palavras-chave:** Política elétrica. Monetarismo. Estruturalismo. Inflação. Planejamento.

**Abstract:** This article scrutinizes the evolution of Brazilian thought on electricity policy from 1945 to 1964, focusing on the topics of planning electricity supply expansion, the FDI *vs.* state ownership conundrum, and the relationship between electricity supply growth and inflation. The economic debate comprised two main concurring camps during this period, one monetarist/orthodox and another developmentalist/structuralist. This bipartisan division was also present in the electricity policy debate. It is argued that while there was some degree of

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convergence between the two camps regarding the issue of planning, in the other two core topics of the debate, divergence was the tonic. However, despite the marked division in the economic epistemic community regarding electricity policy, political and economic conditions favored policy experimentation with a pragmatic policy stance that combined features from states and markets - which combined ideas from both camps - even after the 1964 coup, when the debate had been mostly neutralized.

**Keywords:** Electricity policy. Monetarism. Structuralism. Inflation. Planning.

**JEL:** B29. B59. F52. L94. N56. Q48.

## Introduction

Despite an early interest of foreign electrical equipment manufacturers and foreign electric power utilities in Brazil's electricity market, in the period spanning from 1900 to 1940, the country did not manage to improve its energy supply substantially (Baer; McDonald, 1998; Topik, 1987). In 1945, although Brazil had the fourth largest hydraulic reserve globally, it had exploited only 6% of that potential (Paiva, 1945). From 1935 to 1945, Brazil's hydroelectric capacity grew only 26%, while consumption grew 70% (Vieira, 2007).

The electricity supply problem became more critical in the late 1940s and early 1950s. By then, Brazil's electricity demand was growing rapidly because of soaring urbanization and the ongoing improvement of the country's real income in the backdrop of a speeding import substitution process (Lima, 1976b; Rau Jr., 1962). From 1945 to 1946, electricity consumption in the state of São Paulo and the Federal district increased by 80%. In the latter, it increased sevenfold from 1934 to 1951 (Loeb, 1957). In the 1951-1954 period, the gap between faltering supply and burgeoning demand created a severe electricity shortage that threatened to stall the country's growth pace.

In this context, the electricity issue gained traction in the public debate, centering on the planning of supply expansion, which was mostly commanded by foreign-controlled electric power utilities, and the ownership question. In the 1930s, there was already an awareness that the country's economic development depended on its ability to exploit its natural resources base,<sup>1</sup> that electrification was fundamental, and that these efforts had to be conducted by endogenous forces. For example, Diniz (1940) writes that:

[...] steam engines no longer represent the sole base of industrial dynamics; hydraulic and electric motors have replaced them. [...] Where hydraulic energy is available, hydroelectric power plants are more advantageous. [...] The modern trend is to electrify the economy. Therefore, our industrial future depends on our ability to harness our hydroelectric resources, which are abundant in Brazil. (Diniz, 1940, p. 131-132)

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<sup>1</sup> See Schlesinger (1954).

That debate was also carried out within Brazil's early economic epistemic community. In its early years of formation, roughly from 1945 to 1964, that community was divided into two main groups. While the first is labeled developmentalist or structuralist and has Celso Furtado as its leading representative, the second is either orthodox or monetarist, and Eugenio Gudin and Roberto Campos are central figures (Leff, 1968). Another classification, by Lima (1976a), juxtaposes "gudinians" and developmentalist authors. While the first group includes Gudin himself, Otávio Bulhões, Mario Henrique Simonsen, and also Campos, the second comprises Roberto Simonsen, Romulo de Almeida, Jesus Soares Pereira, Celso Furtado, Ignacio Rangel and João Paulo Almeida Magalhães.

One important characteristic of this debate is its relative polarization, which contrasts with the relative liberal hegemony of Brazil's early 20<sup>th</sup> century economic thought (Mantega; Moraes, 1978). Some fundamental divergences concern the interpretations of the causes of inflation and possible policy measures, balance of payments problems, the views regarding FDI, and the degree and scope of government intervention (Kohli, 2004; Leff, 1968). However, despite the diverging views, the two groups agree that the state should commit – at least to some degree – to planning techniques that steer economic development. The former group defends that the state's role should restrain itself to "intervention by direction" when the state only guides development through indicative planning. The latter group espouses "intervention by absorption", when the state directly conducts the development process, either through the foundation of state companies or by implementing a very stringent ISI plan (Magalhães, 1965). Barbosa (2015, p. 314) writes that many of these authors, which to a considerable extent, occupied key positions in the state bureaucracy, were "organic intellectuals from the state" for they sought to steer economic development by acting "upon society, planting the seeds of an effective democracy, which would not emerge spontaneously". With few exceptions, these were state bureaucrats and economists who proactively pursued institutional learning and policy experimentation toward achieving the ultimate goal of economic development.

Focusing on electricity and energy policy, this article argues that relative convergence existed concerning the need for planning and coordinating sectoral expansion due to the strategic importance of electricity and the high degree of underdevelopment of the energy sector in Brazil. However, the convergence was of a limited dimension, as the two camps had diverging

views on the relationship between investments in the energy sector and inflation, the participation of foreign capital, and the creation of a state company in the field.

## 1. The issue of planning

In the 1930s, because of sectoral difficulties that confronted the electricity sector, the government increased its drive to invest financial resources in novel electric power generation capacity and also to modify the institutional rules of the game (Bulhões, 1965). In 1933, the government created the Water Service, and Decree-Law 23501 extinguished the golden clause, establishing that contractual reviews should respect the principle of cost of service in tariff determination (Schlesinger, 1954; Souza, 1936; Vieira, 2007). Furthermore, the 1934 Constitution, through article 119, established that the industrial use of mines, mineral deposits, and water sites would depend on federal authorization and that concessions would only be granted to Brazilian companies or those established in Brazil (Abreu, 1999; Ianni, 1971). Also in 1934, the Code of Waters implemented the criteria of historical cost for tariff fixation at a maximum 10% profit rate (CMBEU, 1954; Melo; Oliveira; Araújo, 1994). The 1937 Constitution further restricted FDI in water power, mining, public utilities, and banking (Abreu, 1999; Spiegel, 1955).

After more nationalist legislation had been passed, a next step was Vargas' 1945 decree authorizing CHESF's creation, the first Brazilian state electric company, to which the 1950 Salte Plan allocated 13% of its resources (Calabi et al., 1983; Melo, 2016). CHESF's creation set a new course regarding the state's role in infrastructure provision because of a larger willingness to allocate public finance to such projects and their larger scale (Ferraz, 1981, in Hage; Manduca; Canesin, 2020). The private sector, particularly Brazilian entrepreneurs, did not have the finance or expertise to formulate plans and conduct more complex projects, which required the state to step in (Spiegel, 1955).

The passing of nationalist legislation in the field of electricity and CHESF's creation occurred in the context of a public debate that favored such policy solutions. Simonsen's triumph over the liberal economist Gudin in the 1944-1945 "Gudin *vs.* Simonsen planning controversy" was emblematic of a growing willingness to plan Brazil's industrialization within the country's public bureaucracy and economic elite. On one pole of the debate,

Simonsen defends the need for rapidly increasing national income to fight poverty and overcome economic backwardness (Simonsen, [1945] 2010b; Sola, 1998). He deems the state's intervention inevitable due to the scarcity of the country's factors of production and because the private domestic sector lacks the capital, technology, and managerial capacity. Therefore, economic development requires modern planning techniques and policy instruments (Ianni, 1971; Lima, 1976a). For Simonsen, economic planning is a technique to anchor private entrepreneurs' expectations, creating a secure investment environment (Simonsen, [1945] 2010a).

On the other pole, although Gudin was a liberal economist, he did not eschew planning by the state *per se*.<sup>2</sup> Planning does not necessarily entail a disadvantage for the private sector because it can balance expectations and encourage private investment (Gudin, 1953, in Magalhães, 1965). Thus, Gudin welcomes a liberal state that selectively creates the rules of the game, corrects market failures, and sets incentives with the foremost aim of increasing productivity. However, it does not engage directly in productive activities (Gudin, [1945] 2010, p. 62-83). According to Velloso (2010, p. 15), "Gudin's plan was [to increase] productivity".

Hence, one key divergence between Simonsen and Gudin in the planning controversy is about whether the state's intervention should take place as "intervention by direction," when the state solely guides development, or as "intervention by absorption" when it directly conducts this process (Magalhães, 1965, p. 20). Favoring the first one, Gudin opposes the proliferation of state-owned companies in the country, associated with intervention by absorption (Magalhães, 1965). The second model is more suitable for Simonsen because there is a pent-up demand for state investments in basic industries not adequately covered by private initiative (Bielschowsky, 1988).

As such, Simonsen's and Gudin's views on the planning of the electricity sector's development mostly reflect their respective policy worldviews. For Simonsen, because Brazil lacks capital and lags in the exploration of natural resources, the fast acceleration of development requires economic steering by the state. In particular, he identifies an insufficient reach of private sector investments in sectors such as ethanol production, petroleum E&P, and

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<sup>2</sup> There are, however, other interpretations, particularly what regards Gudin's later views on planning. Regarding Gudin (1952), Bielschowsky (2001, p. 100) argues that in his analysis of underdeveloped countries Gudin "excluded planning". Similarly, Chieza and Gaspari (2014, p. 19) write that "Gudin defended that Brazil did not need a plan, but agricultural productivity and a free market".

electric power generation. He thus recommends the very conscious planning of these sectors' expansion. Nevertheless, this effort should be coordinated with the private sector (Simonsen, [1945] 2010b).

In his turn, Gudin believes that although Brazil has been blessed by its natural resource base, it lags in the factor accumulation of labor, energy, capital, and technical capacity, which he regards as fundamental preconditions for economic growth and development to happen (Gudin, [1945] 2010). To overcome this problem, he espouses an open doors policy for the immigration of foreign labor and FDI, markedly in the hydroelectric power sector. Furthermore, bureaucratic rules should be simplified to attract these investments (Gudin, [1945] 2010). Gudin concedes that it is the state's exclusive function to plan the expansion of sectors such as health and education, monetary emission, credit, public finances, the tax regime, public works, and public utility services such as hydroelectricity. For the author, the state may even protect nascent industries, which should be granted cheap money or even subsidies. However, it should not directly participate in industrial enterprises as an investor (Gudin, [1945] 2010). Ventures in sectors such as transportation, communications, and hydroelectricity should be conducted by concession or delegation (Gudin, [1945] 2010).

An alternative interpretation is that Gudin saw public investments in the electricity sector as a second-best policy. According to Mello (2011), when the idea to build a hydroelectric dam in the São Francisco river at Paulo Afonso appeared, it was starkly opposed by Gudin, who insisted that the federal government's sparse resources should be concentrated on ventures in the South-Eastern region, where there was already a large pent-up demand for electricity. A large hydroelectric dam in a remote region would likely be uneconomic. Nevertheless, Gudin (1963) changed his views on the pertinence of building the Paulo Afonso dam twenty years later when he finally acknowledged the dam's economic viability and wider social benefits.

Non-nationalist developmentalist authors like Glycon de Paiva and Lucas Lopes (Bielschowsky, also espouse the view that the sector's expansion must be planned. Paiva (1945) points out that Brazil has to undertake a massive planning effort to steer wide-scale electrification, which considers that the country's predominant indigenous energy source is hydropower. Because the country has financial restrictions, the costly exploitation of this energy source's potential must be carefully planned. He suggests that the finance for Brazil's large-scale electrification plan could come from agricultural exports'

internal savings. Although the additional electric power from the planning effort would supply growing industrial demand, the author does not recommend full or “hypertrophied” industrialization that demands a large degree of state intervention, as it would be rendered useless because of international competition. Instead, the country’s industrialization pace should be carefully planned to maintain agriculture’s potential to export and create the funds necessary for its massive electrification undertaking (Paiva, 1945).

Lopes, one of the Masterminds of the 1950 Minas Gerais Electrification Plan and CEMIG’s first president, holds a similar view. The plan was formulated to ensure the production and distribution of energy at low costs to promote the state’s industrialization (Siqueira, 2001; Eakin, 2001). He calls upon the state’s “directive power” and “catalytic action” to map and establish the government’s general development plans (Lopes, 1955b, p. 25; Lopes, 2006, p. 78). Lopes highlights the importance of defining so-called “electro-economic zones” or “areas of industrial possibility” upon which the planners’ efforts should be concentrated. These are economic activities in which an increased electricity supply attracts other investments because of its strong backward and forward linkage generating potential (Lopes, 1955a, p. 219-229; Lopes, 2006, p. 87). However, state intervention should not be an end in itself. The state’s role should be that of “an incentive manipulator” and not that of “a controller of decisions”. The state should focus on sponsoring pioneering ventures and not function as “an absorbing Leviathan” that hinders the private sector’s flourishing (Lopes, 1955a, p. 301; Lopes, 2006, p. 116).

As CEMIG’s first president, where Lopes revealed himself as an “exceptional public entrepreneur”, he appeared to apply his theoretical principles thoroughly. In that position, he set out to “construct and unify the electric power grid” and “pursued a policy of expanding power generation ahead of demand to attract new industry that would then create additional demand”. Eventually, CEMIG’S installed capacity and distribution network “became one of the most important stimuli to industrial expansion in [...] Minas Gerais” (Eakin, 2001, p. 117).

It remains to be seen how Campos addressed the issue of planning in the electricity sector and how his views influenced the Brazil-U.S. Joint Commission’s and the Goal’s Plan work. For Campos, who starts from a more developmentalist perspective – but later in his career distances himself from that standpoint –, planning in a broad sense is politically neutral, for it can be used to reinforce private initiative’s strength by indicating overall growth

targets and giving incentives for entrepreneurial action (Campos, 1969). The state's role should be thus concentrated in the planning phase and the political coordination of the developmental process (Souza, 1999). He also favors public policies that promote appropriate market functioning (Ekerman, 1989).

Campos's analysis of planning in the electricity sector is attached to his views on so-called "strangling points", a topic also extensively discussed by Roberto Pinto de Sousa (Campos, 1963; Sousa, 1958). In that framework, a balanced economic growth path requires inputs from infrastructural services, such as transportation and energy, and superstructure activities – like agriculture and industries – to be supplied in proportionate amounts (Campos, 1963). Infrastructural services such as the electricity sector provide external economies to other industries, notably the higher-added activities from the manufacturing sector (Levy, 1962; Sousa, 1958). If sufficiently stimulated, they will become "germination points" because of their tremendous ability to stimulate private industrial investments. Conversely, the lack of an essential production input like energy generates a bottleneck or a strangling point (Campos, 1963; Levy, 1962). He concedes that a sectional planning effort may be oriented to these sectors, such that these gravely undercapitalized sectors do not become strangling points (Campos, 1963).

Because of the slow build-up of capacity in the context of rising electricity demand, the electricity sector is one of the two most serious strangling points in Brazil's economy, alongside transportation. The system is overloaded and operates with a very high load factor, thus causing frequent blackouts (Campos, 1963). In the context of a post-war investment boom, strangling points in infrastructural sectors such as electricity aggravate inflationary pressures (Sousa, 1953). The consequence is low overall economic productivity growth and a growing gap between marginal social and private marginal products (Campos, 1994). The existence of such strangling points also diminishes the economic multiplier's strength (Sousa, 1958). The low tariff level imposed by the historical cost criterion restricts profitability and chases investors away from the electricity sector, thus leading to strangling points (Oliveira, 1957).

As a solution to this problem, "sectional planning" comes into the fold, which Campos prefers to a more comprehensive effort of planning the entire economy's expansion. First, state investments should be concentrated on a few chosen priority sectors to avoid the deleterious effects of long-term state intervention (Campos, 1963). The state's scarce resources should preferably

be invested in sectors with the potential to maximize overall productivity and attract private initiative. They should be concentrated in regions with some ongoing promising economic activity to prevent resource dispersion and the weakening of multiplying effects (Campos, 1952). In that effort, the state uses its “telescopic facility” to map the investment opportunities and resources available, thus facilitating the choice among competing objectives (Campos, 1952, p. 16).

Sousa takes a similar stance and proposes that removing strangling points requires planning to select the most suitable among concurring projects. Preference should be attached to projects with a large potential to generate external economies and attract private initiative (Sousa, 1953). In the electricity sector, he recommends reforming the legislation that had previously shielded away FDI in the electricity sector due to infrequent tariff readjustments and the maximum profit rate’s curtailment. Accordingly, the state should limit its role as a scheduler of investments and coordinator of the investment pace (Sousa, 1953).

Within that theoretical framework and ideological mindset, the Joint Commission submitted its final report in 1953, proposing investments that amounted to US\$387.3 million (Baer, 2014). The Commission favored the participation of FDI in national development, which it regarded as fundamental, alongside a proactive export-promotion policy, to overcome the country’s balance of payments problems (Klüger, 2014; Sola, 1998). According to Ianni (1971), the policy view that it was fundamental to create institutional conditions for the free entry and exit of FDI had been clearly formulated in all the Commission’s recommendations and analyses. Thus, in its fund destination policy, the Commission foresaw that loans should be handed out to preserve foreign utilities’ market power and investment capacity (Bastos, 2006). However, it also acknowledged that these loans should be made available to public corporations in ventures where private utilities showed no interest, demonstrating a considerable degree of pragmatism (Skidmore, 1967).

## **2. FDI and the Eletrobras debate**

Although the Joint Commission had a relevant role in securing financial resources for the electricity sector, the Brazilian government also played an important role in that undertaking, in a period that frankly favored planned solutions to economic and developmental problems. When Vargas took office

for the second time (1951–1954), the prospect of supply collapse hovered the electricity sector. By the end of the 1950s, Brazil would face a severe electric power supply crisis with economic consequences of unpredictable proportions. Although Brazil had a large hydroelectric potential, the system's evolution occurred in leaps and bounds. Moreover, each project was conceived individually, and the electric power system lacked interconnection projects. The problem thus entered the federal government's public policy agenda (Melo; Oliveira; Araújo, 1994). Shortly after taking office, Vargas created an Economic Assessorship under the coordination of Rômulo Almeida, which had economists like Ignácio Rangel and Jesus Soares Pereira in its ranks (Barbosa, 2015). The group was tasked with elaborating strategic projects for the energy sector, including a coal plan, a petroleum and electricity program, and a nuclear energy policy (Almeida, 1982).

According to Jaguaribe (1968), although the Assessorship lacked a strong administrative apparatus, it managed to produce a consistent plan to steer economic development. In the electricity sector, it recommended four projects. The first was the Electrification Fund, which would be financed by the Single Tax on electricity, created by the 1946 Constitution, to provide a steady flow of financial resources to the electricity sector (Melo; Oliveira; Araújo, 1994). The second aimed to regulate the Single Tax resources' destination, establishing that they would also be directed to newly created state-owned companies at the federal and state levels. The third project proposed implementing 10-year state electrification plans, providing for the interconnection of the regional systems and the mobilization of financial resources. Finally, the fourth proposed the creation of a federal electricity holding, Eletrobras, which would manage the Electrification Fund and conduct the 10-year plans' execution (Abranches, 1977).

While the first two bills were rapidly approved in 1954, the two bills that created the National Electricity Plan and Eletrobras were still subjected to difficult political sewing (Melo; Oliveira; Araújo, 1994). The government's determination to push through a more definitive statist solution to the electricity sector's questions was much smaller than in the petroleum sector. The former had a long-established institutional framework and an entrenched productive structure, with a strong foreign capital presence, very much in contrast to the latter (Contreras, 1994). Decision-making in the electricity sector was also postponed by lobbying,<sup>3</sup> which was supported by public in-

<sup>3</sup> According to Campos (1994), the claim that the Eletrobras project was postponed due to the political

stitutions such as the National Economics Council (CNE), a Congress and Executive Consultative Body that frankly supported a private electricity industry solution, and even by liberal economists themselves, such as Gudin.<sup>4</sup>

Amidst a heated public debate, the Assessorship's proposals were at the root of a considerable disagreement between Vargas' Assessorship and orthodox economists involved with the Mixed Commission and the CNE.<sup>5</sup> The discussions between their respective representatives about the federal government's degree of intervention in the electricity sector and the question of FDI were among the most heated ones in the policy debate within Brazil's early economic epistemic community (Lima, 1984; Loureiro, 1997; Silva, 2018).<sup>6</sup>

The orthodox camp's diagnosis is that in the early 1950s, the most significant hindrance to expanding electric power capacity was the financial constraint faced by private utilities. It is argued that the 10% maximum profit rate allowed by the 1934 Water code discourages investments in new generation capacity due to the much higher profit rates that can be obtained in other industries (CMBEU, 1954; Loeb, 1957; Pereira, 1975). Moreover, the problem has worsened because tariffs were not increased with inflation. From 1947 to 1954, while electric power tariffs in the Federal District had increased less than 40%, wholesale prices increased around 170% (Loeb, 1957).

In 1952 the CNE presented a document called "Organization of Services and Guidelines for the Development of Electrification in the Country", which based foreign electric utilities' lobbying activities. That document proposed introducing monetary correction of the companies' investments and a minimum guaranteed profit rate of 10%, obtainable even if efficiency gains were not achieved (Pereira, 1956). The Mixed Commission also pleaded for legislation reform to alter the criteria of service remuneration and the institution of more frequent tariff readjustments (CMBEU, 1954). The Mixed

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pressure of foreign utilities (AMFORP and Light) did not proceed. These companies lacked popular support and did not have the political strength to carry out this kind of lobbying activity.

<sup>4</sup> From the 1930s to the early 1960s Gudin acted in different positions for CPFL (Companhia Paulista de Força e Luz) a subsidiary from AMFORP, primary as an intermediary between the company and the Brazilian government (Scalercio; Almeida, 2017).

<sup>5</sup> For example, the CNE shared the "gudinian" view that Brazil should not accelerate public investments' growth rate (Magalhães, 1965).

<sup>6</sup> At the same time, it has been argued that Vargas's administration was relatively pragmatic regarding its choice of economic instruments. Skidmore (1967), for example, describes Vargas' method as "dialectic", as he compensated moderate measures with nationalist initiatives, with the foremost goal of achieving economic development. See also Bastos (2005).

Commission recommended devising regulations that facilitated private utilities' role as public services providers and also decentralizing the industry's management (CMBEU, 1954; Silva, 2018).

Economists closely aligned with the CNE and the Mixed Commissions' worldviews, such as Gudín, Bulhões, and Campos, see openness to foreign competition and the facilitation of FDI as key solutions to the electricity sector's problems. For Gudín, economic nationalism prevents the country from harnessing valuable FDI, which is fundamental for the electricity sector's development because of its high capital requirements (Gudín, 1965). Campos defends that the sector's problems should preferably be dealt with by market logic. Therefore, the most critical and crucial policy decision is implementing "tariff realism", as infrequent tariff readjustments – below inflation – discourage private investment in this sector (Campos, 1994; Silva, 2011). Furthermore, because of the electricity sector's high capital intensity characteristic, which demands a commitment to long-term investments, tapping FDI would permit Brazil to achieve a higher capital accumulation rate. This would free domestic capitalists or the state to focus their investments on ventures with a shorter maturation period (Campos, 1994). For Bulhões, public services concessionaires in the electricity sector would invest if they received appropriate remuneration. Hence, he dismisses the prevailing cost-plus regime that was discouraging private investments in the sector (Bulhões, 1960).

On the other side of the debate, economists like Jesus Soares Pereira and Américo de Oliveira believe that the state should control the electric power industry. Accordingly, a federal holding should centrally manage the electricity industry, and the Single Tax on Electric Energy resources should preferably be allocated to state companies (Silva, 2018). Pereira, who criticizes the CNE's extreme privatism, pleads for the statist solution because of the impact of the electricity sector's profit remittances on the balance of payments. Intervention by the state is also necessary because private utilities are unwilling to expand supply to fringe regions, which aggravates regional imbalances (Pereira, 1956). Furthermore, the BNDES is not an adequate manager of the Federal Electrification Fund's resources and lacks the managerial and technical capacity to conduct a large-scale public program to expand the country's electrical systems. Therefore, the electricity sector needs state-led organizational leadership to plan electric energy supply expansion effectively and rationally (Pereira, 1975; Silva, 2011).

Oliveira argues that foreign-held utilities have for decades been handsomely rewarded with terms and conditions sufficiently attractive to carry out operations and expansion planning almost entirely through self-financing (Oliveira, 1957, 1958). Despite this, they have failed to increase the country's installed capacity, exposing it to frequent blackouts caused by an operation with an overstretched load factor. The economic impacts of this dire sectoral outlook justify the electricity sector's nationalization. Like Pereira, Oliveira also welcomes nationalization because the remittance abroad of profits in the electricity sector puts pressure on Brazil's balance of payments (Oliveira, 1957).

Within the developmentalist camp, Lucas Lopes and Ignacio Rangel hold more nuanced views. Lopes welcomes the São Francisco's plan – which includes the creation of CHESF – because of its pioneering nature in promoting regional development. He defends public electricity investments in regions where the private initiative has no condition or interest in investing, with the ultimate goal of decentralizing the country's economy (Lopes, 1955a, 1955b). However, he also believes that government regulation and the curtailment of prices shie away private investments from the sector (Lopes, 1955a). Although Lopes understands that the Federal Electrification Fund – financed by the sole tax – is necessary to resolve the sector's chronic financial problems, he does not support the federal solution of a state holding. For him, this solution threatens to drain resources into countless projects that lack a technical basis but would be included in the public investment agenda for political reasons (Campos, 1994; Lopes, 1955a; Silva, 2011).

In his turn, Rangel, with the foremost example of the electricity sector, concedes that granting public services to foreign companies before the nationalist legislation was passed in the 1930s was a logical decision. By then, Brazil lacked a national capital goods industry capable of supplying the equipment and services and the capital markets required for these industries' setup. In the late 19<sup>th</sup> and early 20<sup>th</sup> centuries, foreign utilities offered a convenient policy solution to the problem due to their sheer financial power and organizational capacities under conditions that were very unfavorable from the domestic point of view (Rangel, 1963).<sup>7</sup>

However, as the economic conditions had changed during the 1940s–1950s period, the operation of these ventures under frankly unfavorable

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<sup>7</sup> See also Branco (1975).

conditions no longer made sense, chiefly because the costs of goods and services were substantially higher than necessary. Rangel thus pleads for the effective implementation of the nationalist legislation, which had already been approved in the 1930s. The reorganization of public services would play a relevant role in establishing new investment and capital accumulation opportunities, stimulating a burgeoning domestic capital goods market. The only objective bottleneck is the supply of financial resources. This problem can be resolved if Brazilian companies can also have access to more favorable financial-economic conditions and if the country manages to establish a more solid capital market (Rangel, 1963).

Eventually, Decree 41.019 of 1957 was approved to regulate and oversee the electric energy provision service, stipulating more transparent and simplified norms and changing historical cost as the basis for the electric power rate calculation (Vieira, 2007). As Tendler (1968) explains, Kubitschek's administration (1956-1961) wanted to avoid the conflict between private and public capitals, particularly in the electricity sector. Although his administration had launched several new public electricity projects, he also was considered "the least antagonistic of Brazil's four presidents from 1950 to 1964" (Tendler, 1968). A crisis in the electricity sector was provisionally resolved by establishing a "modus vivendi" in which the government maintained distributors satisfied through preferential exchange rates and by authorizing price readjustment (Tendler, 1968). Similarly, Castro (1985, p. 149) refers to a "cleavage pact", a tacit agreement between the private sector and the state where the division of labor satisfied both. While the private sector took care of the distribution segment, as foreign companies growingly lost interest in the generation segment, chiefly because of falling profit rates in that business segment (Szmercsányi, 1986a, 1986b in Saes; Loureiro, 20134), the state was in charge of expanding the electricity generation sector. As the state eschewed the conflict with foreign concessionaires, it accepted the role of undertaking the more risky investments in large-scale hydropower dams, for which it nevertheless could channel the finance from the Single Tax on Energy (Melo; Oliveira; Araújo, 1994; Pereira, 1975; Rau Jr. 1962).

Even though the tariffs question was settled, favoring private utilities, discussions towards implementing the electrification plan and Eletrobras' creation marched in Congress and government circles. In addition to the suspicion that private utilities like Light and AMFORP were not willing to invest sufficiently to expand installed capacity, there was a perception that

the potential energy generation capacity within their respective concession areas was effectively ending (Pereira, 1957).

Eletrobras' creation occurred in a context in which the nationalist debate was revived. Particularly in the National Congress, political organizations such as the Nationalist Parliamentary Front (FPN) had a fundamental role (Corrêa, 2007). In its diagnosis of the electric power industry's problems, the Front criticized foreign-controlled electricity utilities' lack of investments, dubious operations, and the government's unwillingness and incapacity for regulating their operations. The Front defended that profit remittances abroad must be regulated and that the state has to exert its sovereignty over its natural resources, such as hydraulic resources. The National Electrification Project and the creation of Eletrobras were regarded as fundamental steps for accelerating economic development (Silva, 2011). The financial leverage that the Electrification fund had given to finance the sector's investment expansion throughout the 1950s was crucial in flattening the political resistance of the main electricity-producing states against these projects (Melo; Oliveira; Araújo, 1994). That renewed political setting eventually permitted policy experimentation with a statist solution in the electric power sector. In 1961, by Law 3890, Congress approved Eletrobras's foundation as a holding company for conducting the federal government's investments in electric power.

### 3. The inflation debate

During the 1950s, the country's annual inflation rate had oscillated in the 10-20% range. However, in the early 1960s, amidst a wave of unresolved economic problems, it topped the 35% mark. Brazil's 1950s and early 1960s inflation debate – one of the most important debates in the period's economic epistemic community – had the issue of electricity as one of its main objects. However, the inflation-electricity nexus is a much larger preoccupation in the orthodox camp, centered on Gudin's writings. In the heterodox camp, it is a concern that appears mostly in Rangel's writings.

For Gudin's orthodox camp, which is closely identified with monetarism, the economy's means of payment must grow at the same pace as economic transactions for growth to be sustained and inflation under control. If public spending is not covered with new revenue sources, there is an increase in the volume of money in the economy, which results in inflation (Biel-schowsky, 1988). For Gudin, inflation means that an "upper ceiling" has been

reached, a point at which economic growth cannot be accelerated (Lima, 1976a; Magalhães, 1964). An inflationary surge results from attempts to speed up economic growth beyond what is possible to achieve with the economy's existing factors of production. When every factor of production is in full employment, an expansionary credit policy or money injection does not result in increased production but in increased prices, a scenario in which there is only nominal GDP growth (Gudin, 1959; Lima, 1976a). Gudin thus defends reducing investments and correcting the country's macroeconomic imbalances, particularly inflation – through monetary stability (Gudin, [1945] 2010; Magalhães, 1965). Controlling inflation entails reducing the country's investment rate and abandoning plans to accelerate economic growth (Magalhães, 1964). In the context of inflation, public investments should preferably be directed to productivity-improving investments, especially in export sectors, and not to protect inefficient domestic industries (Gudin, 1979; Lima, 1976a).

Orthodox economists believe that inflation control demands the flexibilization of the electricity pricing policy. The government's control of public utility prices – a failed long-term inflation control policy – had made investments in infrastructure such as electricity unattractive to the private investor (Gudin, 1959; Oliveira, 1957). In Campos's view, the government's control of tariffs to halt inflation generates strangling points, which “are originally inflation-induced, even though at a later stage they may become inflation-feeding” (Campos, 1961, p. 74–75). For Gudin (1959), in an inflationary context, private investments are channeled to property investments instead of the more critical electricity generation investments, where the returns take more time to appear and are corroded by inflation. When Kubitschek's administration implemented its ambitious Goals plan, a second-best policy alternative to overcome the problem of insufficient electricity supply, the finance needed to pay for the Goals plan consecution had to be obtained by issuing new money, further accelerating inflation (Gudin, 1959; Sola, 1998; Sousa, 1958). For Gudin, a much more suitable path – in which inflation is minimized – is to establish an equilibrated economic order that stimulates private investments, among others, in electricity generation. For this to be possible, there must be clear rules for the economy's most important prices and costs (Gudin, 1959). Hence for these authors, the liberalization of the sectoral pricing policy would ease inflationary pressures and guarantee private entrepreneurs' investments in novel electric power generation facilities.

Sousa (1956) offers a more nuanced view within the orthodox camp. For the author, inflation in developing countries arises from a limited supply of services that provide external economies, such as the electric power industry. Because there is no spare capacity in these sectors, the acceleration of economic development increases demand and generates inflationary pressures. For Sousa, however, a tight monetary policy should be used with parsimony and only in the short term to avoid unnecessary economic contraction. The main instrument to tackle inflation is to invest in an additional capacity that attenuates these bottlenecks. Because these investments affect productivity due to their external economies, they have a deflationary effect. For the author, private entrepreneurs should carry these investments under a regulatory state's guidance.

By contrast, the Heterodox group, mostly aligned with ECLAC's structuralist ideas, tends to see some degree of inflation as a positive phenomenon (Hewlett, 1980; Lima, 1976a). For Furtado, the inflationary process results from the rigidity of supply in underdeveloped economies. Because of underdeveloped nations' demand profile transformation – due to the elites' desire to emulate developed countries' consumption patterns – the solution to relieve inflationary pressures is to make the supply side more flexible. Overcoming inflation is thus closely tied to overcoming underdevelopment (Furtado, [1960] 2016). In Magalhães' view, the upper ceiling to growth is given not by labor, which is the abundant factor of production in developing nations, but by capital, which is not yet fully employed at that stage of development (Magalhães, 1965). Magalhães accepts that a moderate inflation rate is instrumental for development because increasing prices and tumbling real wages stimulate investments. As inflation may create large forced domestic savings, it may aid in displacing the upper ceiling. Because inflation positively affects development, anti-inflationary policies must be implemented with caution because they reduce the economy's total savings, thus curtailing investments and reducing the country's developmental pace (Magalhães, 1965).

For Rangel (1963), inflation is an institutional fix for capital accumulation and growth in an imperfect developmental setting. In the unique circumstances in which Brazil's capitalism is unleashed, a high rate of labor exploitation prevails, and wages do not increase according to productivity growth. This generates a low domestic propensity to consume, which is compensated by a high immobilization rate. As a result, Brazilian capitalists

have a large propensity toward increasing idle capacity (Rangel, 1962). The author thus sees inflation as “a heterodox but effective resource to maintain the immobilization rate when it manifests a tendency to decline” (Rangel, 1962, p. 58), where inflation can convert a dangerous decline in the economic system’s activity “into a relatively innocuous movement of rising prices” (Rangel, 1962, p. 83).

He argues that monetary policy should be cohered with the country’s broader developmental goals, for inflation increases real demand (Rangel, 1962). Moreover, the issuance of new money generates a new source of revenue for the government, such that there ensues an income transfer of subjects with low consumption propensity to the public sector, whose consumption propensity is more elevated. Nonetheless, Rangel sees with some skepticism the thesis that “inflation is good”, for he is worried that the acceleration of inflation reduces inflation’s efficiency as a compensating mechanism, rendering inflation a policy tool that must be used with care (Rangel, 1963).

Following heterodox reasoning, the electricity sector is a relevant originator of inflationary pressures because of the chronically inadequate capital formation in the sector (Hewlett, 1980; Lima, 1976a). The inadequate electricity supply is one of many deeply embedded structural rigidities that characterize developing economies. Due to the existence of this rigidity and because of FDI’s mostly ancillary role in channeling investments to sectors such as electricity, Brazil had to turn inward for resource collection drawing on inflationary forced savings (Baer; Kerstenetzky, 1964). Accordingly, “widespread inflationary pressures became the inevitable concomitant of modern industrialization” (Hewlett, 1980, p. 90). It is in that vein that Rangel sees inflation arising from the electricity sector fundamentally in a positive light, as electricity tariffs’ indexation enabled Brazil’s modern cities’ construction, systematic electrification, and heavy industry implantation (Rangel, 1963, 1985).

However, Rangel does not believe that the electricity sector should perpetually draw its growth from inflationary finance. In his view, electricity generates inflationary pressures mostly because of the favorable rules to FDI that governed the system’s expansion in the 1900–1960 period. For Rangel, this set of rules:

[...] unnecessarily makes the service more expensive and promotes inflation in several ways: because it unnecessarily increases

the cost of services, because it prevents them from developing [...] and, mainly, because they depress the internal demand for capital, making the economy more dependent on the compulsion exerted by the devaluation of the currency over the preference for liquidity in the economy. (Rangel, 1963, p. 95)

While Rangel believes that it is necessary to reform public finance to curb inflation, which had been structurally compromised because of the need to maintain the rate of immobilization high (Rangel, 1963), he also believes that inflation should be tackled by the removal of certain pricing anomalies. Hence, removing the favorable conditions granted to foreign electric power utilities is also a policy alternative that must be considered to resolve the problem of inflation (Rangel, 1963). This is quite in contrast to the orthodox camp's view, which claims that the liberalization of the pricing policy will lead to the curtailment of inflation. On the contrary, what leads to the control of inflation in Rangel is the establishment of a competitive electricity market through the effective implementation of the set of rules that had been established in the 1930s to guide the sector's expansion.

#### **4. Conclusions: a postscript on the policy debate briefly after the coup**

This article has argued that the bipartisan division in Brazil's economic epistemic community in the 1945–1964 period also existed in the electricity policy debate. However, while in the debate over FDI *vs.* state control and on the relation between inflation and electricity divergence was the tonic, some degree of convergence existed regarding the issue of sectoral planning.

In the period in question, policymaking in the electricity sector largely reflected the incumbent administrations' shifting policy views. Even so, political and economic conditions favored policy experimentation with a pragmatic policy stance that combined features from states and markets – which combined ideas from both camps – even after the 1964 coup.

The 1964 military takeover marked a caesura in Brazilian economic policymaking. The military government rapidly depoliticized the public decision-making process and changed macroeconomic policymaking under the Campos-Bulhões team's orthodox direction (Boa Nova, 1985). As a result, the 1964 PAEG program, Brazil's first postwar monetary and fiscal austerity

program, contained economic reforms, public spending cuts, a tax burden increase, trade and financial liberalization measures, and wage tightening measures (Frieden, 1991; Kaufman, 1988; Maddison, 1992).

The liberalization of energy policy also marked the period. Decree n. 54.936 of November 1964 introduced a new “tariff realism” policy that substituted the historical value of fixed capital pricing regime principle with the periodic revaluation of assets (Coutinho; Reichstul, 1977). This curtailed the government’s interference in price formation and removed subsidies on public utility rates (Maddison, 1992). From 1964 to 1967, tariffs grew an average of 62.4% per year, above inflation, which grew 39% during that period (Silva, 2011). As a result, the role of inflation in the electricity sector’s expansion was reduced, and the electricity industry now operated with a high self-financing margin, which reached 75% during the period (Baer; Kerstenetzky, 1964, p. 367; Coutinho; Reichstul, 1977).

However, after a few years of policy experimentation with orthodox measures, the regime shifted to less orthodox policy measures towards the end of the 1960s, mainly because of low economic growth rates. A pragmatic change of direction, with a larger role for public investments, also ensued in the electricity sector, with Antonio Dias Leite as one of its main architects. Dias Leite criticizes the government’s energy policy and pleads for more extensive public involvement in what he calls “the nucleus of economic expansion” (Dias Leite, 1966, p. 42-43; Singer, 1976, p. 158). Dias Leite (1966) believes that this nucleus’s expansion (or lack thereof) defined the country’s development pace. It has been argued that after Dias Leite’s appointment as head of the Ministry of Mines and Energy (MME), the pace of investment expansion in the electricity sector could be rekindled, which was now coordinated by the state (Campos, 2018).

As a result of this counter-reform, Eletrobras increased the pace of its inversions and could comfortably execute long-term planning and exert direct and firm control over a frankly expanding sector whose input was fundamental for the economy (Coutinho; Reichstul, 1977). With this, the electricity sector’s installed capacity grew at an average annual rate of 11,9% from 1967 to 1973 (Cachapuz, 2006). From 1962 to 1971, the share of Brazil’s electric power generating capacity controlled by state companies grew from 36 to 90%. In 1973, the state controlled 45% of the total electricity distributed and consumed (Robock, 1975).

The military regime, which delivered spectacular growth rates in the

early 1970s, sought legitimacy and pursued national security by achieving growth and economic development (Ianni, 1981). Its success stems from its ability to pragmatically combine monetarist policies with bold state investments, with an open stance for FDI, but with a stark disregard for bold distributive policies. Policy experimentation with a pragmatic policy stance is possible because the political opposition had been neutralized (Mantega; Moraes, 1978). It is a regime that has pragmatically learned to combine the strengths of states and markets vis-à-vis the goal of rapidly increasing capital accumulation and the pace of economic growth.

It is thus not a coincidence that Dias Leite (1966) not only pleads for larger state involvement in the electricity sector but also criticizes the pre-1964 policy of tariff containment. In his view, that policy had mostly satisfied middle-class domestic consumers and disturbed this vital sector's financial health. He reasons that the negligible weight of electricity costs in industrial consumers' total expenditures, coupled with electric power's importance for economic development, justifies the liberalization of the pricing policy.

Another author who simultaneously pleads for the state's guiding hand and liberalizing reforms is Swiatoslaw Sirks. On the one hand, he argues that the solution to the electricity supply crisis that would hit Brazil after 1970 is centrally planning the system's expansion (Correio da Manhã, 1964). On the other, he believes that reforms which increase the supply of foreign savings through FDI to the electricity sector are important because they supplement domestic capital formation. For Sirks, the country's development rate is directly proportional to its investment rate, which can be either increased through the largening of internal savings or by recurring to savings from abroad. However, increasing the country's savings rate comes with the risk of reducing the country's consumption rate. Therefore, due to the electricity sector's large external economies generating potential, the country is better off with a policy that facilitates the flow of FDI to this industry (Sirks, 1968).

In a similar fashion, Campos also sought to establish a "synthesis" between the orthodox and developmental viewpoints to explain the success of the military rulers' developmental strategy, the "Brazilian model". In his view, the model succeeded because of the superation of controversies that had previously impeded the adoption of "rational and consistent economic policies" (Campos, 1974, p. 72). One of these was the opposition between nationalists and the advocates of a more open economy, which previously

had had the electricity sector as a battleground. For Campos, the policy change from a “confiscatory” nationalization of foreign utilities’ assets to “negotiated nationalizations” had been fundamental for the model’s success. Because it cleared the investment climate, it paved the room for novel rounds of foreign loans to the electricity sector and FDI to other sectors (Campos, 1974).

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