

Unfolding international development cooperation in energy efficiency programs

Desdobrando a cooperação internacional para o desenvolvimento em programas de eficiência energética

La implementación de la cooperación internacional para el desarrollo de programas de eficiencia energética



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Abstract: How does international development cooperation (IDC) unfold in the domestic arena? More specifically, how priorities and dimensions addressed in cooperation agreements enter the domestic public policy agenda? This article seeks to present elements that respond to such questions, through qualitative analysis based on bibliography review and documental analysis of bilateral agreements on energy efficiency signed by Brazil with the developed countries, Brazilian national energy policies legislation implemented since the first oil crisis in the 1970s and the Brazilian National Plan on Climate Change. The goal is to identify the actors and the mechanisms by which those programs, which were originally structured in developed countries, were spread to Brazilian energy policy and characterize the instruments such as the cooperation

agreements between the parties. We investigate the stakeholders involved in the negotiations, the privileged issues, the sectors and topics covered as well as the financial sources of the negotiated projects. As a result, we highlight that IDC conditioned the content of energy efficiency programs (EEPs) adopted, indicating that Brazilian Foreign Policy (BFP) has a relevant role to play in energy policy in Brazil.

Keywords: Brazilian Foreign Policy. Energy efficiency. International agreements.

Resumo: Como a cooperação internacional para o desenvolvimento (CID) se desdobra na arena doméstica? Mais especificamente, como as prioridades e dimensões abordadas nos acordos de cooperação entram na agenda de políticas públicas domésticas? Este artigo procura apresentar elementos que respondam a tais questionamentos, por meio de análise qualitativa baseada em revisão bibliográfica e análise documental de acordos bilaterais de eficiência energética assinados pelo Brasil com países desenvolvidos, a legislação nacional brasileira de políticas energéticas implementada desde a primeira crise do petróleo na década de 1970 e o Plano Nacional sobre Mudança Climática. O objetivo é identificar os atores e os mecanismos pelos quais esses programas, cujo conteúdo originalmente foi estruturado em países desenvolvidos, se difundiram para a política energética brasileira e caracterizam os instrumentos, neste caso, os acordos de cooperação entre as partes. Investigamos as partes interessadas envolvidas nas negociações, as questões privilegiadas, os setores e tópicos abordados, bem como as fontes financeiras dos projetos negociados. Como resultado, destacamos que a CID condicionou o conteúdo dos programas de eficiência energética (PEEs) adotados, sinalizando que a Política Externa Brasileira (PEB) tem um papel relevante a desempenhar na política energética no Brasil.

Palavras-chave: Política externa brasileira. Eficiência energética. Acordos internacionais.

Resumen: ¿Cómo se desarrolla la cooperación internacional para el desarrollo (DIC) en el ámbito doméstico? Más específicamente, ¿cómo las prioridades y dimensiones abordadas en los acuerdos de cooperación entran en la agenda de políticas públicas nacionales? Este artículo busca presentar elementos que respondan a estas preguntas, a través de un análisis cualitativo basado en la revisión bibliográfica y de un análisis documental de los acuerdos bilaterales de eficiencia energética firmados por Brasil con los países desarrollados, así como de la legislación nacional brasileña sobre políticas energéticas implementada desde la primera crisis del petróleo en la década de 1970 y del Plan Nacional de Cambio Climático. El objetivo es identificar los actores y mecanismos por los cuales estos programas, cuyo contenido se estructuró originalmente en países desarrollados, se difunden a la política energética brasileña y caracterizan los instrumentos, en este caso, los acuerdos de cooperación entre las partes. Investigamos las partes interesadas involucradas en las negociaciones, los temas privilegiados, los sectores y temas cubiertos, así como las fuentes financieras de los proyectos que se están negociando. Como resultado, destacamos que el CID ha condicionado el contenido de los programas de eficiencia energética (PEE) adoptados, lo que indica que la política exterior de Brasil (PEB) tiene un papel relevante a desempeñar en la política energética en Brasil.

Palabras-clave: Política exterior brasileña. Eficiencia energética. Acuerdos internacionales.

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Introduction

How does international development cooperation (IDC) unfold in the domestic arena? There is a considerable body of literature developed in Brazil from the last decades, addressing issues on this inquiry. Nevertheless, most of the existing works focus on either military or strategic issues (ABDENUR; SOUZA NETO, 2014) or, when it comes to subjects related to technical cooperation, most of recent works deal with South-South cooperation (BESHARATI; ESTEVES, 2015; GÓMEZ *et al.* 2012; MENDONÇA; FARIA, 2015; Milhorange, 2013; VILLAR, 2016; SCHLEICHER; PLATIAU, 2017; XAVIER *et al.*, 2018). Some theoretical contributions to the issue, either present relatively narrow perspectives, focusing on paradiplomacy, as Oliveira and Luvizzoto (2011) or do not bring an empirical analysis to corroborate theoretical insights like Pecequilo (2008). Therefore, there is a relatively gap on literature concerning empirical contributions analyzing the spillovers of IDC to domestic politics on technical arenas.

Regarding that, we highlight the importance of energy efficiency programs (EEPs)¹ related issues. The technical literature usually explain EEPs content in terms of techno-economic arguments (PICCINNI, 1994; SOUZA *et al.*, 2009; SOUZA *et al.*, 2011), since investing in energy efficiency is almost four times cheaper than in new sources of energy (Ribeiro, 2005).

Nevertheless, besides the economic reasoning, energy efficiency is straightly related to the political logic, and also connected to the international scenario (POLLIS *et al.*, 2013); either by the influence of oil prices fluctuations on energy security, and

¹ Energy efficiency programs can be understood as a set of practices and policies that reduce the cost of energy and/or increase its supply without increasing the amount of energy generated; involving integrated and streamlined planning of resources. There are two focuses on promoting efficiency projects: on the supply side or final consumption (demand). On the supply side, it is efficiency in generation, transmission, and distribution, through practices and the insertion of technologies that stimulate efficiency throughout the energy chain. An example of this is cogeneration and natural gas burning turbines, among other technologies that can provide more energy in a shorter time and existing locations. It also includes financial incentives to the production of less energy consuming appliances. On the demand side, it corresponds to measures that culminate in the reduction of energy needed to meet the demands of society, through technologies and practices aimed at ensuring a reduction of final consumption. It might be achieved either by the use of consumer control devices or by the better use of energy, labeling of electrical appliances or socio-educational programs, resulting in a more conscious and rational use of electric energy (Ribeiro, 2005).

by the international diffusion of norms and practices embedded on climate change international regime (CCIR). Since the first wave of publications on energy politics by the 1970s, when the firsts oil price peaks occurred, the concept of energy security gained a broader meaning, going through a narrow understanding of adequate energy supply to meet demands of incorporating concerns of environmental preservation, economic-social development and reduction of external dependence (HAGE, 2008; SOVACOO, 2012). By that time, the challenges to secure the supply were faced either by the development of alternative sources, like Brazil did with the Programa Nacional do Álcool, or by optimizing existing technologies through energy efficiency.

Brazil is a relevant case in this approach because it is an example of an underdeveloped country that started to promote those kinds of policies domestically, in the late 1970s. Besides, the international level field achieved a more relevant role with the creation of an energy department within the Brazilian Foreign Ministry (BFM), in the mid-2000s. In this context, understanding foreign policies as public policies (MILANI; PINHEIRO, 2016) both IDC agreements and domestic EEPs emerge as relevant instruments of public policies that states can aim in order to improve energy security.

Therefore, this article aims to analyze how IDC in Brazil unfolds in the domestic agenda, in the quest of the promotion of EEPs. In order to understand this process, we employ a qualitative analysis based on bibliography review and documental analysis of bilateral agreements on energy efficiency signed by Brazil with the developed countries, Brazilian energy policies legislation and, the Brazilian National Plan on Climate Change. As a marginal goal, we also want to identify whether IDC encompass strategic elements coming from the recipient country. In other words, we seek to understand whether the implementation of EEPs respond only to a market logic, following an economic reasoning, or to political insights materialized in IDC and strategic movements from the Brazilian Foreign Policy (BFP), seeking to promote energy instruments in the context of fomenting sustainable development and of implementing CCIR norms and principles.

In order to assess such issues, the work is organized into five parts, including this Introduction. On Section 2, we present a historical background, assessing the evolution of EEPs in the international arena, either from an analysis of how the issue evolved amid intergovernmental entities as the kind of policies implemented in pioneer countries. On Section 3, we present a brief review of the literature on IDC technical areas as a strategy of Brazilian Foreign Policy. On Section 4 we present our empirical analysis of the bilateral agreements signed with developed countries in the area of energy efficiency, seeking to identify the channels of the regulatory frameworks identified below and characterize the role of the BFP in this process. In the sequence, we give an overview of energy efficiency initiatives in pioneer countries in the adoption of such programs that have become regulatory references for Brazil, considering the period before and after the signing of the Kyoto Protocol. After that, we present a documental analysis of the Brazilian energy efficiency programs. Section 5 concludes with the final considerations. As a result, we were able to map the objectives of international cooperation, through the analysis of the priorities and dimensions established by the BFP to implement EEPs.

Historical background: the evolution of EEPs in the international arena

In the 1970s, during the two most important international oil price crises, under the banner of reducing oil demand, it became worldwide imperative to create mechanisms that could stimulate efficiency throughout the energy chain. In this context, several countries started to rethink the ways of generating, distributing and consuming energy, coming up with several possibilities of turning energy related activities more efficient.

In this context, the first wave of EEPs in developed countries led the industrialized countries to organize themselves to form

the International Energy Agency (IEA) (HUGHES; LIPCY, 2013). The objective was to guarantee the supply of energy, reducing the dependence of member countries on oil and its derivatives (RIBEIRO, 2005). Energy efficiency became a global concern and the industrialized countries have adapted their strategies and raised funds to invest in renewable energy sources (SOUZA *et al.*, 2011).

Measures of optimization of energy management emerged in the 1980s, in countless countries, where demand programs stood out. The pioneer countries on energy efficiency programs and their implementations were Germany and the United States. In Germany, the Heating Costs Act (HeizkostenV) was introduced in 1981, regulating the cost of heating and hot water, with higher consumption-based charges, creating greater incentives to save energy (POWER; ZULAUF, 2011).

In 1975, the United States implemented the Energy Policy and Conservation Act requiring the Federal Trade Commission to establish a producer labeling program and the Department of Energy (DOE) to define voluntary efficiency goals (HARRINGTON; DAMNICS, 2001). Within this background, legislation establishing mandatory minimum levels of efficiency for equipment, vehicles, and buildings through labeling programs, was put into force. In 1978, the policy gained national status and created the obligation for efficiency goals. In the 1980s, the country also implemented the Integrated Resource Planning (PIR), which considered that new energy efficiency programs are competing with available supply expansion alternatives. Besides that, the country had also implemented, similarly to Germany, incentive pricing regulation methods (SOUZA *et al.*, 2009).

During the end of the 1990s, the second wave of policies started to emerge in the international and national agendas dominated by concerns about the impact of fuel combustion on climate change. In 1992, the United Nations promoted a major event with a broad scope on the development and the environment. Rio-92 aimed to launch a program to achieve sustainable development in the 21st century, with the consolidation of action plans in Agenda 21. The

energy was not the main theme discussed, receiving only a few modest considerations throughout the document. The Conference was important, however, in creating two key entities for the emergence of energy on the international agenda. The first is the United Nations Commission on Sustainable Development (CSD), an entity linked to the UN Economic and Social Council (ECOSOC), which oversees the results of Rio-92. The second is the Global Environmental Facility (GEF), or the Global Environment Facility, created to provide resources and concessional funds to cover projects that benefit the global environment.

Another relevant topic addressed at the event was the United Nations Framework Convention on Climate Change (UNFCCC), open for signature by the states at the time. The Convention represented a diplomatic step towards future negotiations among countries on GHG emissions. With its implementation in 1994, negotiations began on a structure of annual conferences between the parties that would function as a forum for negotiation, regulation, and adjustment of the climate regime (SIQUEIRA, 2012). These meetings, which have been developed autonomously by the Conference of the Parties (COPs), became an important place for the negotiation of the CCIR, with significant impacts on the direction of many EEPs.

In the meantime, in December 1997, delegates at COP3 in Kyoto, Japan, agreed to a Protocol to the UNFCCC committing industrialized countries and countries in transition to a market economy to achieve emission reduction targets. Its content was an effort to avoid the aggravation of living conditions on the planet through cooperation by setting goals for GHG reduction with the development of renewable energy technologies. In this regard, the implementation of mechanisms, such as the Clean Development Mechanism (CDM), was designed to simultaneously address the effects of global warming and foster economic development.

Nine years after Rio-92 the international community focused exclusively to energy issue in 2001 by promoting a meeting at the 9th session of the CSD in New York. From this event onwards, developed countries were included in the official documents about

the importance of energy efficiency technologies. In this context, the concept of energy securitization began to be understood beyond security of supply and was presented as covering the dimensions related to the environment, efficiency, trade, innovation, climate change, and affordability (SOVACOOOL, 2012). In this sense, EEPs started to be seen as a mean to achieve a greater goal of promoting social and economic development, through more sustainable methods and, at the same time, improving energy security, minimizing oil dependence.

In 2002, in the context of the World Conference on Sustainable Development held in Johannesburg, energy appeared as one of the five priorities of the event, defined by the anachronistic WEHAB, water and sanitation, energy, health, agriculture and bio-diversity. In this sense, debates began to emerge around the setting of goals and deadlines for the adoption of renewable energy, the reduction of subsidies to fossil energies and the terms of transference of technologies from developed countries to developing countries.

Thinking about the EEPs implemented in developed countries after the signature of the Kyoto agreement, we highlight below as the most important the ones in Germany, in the European Union, in Denmark, and in the United States.

In Germany, the main regulatory framework formulated in 2002 and subject to revisions in 2007 and 2009 was the Energy Conservation Act (EnEV). It has become Germany's main legal tool for reducing energy use by requiring: (a) changes in the building industry and (b) energy generation - with the requirement to use more efficient and renewable technologies, aiming to reduce CO₂ emissions - and c) the mandatory energy performance certificates sent by qualified and accredited consultants.

Regarding the programs of European Union countries, we highlight the cases of the United Kingdom and France, the most important actors in this area. In the United Kingdom, the government plan focused on population awareness and managing the program of the Department of Environment, Transportation and Regions and

the Electricity Standards of Performance program. Modern water heaters, heating control, improvements in the insulation of walls in the civil construction, use of alternative fuels, efficient lighting and fomenting projects that contribute to the conservation of energy were implemented. The Energy Saving Trust (EST) received a budget of 31 million pounds in 1998-99, as well as a fund from a compulsory collection of 1 pound per year of the electric power consumer, which resulted in approximately US \$40 million per year (RIBEIRO, 2005).

EEPs from France, promoted in 2006, focused on waste management, air pollution and the improvement of the clean energy matrix. The energy efficiency programs were under the responsibility of the Environment Agency and the Energy Matrix (ADEME), indicating an important interaction between environmental and energy policies (SOUZA *et al.*, 2011). Some European countries have followed similar paths, including the creation of public agencies linked to energy efficiency and responsible for environmental protection and the development of renewable energies, such as the Netherlands, Sweden, and Spain.

Denmark has developed similar programs, seeking to reduce energy waste in all consumer segments, through similar mechanisms, especially with the adoption of labeling programs and the standardization of products, methods and industrial processes (STRAPASSON, 2004). The country also established a specific department to lead energy efficiency management (RIBEIRO, 2005).

USA created programs to implement the actions taken through the Kyoto Protocol. The Department of Energy started to operate through the Energy Efficiency and Renewable Energy Network (2007), established with the objective of stimulating renewable sources and economic competitiveness as a way to diminish costs and protect the environment. The focus was on energy concessionaires, industry, transportation and building sectors, as well as investment in research, development and the application

of Equipment Labeling and Standardization Programs (SOUZA *et al.*, 2011).

In parallel with domestic efforts, international negotiations also evolved on the matter of political instruments of making energy generation and consumption more efficient. Nevertheless, as Karapin (2016) points out, through a deep historical analysis, policies and agencies powerfully shaped subsequent policies, in some cases, re-framing as “climate” rather than simply “energy” policies. In this context, the UNFCCC COP15 meeting in 2009, known as the Copenhagen Conference, marked the culmination of a two-year negotiating process to enhance CCIR under the Bali Roadmap, launched by COP 13 in December 2007. The conference was subject to unprecedented public and media attention, and more than 40,000 people, representing governments, nongovernmental organizations, intergovernmental organizations, religious organizations, media and UN agencies applied for accreditation at the conference.

Until the Rio+20 Conference (2012), some events undermined the goals set in Johannesburg, including the international financial crisis in 2008, the drop in fossil fuel prices (shale and oil) between 2008-2010 and the Euro crisis in 2010-2011. Given the fear of countries that could back down the negotiations that aimed enhancing environmental protection, the organization held a conference in Bali in 2010, where ministers representing member countries met and signed a statement with important Rio + 20 Conference, to be held two years later (UNEP, 2010). The speech envisaged alternatives for promoting well-being and social equality, concomitant with the reduction of environmental risks. In this sense, the Global Green New Deal was launched, in which was recommended a fiscal stimulus of around 1% of world GDP (U\$ 750 billion approximately) to be invested in green technologies to incentivate job creation and minimize greenhouse gas emissions (UNEP, 2009).

In the midst of global events towards the promotion of EEPs, the final document of the Rio+20 Conference (2012), the Future We Want (FWW) proposed the creation of a guide for the

implementation of policies to promote green economic growth, in addition to the establishment of a commitment aiming to extinguish fossil fuel subsidies. Besides, The UN Development Programme (UNDP) also became in charge of two important energy efficiency programs: The Sustainable Energy for All initiative (SE4ALL) and The Sustainable Development Goals (SDG).

On one hand, SE4ALL aims to consolidate a common cause of support for three interlinked goals to be achieved by 2030: (a) ensuring universal access to modern energy services; b) double the overall rate of energy efficiency improvement and c) double the share of renewable energy in the global energy matrix (UNDP, 2011). On the other hand, seventeen SDGs were launched in September 2015, in the context of Agenda 2030, Transforming Our World as a reformulation of the Millennium Agenda established in 2000, under the framework of the Millennium Development Goals (MDGs).

The seventh SDG is to guarantee access to cheap, reliable, sustainable and renewable energy for all, aiming:

7.1 By 2030, ensure universal, reliable, modern and affordable access to energy services. 7.2 By 2030, substantially increase the share of renewable energy in the global energy matrix. 7.3 By 2030, double the overall rate of energy efficiency improvement. 7.a By 2030, strengthen international cooperation to facilitate access to clean energy research and technologies, including renewable energy, energy efficiency and advanced and cleaner fossil fuel technologies, and to promote investment in energy infrastructure and clean energy. [...]. (UNDP, 2015).

Hence, we can infer that, historically, the topic of energy efficiency evolved from a narrow perspective, based on an economic reasoning of minimizing energy demand, although there was also the idea of strengthening energy security, still understood in the 1970s and 1980s, as an energy supply issue. Throughout the years and the evolution of the climate change issues on the international agenda, EEPs started to be promoted as mechanisms related to a broader perspective of energy security and climate

change (SOVACOOOL, 2012; KARAPIN, 2016), including social and environmental vectors having the development as the flagship of political target. Besharati and Esteves (2015) point that, in fact, that agenda is straightly related to relevant reflections raised on the literature of IDC. Therefore, in order to investigate whether and how those ideas penetrated on Brazilian PEEs we now turn to some theoretical concepts in order to understand how IDC fits BFP strategies in technical sectors and in the sequence, the unfolding of those aspects for the domestic arena.

Bilateral international agreements to face Brazilian Foreign Policy strategies in technical sectors: some theoretical insights

Oliveira and Luvizotto (2011) identify four conceptual ideal types of International Cooperation, that can be classified in an evolutionary scale: a) vertical international cooperation, b) technical cooperation tout court, c) horizontal international cooperation and d) decentralized international cooperation. The first type of cooperation, inherited from a post-World War II vision, is assistance-based and involves vertical transference of the advanced countries to the least developed countries, which presupposes a passive attitude on the part of the latter and shows their subaltern condition and it is usually linked to the notion of Official Development Assistance (ODA).² Over the decades, the definitions and concepts related to the topic have changed greatly and this type of assistance, although still exists, it was hardly replaced by the concept of technical cooperation tout court, which is the second type of cooperation. This has made it possible to treat developing countries as partners in the process of solving their problems. The last two types presented by Oliveira and Luvizotto (2011) regard South-South and sub-national initiatives.

² According to Besharati and Esteves (2015), the most recent definition in the theme (OECD, 2003) establishes that ODAs are only financial resources, goods and technical assistance that are offered to other countries for the purpose of development (not commercial or political), through official government channels, and on concessional terms (with a grant element of at least 25%).

Considering this second type of IDC, Besharati and Esteves (2015) note that in contrast to the ODA, flows of technical and financial assistance of developing countries need to be lined up with the priorities of the recipient and best-informed countries in a transparent way. Therefore, in this context, development cooperation is not only about financial flows, but also about the exchange of people, goods, ideas and technology. Consequently, bilateral agreements negotiated by Brazil with developed countries in the context of the promotion of EEPs can be pointed as a strategy to insert the country in the international field in order to achieve one of the main goals of BFP, which is to seek development (RIBEIRO, 2014). As discussed by Oliveira and Luvizotto (2011), international technical cooperation is seen under two main aspects: as an instrument of foreign policy and to promote the socio-economic development.

The increase in technical issues on BFP influenced not only the content of negotiations, but also the process, specially regarding the growth in the number of agents that integrate the foreign policy decision arena (RIBEIRO, 2014). Traditionally, the most important actors considered were the Executive Chief (with emphasis on Presidential Diplomacy) and the Ministry of Foreign Affairs (MFA or Itamaraty). In this new context of IDC, other ministries (such as the Finance, Military, Energy or Environmental ministries), the legislative power, interest groups (such as businessmen, for example) and public opinion started to gain a more relevant role.

According to Milani (2012), other factors contributed to the politicization of the BFP field, notably from the 1990s onwards. These include: a) the opening of Itamaraty through consultative forums and the formation of joint delegations; b) the mediatization of foreign policy; c) the relative increase in visibility of foreign policy agendas during the presidential electoral disputes in the 1990s and 2000s; d) the increasing interest of academics and specialists in monitoring foreign policy followed by the expansion of undergraduate courses in International Relations.

There are two main consequences of this process: firstly, an initial loss of exclusivity and a need for adaptation of the MFA, which formerly centralized all decisions with the Executive Branch. Secondly, the intensification of IDC projects due to the internationalization of segments of Brazilian State structure, likewise the energy utility sector (MILANI; PINHEIRO, 2012). Therefore, it became imperative to analyze BFP from a sectorial perspective, aiming to deepen the understanding of such complex dynamics.

According to Medeiros (2010), the role of MFA on those issues was to articulate the interests of the various national actors on the energy sector considering the possibilities presented in the international scenario, turning to the subject more emphatically and establishing a structure. The creation of the Departamento de Energia do Itamaraty (DEI), in 2006, represented a change in the perception, on the part of the conductors of the BFP regarding energy or, at least, in the way which energy politics was conducted in the foreign arena. This new strategic perception was consolidated with the establishment of a hierarchically superior entity to the DEI, in 2008, the Subsecretaria de Energia e Alta Tecnologia do Itamaraty. In 2011, the Minister of Foreign Affairs created the Under-Secretary-General for Environment and Energy given the reorientation of the topic due to Rio+20 Conference.

Unfolding IDCs on Energy Efficiency Programs: from bilateral agreements to domestic policies

In order to fill an empirical gap identified previously on IDC literature, we analyze a list of bilateral agreements signed with developed countries on energy efficiency, regarding the actors, issues, and goals involved. We used the database maintained by the Department of International Affairs of the Ministry of Foreign Affairs (Concordia-MRE). Inserting the term “energy” in the research tool, we found one hundred and seventy-four international bilateral

and multilateral acts, which include those current, non-current and ongoing ones, between 1980-2017. Concerning only current acts, there are a total of 51 (fifty-one) regarding energy efficiency issues, some as a specific agenda, some with several provisions on the subject and others that only mention energy efficiency. Among those, we selected the ones signed with the developed countries, which are a total of 12 (twelve), representing approximately 25% signed by Brazil with five developed countries: Germany, Denmark, USA, France, Italy, in addition to the European Union (EU).

Brazil's international acts with developed countries represent less than half of all those established on energy efficiency between 1980-2017. This demonstrates that even though these countries were the promoters of these programs after the second oil crisis, Brazil has expanded its approach among underdeveloped countries as technical cooperation patterns. This may be an indicator that the international cooperation promoted by the Brazilian governments in terms of energy may have privileged South-South cooperation, and strategic alliances with non-hegemonic actors (HIRST *et al.*, 2010).

In the sequence, we present a qualitative analysis of the agreements, in order to understand the BFP concerning the issue in question. Some factors will be examined to allow a broader understanding of energy efficiency within the framework of the agreements established by Brazil internationally. It is intended to observe (1) broad objectives related to these agreements, identify (2) some of the actions envisaged by the parties to promote cooperation, (3) governmental entities designated to act as representatives in the implementation of agreements, (4) the value invested by the parties and (5) the Brazilian actor responsible for signing the agreement.

Table 1. International Development Cooperation Agreements on the search of energy efficiency among Brazil and Developed Countries (1980-2017)

Country	Year	Invested values	Brazilian counterpart	Responsible institutions	Brazilian authority	Issue; actions	Goals
Italy	1981	NA	NA	Auxiliary company of Brazilian electric companies under the supervision of the secretaria de tecnologia of the ministry of mines and energy; italian company ansaldo	Secretary of the Secretaria de Tecnologia of the Ministry of Mines and Energy	Joint studies of feasibility and energy planning; development of projects and implementation of pilot units; transfer of technology; solar, wind and biomass systems, low-power hydroelectric plants, energy conservation	Cooperation for Development and Application of Renewable Energy Sources and Conservation of Energy; Research and development in the field of energy
France	1983	NA	NA	Companhia Energética de São Paulo; NOVELERG (French Energy Company)	Ambassador	Study, design and execution of plans and programs for the research and development of new energy sources, especially renewables, solar energy capture and use, methanol production from biomass, hydrogen production and use, and energy conservation systems	Scientific and technical cooperation between the Companhia Elétrica de São Paulo and NOVELERG (French electric company)
Germany	1993 /2000	865,000.00 German brands for technicians in various fields, experts, equipment for renewable energy installation, machines and implements for testing and instruction purposes, measuring and control instruments, special tools, electronic data processing equipment	Human resources, exemption of all equipment provided by Germany from licenses, import and re-export duties, and other fiscal charges, liability for customs procedure, expenses with port taxes and storage of equipment provided.	Deutsche Gesellschaft für Technische Zusammenarbeit (GTZ) e Companhia Energética de Minas Gerais (CEMIG)	Acting Minister of State for External Relations of the Federative Republic of Brazil	Support to Companhia Energética de Minas Gerais (CEMIG) to improve the energy supply of agricultural exploitation, using renewable energy sources, not harmful to the environment and rational use of energy	Rational Use of Energy in Agriculture to increase agricultural production, contribute to improving the energy supply in rural MG and the quality of life in general.
Germany	2000	114,000, 00 German brand on machines, apparatus and materials as instruments of measurement and analysis of data, consumables and fuels and materials of diffusion. Technician specialized in energy technology, business advice and management, provide technical partners training internships in Germany	Contributions through SEBRAE: expenses for each technician sent and contracted "in loco" by the Government of Germany, whose value will be established annually between the Agência Brasileira de Cooperação (ABC) and the Cooperation Agency of GTZ in Brazil	GTZ Cooperation Agency in Brazil and SEBRAE RJ (under the supervision of ABC)	Minister of State for Foreign Affairs	Training small and medium-sized companies in the rational use of energy and implement energy conservation measures through integrated energy consultancy, elaboration of information systems, public relations and advice on energy management and awareness of the importance of the theme. Implement cooperation between consulting institutions and companies.	Conservation of Medium and Small Industry Energy in the State of Rio de Janeiro
United States	2003	Provision of resources for alternate meetings once a year in Brazil and the US. Preparation of the ordinary meeting of the consultation mechanisms, when it occurs in the capital.	Resources for meetings	Department of Energy of the United States of America and Ministry of Mines and Energy of the Federative Republic of Brazil	Ministry of Mines and Energy of the Federative Republic of Brazil	Establishment of consultation mechanisms at the ministerial level to deal with topics of mutual interest in the area of energy, including energy planning and energy policy analysis, energy trade and investment, and cooperation in the field of energy technologies. Exchange of ideas and information on efficient and advanced energy technologies.	Developing reliable and diversified sources of energy, in a sustainable way, to ensure economic and social development. Improving energy infrastructure according to environmental criteria, create the appropriate climate for national and foreign investments in energy expansion
European Union	2007	Each party shall cover the costs of attending the alternate meetings in Brussels and in Brasília	Each party shall cover the costs of attending the alternate meetings in Brussels and in Brasília	Department of Energy of MRE and Ministry of Mines and Energy; Directorate-General for Energy and Transport of the European Commission and Directorate-General for External Relations	Minister of Foreign Affairs	Strengthen policy links to improve security of energy supply, diversification and supply routes; regulation for competitive energy markets; renewable energy sources, biofuels; energy demand management and energy efficiency, joint initiatives and work to promote energy efficiency at the international level; technological cooperation in energy efficiency and low-carbon energies	Promote the regular sectoral policy dialogue between Brazil and the EU on Energy Policy and Sustainable Development in Brazil
Denmark	2007/2011	NA	NA	Kingdom of Denmark and Government of the Federative Republic of Brazil	Minister of Foreign Affairs	Expand cooperation in new and renewable energies and energy efficiency.	Cooperation in the field of green economy, sustainable development and eradication of poverty, combating global warming and the negative effects of climate change.
Germany	2008	NA	NA	Government of the Federative Republic of Germany and Government of the Federative Republic of Brazil	Acting Minister of State for Foreign Affairs	Promoting forms of conservation and rational use of energy, development in generation, transmission and distribution of electricity, reliability, and safety of the electric system.	Heat and electricity, building sector, transportation systems, industrial equipment and processes, energy efficiency measurement, audit and verification procedures, best practices for assessing the effectiveness of energy efficiency policies and measures
	2015	2,500,000.00 Euros in Human Resources and Materials	Non-financial - Technical and Managerial Servers, physical facilities and equipment; provide immunity and protection to technicians; exemption from taxes on equipment and official charges	GTZ; ABC/MRE and Ministry of Cities	Director of the Agência Brasileira de Cooperação / MRE	Technical Cooperation Energy Efficiency in Water Supply	Promoting policy dialogue, scientific and technological exchange, and private sector participation. Improve and develop sustainable energy infrastructure, ensure the safe and sustainable supply and use of energy, through energy efficiency measures and by expanding the use of renewable energy
	2016	500.000,00 00 Euros in Human Resources and Materials	ibdem	ABC and National Institute of Metrology of Brazil and Germany	Director of the Agência Brasileira de Cooperação / MRE	Strengthening of the Quality Infrastructure for Renewable Energies and Energy Efficiency	Cooperation for Sustainable Development; Development of Brazil
	2017	4.000.000,00 00 Euros in Human Resources and Materials	ibdem	GTZ; ABC/MRE and Ministry of Cities	Ambassador	Implementation of Energy Efficiency for Sustainable Urban Development	Cooperation for Sustainable Development; Development of Brazil
	2017	265,000,000.00 Euros Loan to finance contracted goods and services .	Return of the value. To grant facilities for the entry and permanence of Germans workers.	Government of the Federative Republic of Brazil, Government of the Federal Republic of Germany and KfW	Minister of State for Foreign Affairs	Implementation of the Programa Pro Clima em Energia Renováveis e Eficiência Energética (BNDES)	Cooperation for Sustainable Development; Development of Brazil

Source: Elaborated based on the international cooperation agreements, collected in the Department of International Acts of the Ministry of Foreign Affairs (DAI-MRE).

The analysis of those agreements highlights interesting aspects of IDC. First, all developed countries, which are partners in cooperation agreements, have the highest scores in the energy efficiency sector, according to the International Energy Efficiency Scorecard published by the American Council (LINDQUIST, 2014). The scorecard analyzed the 16 largest economies in the world, according to three key areas of energy consumption: “buildings,” “industry” and “transportation.” Among a maximum score of 100 points, Germany had the highest overall score with 65 points. Other countries with the highest score in each category are China in building, Germany in industry and Italy in transportation. They also highlight the role of France, Italy and the European Union regarding the national efforts towards energy efficiency policies.

Second, we note that the most important partner is Germany. Germany is a world reference in this subject, being the one with legislation and implementation of programs with the greatest success rate in terms of energy efficiency. Among the goals established within these agreements with Germany, it is noted that cooperation for sustainable development and Brazilian development in the region is a recurring goal, demonstrating a clear concern about the environmental issue. Besides, Lima et al. (2018) reinforce this perception showing that Brazil and Germany focus their cooperation on two major priority themes: Renewable Energy and Energy Efficiency and the Protection and Sustainable Use of Forests. The projects have supported the implementation of the main Brazilian environmental policies focused on forests, biodiversity, climate change, among other topics.

Regarding the other initiatives, we point out that there is only one agreement with each one of the other partners. Within the numerous commitments made, there are many cases that are very specific cases and others not so much, which shows the diversity of means through which Brazilian external action is configured when energy is concerned. The overall goal of these agreements is technical cooperation for sustainable development in Brazil, through a variety of possibilities, such as reducing consumption

and optimizing existing resources, training, developing diversified sources of a new energy model, based on solid environmental criteria.

The agreements mention several points related to energy and energy efficiency involving technological, economic, social and environmental aspects. To illustrate those aspects, we find expressions such as exchange of experiences related to sustainable production and development, search for durable and economically feasible solutions to energy issues and quality infrastructure strengthening projects for renewable energy and energy efficiency, energy saving measures, energy trade and investment. Furthermore, they also mention cooperation in the field of energy technologies, exchange of ideas and information on efficient and advanced energy technologies, energy planning and energy policy analysis that are compatible with the need for growth, development and fight against poverty.

The main governmental actors involved in the signature, coordination, and execution of the actions established in the cooperation agreements are varied. Brazil does not uniformly determine the entities and institutions that will participate in these actions. However, it can be observed that in the signature and coordination the Ministry of Foreign Relations (MRE) the Agência Brasileira de Cooperação (ABC) and the Mines and Energy Ministry (MME) are prevalent.

Regarding execution, the actors are less homogenized, with the prevalence of the Brazilian power utility companies and the signatory countries, the MME and the MRE, based on the actions of the Agência Brasileira de Cooperação. Other actors who should be highlighted about the performance of the agreements on efficiency energy are private companies that work with the issue and the Instituto Nacional de Metrologia, Qualidade e Tecnologia (INMETRO). It is expected that there would be involvement of other actors contracted throughout the agreement such as universities and energy research centers, to foster the development of research, exchange of information and transfer of technologies.

However, the Brazilian Environment Ministry, for example, is not included or referred in any of the agreements analyzed. Such fact is controversial once the environmental approach is present in many acts, especially the ones negotiated from the 2000s on.

Given these findings on actors, privileged issues and instruments of action, we seek to identify how international cooperation agreements are: a) reflecting developed countries EEPs and b) unfolding in the arena Brazil and entering the agenda of domestic public policies.

In Brazil, the strategy adopted after the oil price shock was to search for new oil reserves, as well as to develop alternative sources of energy (such as through the Programa Nacional do Álcool, PROÁLCOOL). Among the power generation sector, the government increased the expansion of hydroelectric plants (SOUZA *et al.*, 2011). On the demand side, the country followed similar programs that were being implemented abroad. Throughout the 1980s, several issues gained visibility due to Brazilian external debt crisis. There were increased concerns surrounding energy waste, especially in the industrial sector, which resulted in the implementation of several national EEPs. In 1981, the CONSERVE Program, created by the Ministry of Industry and Commerce, was launched through the MIC/GM46 Ordinance and it is considered the first major effort in terms of energy conservation in Brazil (RIBEIRO, 2005). It was similar to the North American regulatory framework launched in 1975.

In 1984, the Programa Brasileiro de Etiquetagem was created, informing the consumer about the energy efficiency of products and, in 1985, it was established the Programa Nacional de Conservação de Energia Elétrica (PROCEL), which is still one of the current programs on energy efficiency in Brazil. PROCEL aims to promote the efficient use of electric energy and combat its waste, by endorsing actions to raise awareness of energy efficiency and investments directed at efficiency in the electricity sector. Another important initiative was the national program for the rationalization of the use of oil and natural gas derivatives (Conpet). Created in 1991, it encouraged the efficient use of non-renewable energy sources through the

promotion of partnerships between government agencies and non-governmental organizations (MENKES, 2004).

Although we did not observe any specific international agreements in this decade that promoted the programs adopted in these pioneer countries (see Table 1), the content of the programs is very similar to those adopted elsewhere. Therefore, it is possible to infer that the initiatives in the energy efficiency of the developed countries were important references for the design of similar programs that arose in Brazil in the years of 1980, as a result of the crisis of energy supplies.

Considering Brazilian post-Kyoto initiatives it is important to highlight the meanwhile liberalization process of the electric power sector in Brazil in the late 1990s (LEITE, 2014). On this basis, the government created the Agência Nacional de Energia Elétrica (ANEEL)³ responsible for sector regulation. In this context, it established the obligation of investments in conservation programs by electric power concessionaires, ratified by Law 9.991 of 2000, providing that:

Power utility companies are obliged to apply, annually, the amount of at least seventy-five hundredths of their net operating revenue in research and development of the electric sector and at least twenty and five hundredths percent in energy efficiency programs in final use, observing the following: I - until December 31, 2010, the minimum percentages defined in the caput of this article shall be 0.50% (fifty hundredths percent), both for research and development as well as programs for energy efficiency in the supply. (BRASIL, 2000).

Therefore, under this framework, power utilities had the ability to decide about the implementation of the EEPs (GREEN, 2000). This process resulted in more autonomy for private companies to use resources to drive energy efficiency projects most advantageously

³ It is the municipality created by Law No. 9,427 of 1996, linked to the Ministry of Mines and Energy (MME) to regulate and supervise the production, transmission, distribution and commercialization of electric energy of all Brazilian power utility companies in accordance with the policies and guidelines of the Federal Government (Law 9,427/96). More details at (<http://www.aneel.gov.br/a-aneel> (05 May, 2017))

to meet their strategic objectives (VILLA VERDE, 2000). This change implied the prevalence of market logic in the sector, with pervasive effects on the implementation of energy efficiency policies as national drivers of socio-economic development. As an example, an expected decentralization of the investment decision could lead to a decoupling of the interests defended by the organisms responsible for the BFP.

The Programa de Eficiência Energética (PEE) originated from this obligation and became the main financial source for energy efficiency projects in the country, with annual investments of R\$ 500 million approximately (NASCIMENTO, 2015). Nevertheless, in January 2016, there was a reduction of 0.5% to 0.25% in the number of revenues to be applied by the concessionaires in these programs. The program lost half of its resources, significantly affecting the results obtained (ALTOÉ, 2017). Therefore, it is necessary to pay close attention to the damage that the reduction of these investments might have had. Energy efficiency investments are crucial regarding the search for a model of national energy development that manages to supply the needs of the society, from a sustainable perspective.

In addition to the PEE, in 2001 the National Policy for the Conservation and Rational Use of Energy (known as the Energy Efficiency Law) was established, demanding compulsory conformity assessment programs in the area of energy efficiency (GELLER *et al.*, 2004). Another important national program that emerged in the 21st century from the Brazilian government's performance, driven by international and national concern about global warming regarding energy efficiency, was carried out by the Ministry of Industry, Foreign Trade, and Services (MDIC). The 'Brasil Mais Produtivo' Program:

Offers consulting to companies focused on energy efficiency, seeking to reduce costs and waste of energy in the production process. Currently, the method to be applied is tested by 48 participants. With this, the government intends to apply the

program resources rationally and efficiently after testing the methodology. (MDIC, 2017).

During UNFCCC COP15 meeting in 2009, Brazil announced voluntary targets to reduce from 36.1% to 38.9% of total projected GHG emissions until 2020. This goal was endorsed by Law 12,187, which established National Policy on Climate Change (PNMC)⁴ and was promulgated by the National Congress in December 2009. Under these conditions, the PDE 2020 (MME, 2010) was formulated with the objective to meet an emission target in the energy sector compatible with the target of the voluntary reduction global emission projected for 2020, in the form established in the Brazilian National Communication in Copenhagen and by the Law 12,187/09. In the document, socio-environmental aspects were considered. At the time, the country declared that its energy objectives were:

[...] issues associated with the reduction of local and global impacts, increasing energy efficiency and the use of renewable sources for electricity generation, the sustainable use of water resources and the minimization of impacts on ecosystems and biodiversity are the extension of this concept, being considered in the criteria and procedures adopted. (MME, 2010, 62).

Within this perspective, Brazil has expressed the need to ensure that economic and social developments are compatible with the contribution to the protection of global climate system, and among the ways to enable this, energy efficiency measures were presented as crucial (MMA, 2012).

In the context of the Global Environment Facility (GEF), previously mentioned as a financing instrument for projects, Brazil benefited from seven projects exclusively related to energy efficiency (see Table 2), three of them established in 2016.

⁴ It consists of legislation adopted by Brazil at the end of 2009 to ensure that socio-economic development is compatible with the contribution to the protection of the global climate system. Under this legislation federal, state and municipal governments are authorized to implement mitigation and adaptation actions. Available at (http://www.planalto.gov.br/ccivil_03/_ato2007-2010/2009/lei/l12187.htm (18 December, 2017)).

Table 2. Projects related to energy efficiency of the GEF for Brazil in dollars

Project	Agency	Loan	Total co-financed	Year approved
Market Transformation and Strengthening Initiative	UNEP	8.115.000	-	1993
Efficient Energy Standards, Certification and Labeling	UNEP	3.000.000	3.370.000	1995
Low Carbon Development Path	World Bank	40.000.000	82.000.000	1997
Removing barriers to energy efficiency and energy conservation	World Bank	20.000.000	180.000.000	1998
Low-cost buildings and energy consumption	UNEP	5.720.000	6.500.000	2016
Removal of Energy Efficiency Barriers	UNEP	2.650.000	7.715.000	2016
Improving Energy Efficiency	FAO	8.850.000	33.900.000	2016

Source: Elaborated based on data (<https://www.thegef.org/> (06, October, 2016)).

To conclude, these programs launched after 2000, highlight energy issue as a fundamental vector of Brazilian socio-economic development discourse under MFA, corroborating the idea of EEPs meeting energy security from a broader perspective including environmental protection goals.

Final considerations

Historically, two factors have deeply driven energy related decisions internationally: energy security and environmental administration (PAUL, 2007). Nevertheless, literature to explain the variables behind the international EEPs point to three elements of analysis: techno-economic, environmental and social (RIBEIRO, 2005), minimizing the role of international factors on energy efficiency instruments choices. Here, we singled the role of the international arena, through the analysis of IDC agreements on

strategic policy choices related to a technical issue like energy efficiency regarding partners, topics, sectors and instruments employed.

Energy efficiency cooperation agreements have served as information bridges on mechanisms (policies and programs) to promote EEPs in developing countries. In Brazil, the main findings of this research, from a content perspective, point to an expansion of understanding of energy efficiency from a narrow perspective of a techno-economic reasoning to a broader one involving sustainable development and climate change policies. From a theoretical analysis, we sign that IDC was an instrument of BFP through which EEPs were promoted, and the greater number of initiatives can be explained for an increase in the energy agenda within Itamaraty, for example, the creation of an energy department at MFA. In addition, we also point to a decentralization process in the coordination of actions with the objective to promote energy efficiency. Even though it is necessary the participation of several institutions, in many cases, given the nature of the subject, such a framework may lead to a lack of unity and coherence in actions.

To conclude, we reinforce the need to improve a research agenda on other technical sectors where BFP showed a greater importance and influence on public policies adopted domestically. This effort is even more relevant in the context of understanding what is politically feasible and durable in this domain, unlike the more dominant social science contributions of economics, which talks about efficiency but is largely indifferent to political or institutional constraints, as discussed by Karapın (2016).

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