

巴西的环境税和可再生能源

**TRIBUTAÇÃO AMBIENTAL E ENERGIAS
RENOVÁVEIS NO BRASIL^{18]}**

**ENVIRONMENTAL TAXATION AND RENEWABLE
ENERGY IN BRAZIL**

Ana Paula Basso (安娜·巴索)

DOI 10.5281/zenodo.8231372

<https://doi.org/10.5281/zenodo.8231372>

¹⁸ Translated into English by Karolina Maria Fonsêca de Souza (卡罗琳娜·索扎).

摘要

本文论述了环境税作为可再生能源的调节器，有利于保护环境和能源结构的多样化。鉴于可再生能源生产存在的潜在风险可能危及社会经济发展，因此有必要制定一项有效和安全的能源政策。巴西政府鼓励可再生资源的多样性，其丰富的自然资源，将带来巨大的能源红利。因此，多样化和易开发的能源结构将改善巴西的社会和经济环境，提升人们的生活质量，促进了相关产品和服务发展。

关键词：环境税收；可再生能源；能源结构

RESUMO

O presente texto trata da tributação ambiental como promotora de energias renováveis e diversificação da matriz energética em prol da tutela do meio ambiente. Diante de tal finalidade, tem-se presente a necessidade de uma política energética eficiente e segura, em atenção a potencialidade e a exposição aos riscos que podem comprometer a produção de determinadas formas de produção de energia renovável que podem comprometer o desenvolvimento socioeconômico. Cabe ao Estado brasileiro incentivar a diversidade de suas fontes renováveis, privilegiando as suas riquezas de recursos naturais, tornando-as cada vez mais acessíveis à população em todas as suas classes. Resulta que, uma matriz energética segura, diversificada e acessível acarreta melhorias econômicas e sociais à nação, em especial ambientais, mas não só, pois proporciona desenvolvimento e benefício na qualidade de vida das pessoas, promovendo inclusão social e ajustamento de preços na produção e oferta de produtos e serviços.

Palavras-chave: Tributação ambiental; Energias renováveis; Matriz energética diversificada.

ABSTRACT

This text deals with environmental taxation as a promoter of renewable energies and diversification of the energy matrix in favor of protecting the environment. In view of this purpose, there is a need for an efficient and safe energy policy, considering the potential and exposure to risks that may compromise the production of certain forms of renewable energy production that may compromise the socioeconomic development. It is up to the Brazilian State to encourage the diversity of its renewable sources, favoring its wealth of natural resources, making them increasingly accessible to the population in all its classes. Consequently, diversified, and accessible energy matrix brings economic and social improvements to the nation - especially environmental, but not only- as it provides development and benefits in people's quality of life, promoting social inclusion and price adjustment in production and supply of products and services.

Keywords: Environmental taxation; Renewable energy; Diversified energy matrix.

1 INTRODUCTION

This study aims to analyze how environmental taxation can encourage the generation of electricity through renewable energy sources to improve the efficiency of the Brazilian energy matrix. Therefore, it is important to consider, when dealing with these policies, the potential of energy production and exposure to risks that may

compromise its execution, as well as the costs of its implementation and performance.

Environmental taxation in the electricity sector aims to mitigate the use of energy that originates from the burning of fossil fuels, which is predominant in the country and in the world, however, has a high polluting level.

It is noticeable that, nations tend to change their energy matrix to cleaner forms in pursuit of sustainability and energy efficiency, which is why the focus has turned to renewable energies. Incidentally, this concern gains greater weight in relation to dependence on fossil fuels in terms of the volatility of their prices, which currently, in addition to the consistent environmental attention for being one of the greatest causes of the greenhouse effect, has also had a strong influence on the economy of countries, interfering in high inflation. This situation has gained a better perception since the war between Russia and Ukraine broke out, due to the fact that the former is one of the main oil producers and has been the target of major economic sanctions from different countries and has cut off its supply to the Occident, which in turn has triggered the price increase of different products and services.

At the same time, it is important to consider that the inclusion of renewable sources should not compromise national development policies. It is known that such sources do not have the same energy potential, compared to the polluting source originated by the burning of fossil fuel, and may suffer interference from the climate, which compromises their own production. In turn, this risk also belongs to its producer/investor, who requires prudence in the implementation of measures that may compensate this. In these circumstances, it is verified that the expenses to implement a renewable energy source are high, which gives it a competitive disadvantage and can make it less attractive, causing an impasse in the expansion of its adoption.

In this context, which is inferred from the need to reduce costs, that environmental taxation can encourage the use of renewable energies, so that they present exponentially as an option to encourage the development of technologies with plans of different scales tending to reduce the negative environmental impacts created by carbon emissions.

It is intended to demonstrate in this outline that it is necessary that the Brazilian legal system meets the international recommendations concerned with the preservation of the environment, stimulating the implementation of different energy sources that are clean and bring environmental improvement for all, taking advantage of taxation so that the renewal of the energy matrix is achieved, making it diversified and efficient, so that the country becomes less dependent on polluting sources.

2 RENEWABLE ENERGIES AND INCENTIVE POLICIES

Renewable energies became more appreciated in the last two centuries because of the warning that fossil fuels were finite. One of the factors that influence efforts to implement renewable energies is the fluctuation in fuel prices. It is noteworthy that in the 1980s, witnessing the fall in oil prices, there was a lack of incentive to explore new energy alternatives. (AQUILA, 2015)

With concerns arising from the consequences of climate change from the 1990s onwards, the UN held important conferences in order to alert nations to the urgency of thinking about solutions to socio-environmental problems, which concentrated on proposals for changes in the energy matrix with the introduction of renewable energies, since climate change mitigation issues are connected to it. It must be highlighted the following meetings and actions that brought relevant debates and documents on measures to face climate change:

Rio 92, Rio +10 and Rio +20, as well as Agenda 21 and the Paris Agreement, in 2015; Brazil made a commitment.

Brazil integrates, almost in its entirety, the multilateral agreements on the environment, although the internalization of these is awfully slow. Even in this slow way, for a long time the country showed itself in a prominent position in environmental protection, such as, in the past, the fight against deforestation associated with the international perspective of the Amazon Forest and hosting two United Nations Conferences (Rio 92 and Rio +20) on the environment and sustainable development.

Already, the government of Jair Messias Bolsonaro, from 2019 to 2022, manifested a liberal agenda in the economy and economic growth aimed at the exploitation of natural resources and agribusiness. The said President, still in 2018, in his election campaign, made a promise to withdraw Brazil from the Paris Agreement, when he was elected. Jair Bolsonaro's allegations were that the Agreement interferes with the nation's sovereignty over the Amazon Rainforest. (SANCHES, 2019)

At the time of his election, President Jair Bolsonaro, even though he did not believe in global warming as a real problem, had to review his position because his demonstration against the Agreement did not have a positive impact on the international front, raising the risk of rejection of Brazilian agribusiness products in the international market. Needing, therefore, to review his position on leaving the Paris Agreement, even though the fires in the Amazon were highlighted in the media. (SANCHES, 2019)

Even though the government preferred to invest in extractive and polluting economic policies, Brazil is committed to the climate through the Paris Agreement, with assumed goals, especially on renewable energies. The main objective of the document is to restrain the global increase in temperature.

The country, when signing the Paris Convention (COP 21) in December 2015, invoked goals before the United Nations Framework Convention on climate change (UNFCCC), with the granting of the Intended Nationally Determined Contribution (INDC). With the cited document, several obligations were assumed by Brazil. Regarding renewable energies, it can be specified as follows:

- i) aumentar a participação de bioenergia sustentável na matriz energética brasileira para aproximadamente 18% até 2030, expandindo o consumo de biocombustíveis, aumentando a oferta de etanol, inclusive por meio do aumento da parcela de biocombustíveis avançados (segunda geração), e aumentando a parcela de biodiesel na mistura do diesel;
- (...) iii) no setor da energia, alcançar uma participação estimada de 45% de energias renováveis na composição da matriz energética em 2030, incluindo:
 - expandir o uso de fontes renováveis, além da energia hídrica, na matriz total de energia para uma participação de 28% a 33% até 2030.
 - expandir o uso doméstico de fontes de energia não fóssil, aumentando a parcela de energias renováveis (além da energia hídrica) no fornecimento de energia elétrica para ao menos 23% até 2030, inclusive pelo aumento da participação de eólica, biomassa e solar;
 - alcançar 10% de ganhos de eficiência no setor elétrico até 2030.
- (...) v) no setor industrial, promover novos padrões de tecnologias limpas e ampliar medidas de eficiência energética e de infraestrutura de baixo carbono; (INDC, 2015)

Such commitments have international prominence and have been endorsed by 195 countries. Europe, even though it stands out in terms of the rise of renewable energies, it should be noted that, in recent times, has faced a crisis in its energy matrix due to problems caused by the climate and, therefore, becoming increasingly dependent

fuel imports. For this reason, it reinforces the importance that the energy matrix should be diversified so that there is less damage to its efficiency. The European Union stands out in the promotion of renewable energies, however, with the increase in electricity demand due to the resumption of the post-pandemic economy and affected by external and geopolitical factors, the European renewable matrix is not able to sufficiently accommodate its demand, causing it to rely on oil imports, mainly Russian, which is responsible for a third of the continent's supply. (CHAVES, 2021)

In Brazil, Law 12,187/09, which deals with the National Policy on Climate Change, had vetoed the guidelines for reducing the use of fossil fuels and their replacement in the energy matrix. It may seem that the Brazilian government was against sustainability measures in favor of the environment in the energy sector, which in fact were not privileged at the time of the veto. However, the exclusion of these measures would be justified by the possibility of weakening the reliability and security of the system. In addition, the Brazilian territory has relevant sources of oil and coal to promote an adequate energy yield, which brings economic benefits to the country. (FIORILLO; FERREIRA, 2020).

Organizing new sources of energy that are renewable is something imperative and of global necessity, however, it is necessary to observe its implications and the risk of energy crisis in the face of its uncertainties. It is not intended to argue that this justifies not investing in renewable sources, on the contrary, since they, unlike oil, which must be considered as an exhaustible source, are environmentally desirable, and should therefore be encouraged. In this way, it is necessary to encourage instruments that allow the lowest possible degradation, so that fossil fuels are used rationally, and so that there are investments in technologies for the diversity of renewable sources in the energy

matrices, making them efficient, clean, and sustainable options accessible to the population.

The main source of electric energy in Brazil is hydraulic production, although it has a strong potential to explore other renewable sources, such as wind, solar and biomass. Brazil has elements to make its energy matrix diversified which can help in national energy security, however, it takes long steps to increase sustainable energy generation.

The energy potential of a hydroelectric plant, in its normality, is considered high. It so happens that this type of production suffers from climatic effects. This was evident from mid-2021 to early 2022, when it was essential to activate thermoelectric plants in Brazil, due to the water shortage witnessed in this period. This led to an increase in energy prices, as well as a change in the tariff flag.

In the world, the percentage of energy produced by hydroelectric plants reaches 20%. (TERRIN; BLANCHET, 2019) While in Brazil, this type of generation in the internal supply is more than half of the Brazilian energy matrix (65.2%). (EPE, 2021) The Brazilian energy matrix is considered renewable, and this great representativeness is due to the production of energy in hydroelectric plants, followed to a lesser extent by the production of wind and solar energy.

Hydraulic electricity generation is reputed to be a clean source. But it is not entirely safe considering that it is conditioned to the climate, and its water flow varies according to the density of the rains. Furthermore, according to studies, the creation of a hydroelectric plant has repercussions on environmental damage, flooding large areas and altering ecosystems, devastating vegetation, silting up rivers and annihilating species, not to mention the displacement of riverside populations. And once installed, it causes impacts on the environment, including the possibility of emitting gases that are harmful to the environment, such as methane and carbon dioxide, which are released by the decomposition of submerged vegetation. (FEARNSIDE, 2019)

Furthermore, environmental losses are aggravated in the event of a water crisis that involves the reduction in the flow of hydroelectric reservoirs, which compromises the essential practice of the riverside population, such as fishing and river transport.

As exposed, the Brazilian energy matrix can be rich from the possibility of the diversity of sources that can be used. Another means of producing electricity that is available is the supply through biomass that originates in sugar cane plants. In 2020, the percentage of supply from this source reached 9.1%. (EPE, 2021). It is a less expensive form of generation than burning fuels, which can reach half the cost of the latter. (FORBES, 2021)

Biomass comes from organic matter and is considered the first source used by humanity, being used to cook food through the heat of combustion. Some of the derivatives of biomass are bio-oil, biogas, biomass-to-liquid, cellulosic ethanol, bioethanol, biodiesel, firewood, charcoal, and peat. Among the experiences with biomass, in 1975 there was Proalcool, a program for the development of ethanol as a substitute for gasoline. At the time, it had world prominence in the commercial exploitation of biomass as an energy source. In the 1980s, Brazil became less dependent on importing fossil fuels, however, the government's financial difficulties and the drop in the price of crude oil on the international market, meant that support for the ethanol industry began to decline. Brazil has a relevant capacity to produce energy from biomass, mainly because it has a large area of planted sugarcane. (AQUILA, 2015)

Another source that Brazil has implemented is wind energy. It can be introduced in various locations and scales, and can be onshore (on land), as well as offshore (seacoast), as well as small or large wind farms. It has been one of the sources that has advanced. Europe has the best use of this source, accompanied by China and the United States. As for the latter, incentive programs and investment funds have

boosted the production of electricity using this type of production source. In Brazil, an attempt was made to encourage this source through the Emergency Wind Energy Program (PROEÖLICA), during the energy crisis in 2001, and this Program did not generate meaningful results and resulted in its replacement by the Alternative Sources Incentive Program (PROINFA). The places with the most wind potential in the Brazilian territory are the coastal regions of the Northeast and the South. (AQUILA, 2015)

PROINFA, created by Law 10,438/2002, later adjusted by Law 10,762, in November 2003 and by Decree 5025, in March 2004, established obligations for electric energy concessionaires to participate in the universalization of access to it, for the increase in the share of electricity from independent undertakings. In this program, financing systems by the National Development Bank (BNDES) and requirements for the participation of national equipment in contracted projects were included. The Program was proposed at an opportune moment “o cenário internacional, de apoio à energia limpa e as preocupações relacionadas com o protocolo de Quioto teve um papel importante na elaboração e aprovação do PROINFA” (AQUILA, 2015, p. 82).

In turn, solar energy is considered the most abundant because it comes from the sun’s rays and can be classified as passive and active, thermal, or photovoltaic, concentrated or non-concentrated. Although it has a small global supply of electricity, it technically has the potential to vastly exceed world energy demand. The main obstacle to its deployment is the cost of its technology. (AQUILA, 2015)

In addition to these, new sources of renewable energy are being analyzed and are presented as alternatives, such as geothermal, bioenergy and wave and tidal energy, which demonstrates the need for continuous stimulation of innovation, fulfilling the responsibility of

the public power to keep an eye opened on the different alternatives for improving the energy matrix.

3 ENVIRONMENTAL TAXATION AS A STRATEGY TO PROMOTE RENEWABLE ENERGY SOURCES

The importance of the environment for human life is undeniable, which should not be limited to theoretical discussions and the preparation of works warning about the exploitation of natural resources at a pace that does not accompany their renewal, environmental protection measures must be implemented by States and individuals requiring economic and regulatory interventions.

Faced with the global concern about climate change, different governments have been more attentive to the development of measures to reduce greenhouse gas emissions. Many have generated policies to promote renewable energies. Intervention by government administrations can be long-term or short-term, with the latter ending with the strategy, and the former continuing until the end of the policy implementation. Some common forms of short-term strategy are direct subsidies, tax cuts for renewable source projects or tax requirements starting from a certain level of carbon dioxide emissions. While the long-term ones would be, for example, the price and quota systems. (AQUILA, 2015)

It is a multidisciplinary and interdisciplinary issue to associate the environmental issue with energy, not to mention the economic and social issues that the theme involves in the face of other guidelines that can be raised according to the format in which the renewable source is implemented and regulated.

Just to clarify, energy raises debates in various aspects, such as:

Na contextura jurídica a energia é um bem juridicamente tutelado como uma questão de interesse público. Possui reflexos importantes nas mais variadas ordens.

Na Economia, a energia aparece como um elemento externo ao sistema econômico, que deve ser levado em consideração a partir de uma relação entre custo e oportunidades. Já em um sentido político, pode-se dizer que a energia é uma condição do desenvolvimento. Ela possibilita que a sociedade crie e mantenha mecanismos de adaptação ao meio ambiente natural através do aquecimento, do arrefecimento, da alimentação dos meios de transporte e motores industriais, além da própria comunicação da sociedade.

Importante apontar que a inclusão social pressupõe, portanto, acesso universal à energia. Somente com energia se pode participar comunicativamente da sociedade contemporânea, quer dizer, uma sociedade que transcende os espaços das interações presenciais face-a-face. Sua falta corresponderia a uma catástrofe social. Os sistemas sociais deixariam de funcionar, a economia quebraria, a segurança se encerraria, a saúde pública será afetada, o direito já não se aplica mais, a política perde seus meios de vinculação generalizada de suas decisões e etc.

[...] A questão energética colocada para o direito não está mais apenas nas relações entre produção, transmissão, distribuição e consumo de energia. Agora a energia tem que ser pensada também como um recurso natural escasso que coloca como problema a própria continuidade operativa da sociedade como um todo; um produto cuja utilização não pode agravar a situação ecológica do planeta; bem como diante de seus significativos impactos na esfera social.

[...] Atualmente – e especialmente após a descentralização do sistema de geração, transmissão, distribuição e consumo de energia –, a energia só pode ser juridicamente entendida como dependente da tecnologia e dos recursos naturais. Essa tríplice referência jurídica, ecológica e

tecnológica permite pensar em princípios específicos ao Direito da Energia: o princípio da segurança no abastecimento energético, da eficiência energética, do não-retrocesso na utilização de tecnologias, do acesso universal à rede de distribuição de energia e, por fim, o princípio da liberdade energética (TERRIN; BLANCHET, 2019, p. 49, 50)

From the Brazilian perspective, there is a consistent absence of incentives for renewable energies other than hydroelectric production. Dependence on this modality to a high degree, has already been verified, even in 2022 with the drought, it was necessary to activate thermoelectric plants, which does not guarantee a safe energy matrix. What is important is that the Brazilian system ensures an energy matrix that is not only sustainable, but also efficient. It matters, in view of the reality that was found in Europe, also in 2022, in view of the war and limitation in the supply of oil, as well as considering the inconstancy in the provision of some renewable sources due to external conditions often caused by climate variations, that the energy matrix is diversified, so that it is efficient in its supply, economic and sustainability aspect.

As an instrument to promote renewable sources to become competitive and attractive, environmental taxation appears as an option. The Brazilian legal system, at the constitutional level, has not specifically related tax law to the environment, although there is no prohibition. However, this understanding can be extracted from device 170, VI, and 225, caput, both of the Federal Constitution, which configure the intention of conforming the economy and the environment, since it is possible to consider the tribute as an economic instrument. That is, environmental taxation can be a mechanism to protect the environment in the economic order.

Environmental taxation is an effective instrument to ensure fundamental rights, which requires an incentive policy to guarantee

legal certainty to agents who invest in favor of the environment. Electricity is essential, almost all activities, from leisure to economic, involve its consumption. Failure and insecurity in the energy supply reflect in the most different stances, hence the relevance of its discussion and the need to diversify its sources and facilitate its access.

Environmental taxation can be represented by its extra fiscal nature of inducing behaviors that are most desired for the protection of the environment. Such conduct would be driven by the tax burden, so that the tax burden would be increased to discourage and reduced or even extinguished to encourage a certain conduct. It would attribute differentiated tax treatment motivated by the environmental protection supported by the Federal Constitution. (BASSO, 2010)

In the same sense is the OECD's Taxing Energy Use report, which guides nations to analyze fiscal options for the use of taxation on energy to induce investment in renewable sources. The document states that taxes influence energy prices to contain negative impacts and that incentives would be alternatives for clean technologies. According to the OECD, taxing polluting sources would reposition demand for renewable sources. It would be a way to discourage behavior. (OECD, 2015)

In this last point, which is suggested by the OECD, it should be noted that considering attributing a higher tax burden on polluting energy in Brazil is complex. Energy taxation is already high, and its price is unreasonable, and it is an element that has repercussions on different production and consumption chains. To make a renewable source competitive, it is necessary to consider its energy potential, its efficiency and make it accessible to the final consumer. The latter, the consumer, needs to be considered in energy policies, since he is the one who uses and pays for the energy, he is the one at the end of the economic chain. It should be noted that environmental taxation

is about changing postures so that there is an effective benefit to the environment and no longer a justification for raising more revenue.

Financial stimuli are needed to continuously improve renewable sources, supporting innovative technologies. However, it should be noted that these incentives must guide a renewable energy market, boosting the market, without forgetting to also incite interest and facilitate access to the final consumer. In this sense, Aquila (2015, p. 51) quoted Çetin and Egrican's reflection in Turkey:

Nesse sentido, Çetin e Egrican (2011) citam o exemplo da Turquia, que possui um grande potencial para o aproveitamento de energia solar, mas sem a formulação de estratégias para o desenvolvimento do uso dessa fonte, o país dificilmente conseguirá se tornar um bom exemplo de sucesso nesse setor. Para isso, é necessária a formulação de uma política energética para aumentar a demanda por energia proveniente dessa fonte.

The use of economic instruments for the promotion of renewable energies is demanded, allowing a different treatment regarding benefits and tax incentives in favor of the environment. The tax burden rates on energy in Brazil, although appreciated as an essential good, are high. There is a disincentive that goes against the promotion of renewable sources.

Even if one considers the production of energy by renewable hydroelectric plants, there is a very large disproportion of internal supply among the other energy sources in Brazil, as verified in the National Energy Balance, based on year 2020, organized by the Energy Research Company, in its report 2021: Biomass 9.1%, Wind 8.8%, Solar 1.6%, Coal 3.1%, Natural Gas 8.3%, Oil Derivatives 1.6%, Nuclear 2.2% and Hydraulics 65 ,two%. (EPE, 2021).

It should be remembered that, as seen above, Brazil proposed, in the Paris Agreement, to obtain 45% of renewable energy from its total energy production and to expand the use of renewable sources beyond hydroelectric energy, reaching a percentage between 28 % and 33% in the total production result by the year 2030. Likewise, it committed itself to expanding the domestic use of renewable energy sources that are not hydroelectric or derived from fossil materials, in the supply of electricity, to at least 23% until 2030, especially due to the increase in wind, biomass and solar sources.

The northeast region of Brazil has the highest degrees of global solar irradiation and the lowest variation during the year compared to all geographic regions, which privileges the country to a favorable evolution in the renewable energy matrix in this modality. (MOREIRA JUNIOR E SOUZA, 2020) Solar energy deserves better attention because it uses an inexhaustible source and does not need a large installation area, nor the devastation of vegetation. Photovoltaic cells also rely on modern disposal techniques that do not harm the environment, and the main thing is that they do not emit any polluting greenhouse gases. Considering the environmental benefits, it makes sense for it to have a differentiated treatment to make it competitive and be able to stimulate it. In this sense, it is important to use economic instruments so that barriers and costs for the implementation of this form of energy generation are reduced to increase its benefit.

The State has the role of developing public policies, especially on environmental protection. The environment is related to fundamental rights and sustainable development, and when it comes to the energy matrix, its progress, making it increasingly efficient and clean, can promote them. When it comes to these four elements, we are talking about improving the quality of life and well-being of all. One cannot create impasses to energy production because it will negatively affect economic growth, on the other hand, the activity cannot annihilate the

environment, compromising people's health. A rational and balanced assessment of all this is required, with the need to conform the environment and the economy to achieve sustainable development.

The taxes and charges that fall on electricity end up being borne by Brazilian consumers, being included in the electricity tariff, ranging from 38%, with the remaining 62% being the cost of generation, transmission, and distribution of electricity. Not to mention the value and taxation levied on equipment from renewable sources that, likewise, will be considered in your offer. Tax costs are high, which highlights the need to implement fiscal policies that promote renewable energies to make them competitive. However, such incentives cannot be considered privileges and must be under cost-benefit control and justified by the protection of the environment.

4 CONCLUSION

Despite verifying the relevance and constitutional orientation of the State to conduct environmental protection, to have a rational balance between the environment and the economy, it was emphasized that Brazil does not use a consistent state policy to encourage clean energies that are different from energy produced by hydroelectric sources. It is important to design a model for the promotion of renewable energies with specific tax incentives to balance the costs between the sources of electrical energy, making those conceptualized as renewables, competitive and attractive, as well as accessible to consumers.

The State, in addition to sanctioning, can also be the driver of behavior. It is up to him to manage the protection of the environment, prioritizing measures that present the lowest possible social cost. For this reason, the country needs to direct efforts to improve its energy

matrix, not prioritizing only hydroelectric plants and considering that water is also a finite asset, plus relying on a hydraulic source also jeopardizes its energy efficiency.

It is up to the country to encourage the diversity of its renewable sources, favoring its wealth of resources that help it to achieve this end. A safe, diversified, and accessible energy matrix brings economic and social benefits, the latter including environmental benefits, providing development and improvement in people's quality of life, which promotes social inclusion and price adjustment in the production and supply of products and services, helping to contain inflation.

Given the above reasons and the international documents signed by Brazil, there is the nation's commitment to introduce renewable technologies and mitigate the environmental impact. Therefore, it is important that public policies are implemented so that there is greater sharing of clean energy, making its production and consumption accessible. And, as seen, environmental taxation can function as a promoter of the increment of renewable technologies, attributing incentives regarding the acquisition of equipment to the reduction of taxes that affect the consumption of clean energy.

5 REFERENCES

AQUILA, Giancarlo. *Análise do impacto dos programas de incentivos para viabilizar economicamente o uso de fontes de energia renovável*. 2015. 152 f. Tese (Doutorado em Engenharia de Produção), Universidade Federal de Itajubá, Itajubá, 2015. Disponível em: https://repositorio.unifei.edu.br/jspui/bitstream/123456789/203/3/dissertacao_aquila_2015.pdf Acesso em 05 de agosto de 2022.

BASSO, Ana Paula. Os benefícios fiscais em favor do desenvolvimento sustentável. *Revista Direito e Desenvolvimento*, João Pessoa, v. 1, n. 2, p. 41-52, dez. 2010.

BRASIL. Ministério do Meio Ambiente. *iNDC - Contribuição Nacionalmente Determinada*. Disponível em: <https://antigo.mma.gov.br/clima/grupo-executivo-sobre-mudanca-do-clima/grupo-executivo-sobre-mudancas-climaticas/item/10570-indc-contribuicao-nacionalmente-determinada.html>. Acesso em 03 de agosto de 2022.

CHAVES, Ana Carolina. *Crise Energética na Europa expõe complexidade da transição energética*. Instituto de Estudos Estratégicos de Petróleo, Gás Natural e Biocombustíveis – INEEP. Rio de Janeiro, 2021. Disponível em: <https://ineep.org.br/crise-energetica-na-europa-expoe-complexidade-da-transicao-energetica/>. Acesso em 03 de agosto de 2022.

EMPRESA DE PESQUISA ENERGÉTICA (EPE) *Balanço Energético Nacional 2021: Ano base 2020*. Rio de Janeiro: EPE, 2021. Disponível em: <https://www.epe.gov.br/sites-pt/publicacoes-dados-abertos/publicacoes/PublicacoesArquivos/publicacao-601/topico-596/BEN2021.pdf> . Acesso em 03 de agosto de 2022.

FEARNSIDE, Philip Martin. 2019. Emissões de gases de efeito estufa das represas hidrelétricas da Amazônia brasileira. pp. 87-90. In: P.M. Fearnside (ed.) *Hidrelétricas na Amazônia: Impactos Ambientais e Sociais na Tomada de Decisões sobre Grandes Obras*. Vol. 3. Editora do INPA, Manaus. 148 p. Disponível em: http://philip.inpa.gov.br/publ_livres/2019/Hidro-v3/Livro_Hidrelétricas_Vol_3-Cap_6_Emissoes_de_gases.pdf. Acesso em 03 de agosto de 2022.

FIORILLO, Celso Antonio Pacheco. FERREIRA, Renata Marques. A soberania Energética em face da ordem econômica constitucional e o Acordo de Paris: a política energética nacional como instrumento de desenvolvimento sustentável. *Novos Estudos Jurídicos*, Vol 25, n. 1., p. 2 a 28, Jan-Abr, 2020

FORBES. *Biomassa das usinas de cana pode gerar mais energia e amenizar efeitos da crise hídrica*. São Paulo. 10 jun. 2021. Disponível em: <https://forbes.com.br/forbesagro/2021/06/biomassa-das-usinas-de-cana-pode-gerar-mais-energia-e-amenizar-efeitos-da-crise-hidrica/>. Acesso em 03 de agosto de 2022.

MOREIRA JUNIOR, Orlando; SOUZA, Celso Correia de. Aproveitamento fotovoltaico: análise comparativa entre Brasil e Alemanha. *Interações* (Campo Grande), Campo Grande, v. 21, n. 2, p. 379-387, abril, 2020. Disponível em: http://www.scielo.br/scielo.php?script=sci_arttext&pid=S1518-70122020000200379&lng=en&nrm=iso. Acesso em 05 de agosto de 2022.

OECD. *Tax energy use 2015: OECD and selected partner economies. Paris: OECD and select partner economies*. Paris: OECD Publishing, 2015. Disponível em: <http://dx.doi.org/10.1787/9789264232334-en>. Acesso em 03 de agosto de 2022.

SANCHES, Mariana. BBC News. *O que representa Trump cumprir promessa e tirar EUA do Acordo de Paris*. BBC [site], 2019. Disponível em: <https://www.bbc.com/portuguese/internacional-50298142>. Acesso em 05 de agosto de 2022.

TERRIN, Kátia A. Pastori; BLANCHET, Luiz Alberto. Direito de energia e sustentabilidade: uma análise dos impactos negativos das usinas hidrelétricas no Brasil. *Revista Videre*, Dourados, MS, v.11, n.22, jul./dez. 2019, p. 47-63. Disponível em: <https://ojs.ufgd.edu.br/index.php/videre/article/view/11215/5766> Acesso em 07 de agosto de 2022.