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THE POTENTIAL OF SUSTAINABLE FINANCE IN BRAZILIAN PUBLIC FINANCES.

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RESUMO

The main objective of this research is to evaluate the fiscal benefits that Brazil could have with the use of sustainable financing to finance itself as a nation and lead the private sector into this new phase of modern finance. The international effort to decarbonize and make the economy more inclusive will require trillions in total over the years to ensure that the global economy becomes sustainable. And, in this context, a new window of opportunity opens up for Brazil, since the country has many fields that could potentially be eligible to be recipients of these resources. Good news given the current scenario of fiscal restriction existing in the national budget, and secondly, the use of sustainable parameters to evaluate investments will no longer be a niche in the sector, to be the norm over the years, therefore requiring such a parameter on all new investments.

Keywords: Public finances; Sustainable finance; ESG; Green Economy.

JEL: Q01, Q54, Q58

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INTRODUCTION

The need for collective action to avoid the worst in terms of climate change has resulted in several international conferences since the early 1970s, with the Stockholm Conference being the first major of its kind (UN 2021). The damage caused by the average rise in global temperature due to the burning of fossil fuels and the cutting of native vegetation, emitters of greenhouse gasses (GHG), since the beginning of the industrial revolution in the 18th century would lead humanity to total catastrophe. Causing, for example, sea-level rise, desertification, thawing of poles and peaks, alteration of the water regime, increase in hurricanes, extinction of animal and plant species and, consequently, the end of the human species itself, due to climate change, caused by the increase in GHGs in the atmosphere (Breitenfellner et al. 2019). Faced with such a bleak scenario, in 2016 the Paris treaty was ratified, which aims to prevent the average temperature of the planet from rising more than 2 degrees Celsius compared to pre-industrial levels and preferably 1.5 degrees Celsius (UN 2021).

To this end, the 190 signatory countries of the agreement have stipulated the Nationally Determined Contributions (NDC), which consist of goals decided at the national level, of public policies aimed at progressively reducing, mainly, the carbon footprint of their respective national economies, as well as building a more inclusive and diverse socio-economic environment (UN 2021). The great benefit of this type of arrangement is that instead of having rigid rules strictly dictated by an international body, countries have the space to decide according to their means and material conditions, which type of path to follow, and which public policies to implement. Brazil, for example, unlike most other countries, has its emissions concentrated mainly in the clearing of native forest, with fires and deforestation to make way for agriculture as the country's main source of pollution, as shown in the graph below, instead of the use thermoelectric plants as the main source of its energy matrix, which is generally the largest source of pollutant emissions in other countries (EPE 2021). Given that, the Brazilian main source is hydroelectric energy, which represents 75% of all its national energy needs (EPE 2021).

Therefore, Brazilian efforts to reduce its carbon footprint include efforts to establish a type of agriculture that is more compatible with sustainable standards, more intensive rather than extensive, in addition to the recovery of native green areas previously deforested by human action, as well as such as the purchase of carbon credits (something that will be further detailed in the following chapters) and carbon sequestration techniques. It should be noted that the Environmental, Social, and Governance (ESG) does not only cover the environmental issue but also, as its name suggests, the issue of inclusivity, which concerns the insertion of racial, gender, and class minorities in the composition of the workforce, in a position of equality with the traditional classes that generally hold a prominent role in society and the ensuring of public policies for the provision of essential public services in an ethical and egalitarian way (CNBC 2020). Another determining factor within the ESG scope concerns good governance practices that include respect for ethical, transparent, and democratic practices in the functioning of both companies and governments (Capriotti 2017).

The process of establishing green finance was led primarily by international and supranational organizations, such as the World Bank and the European Investment Bank, the first institutions to issue a green bond, as of 2007, and thus serving as a model for the rest of the other financial institutions around the world (WB 2018). Second, the European Union (EU) has been the leading institution in the world in terms of institutionalizing green finance, leading the way in issuing green bonds, as well as in regulating the sector, and in formulating an ambitious economic plan, the European Green New Deal, which has served as a model for similar plans in other regions of the world. More details on the European Green New Deal will be given in chapter 3 of this research.

As a result, this work is structured in four parts, in the first, the description of the emergence of green financing mechanisms, such as the carbon market, independent environmental assessment companies, the role of central banks in boosting green finance, and the ESG bonds. In the second, how the adaptations made within the scope of this new economic model benefit both the environment, governance and inclusiveness practices. The third part will be devoted to case studies of countries that are more advanced than Brazil in the use of sustainable financing, which can even serve as a model for Brazil in some aspects and the fourth part, how much public accounts and the economy, as a whole of Brazil, would have to gain in the deepening of such instruments.

1. THE RISE OF GREEN FINANCE.

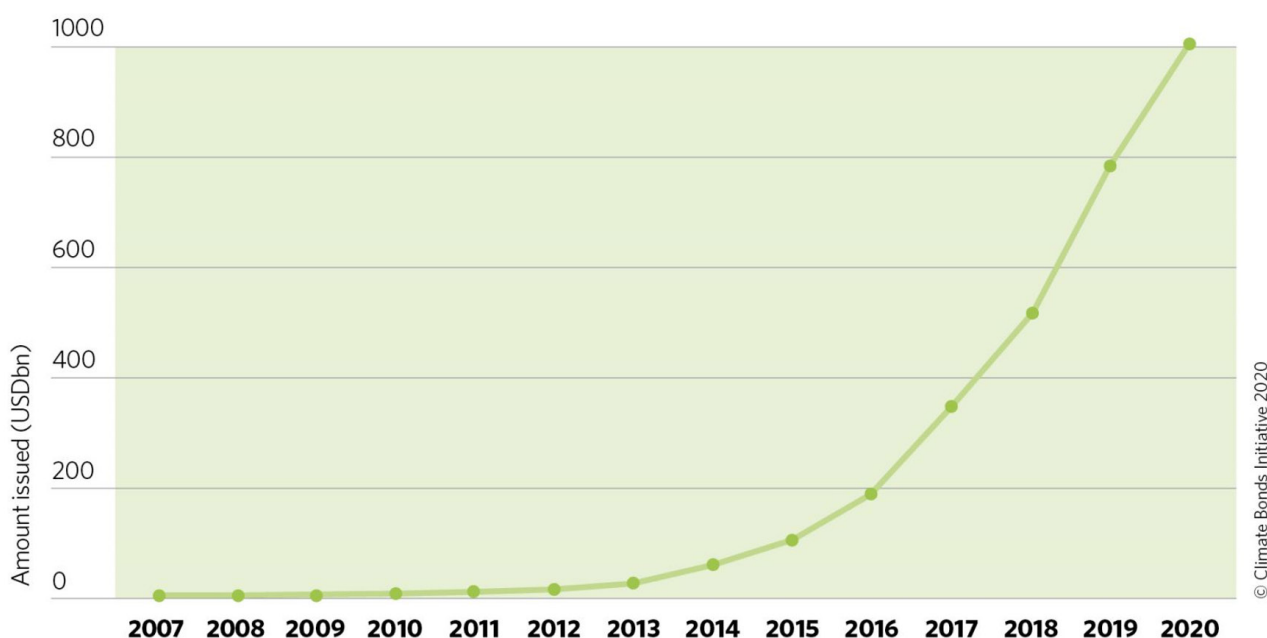
The green financial market owes its existence to the need to finance the greatest collective effort ever undertaken by humanity, that is, to decarbonize the global economy as much as possible and reforest as much of the earth's surface as possible (CNBC 2020). An economy that is based on fossil fuels, and therefore, carbon emissions since the beginning of the Industrial Revolution process, started in England in the 18th century, that forever changed the face of the world economy indelibly. Humans have emitted more than 2000 gigatons of carbon dioxide since the beginning of the industrial revolution into the atmosphere (WRIBRASIL 2020). The modern world is a child of such a revolution that allowed the world population to pass the one billion mark for the first time, made possible motor ships, airplanes, trains, as well as large-scale urban lighting and the use of appliances such as refrigerators and televisions. Such a revolution enabled the greatest leap in productivity in the global economy ever (Hobsbawm 1996).

However, the biggest step in terms of progress taken by humanity came at a great cost to the environment, given that it released millions of tons of CO₂, among other polluting gasses, into the atmosphere over the last two hundred years, with the burning of coal, oil and natural gas, the fuels of the industrial revolution and which still make up most of the energy matrix of the global economy at the beginning of the 21st century. The cost of decarbonizing the global economy is budgeted at between US\$ 6 and 10 trillion over the next 10 years, with 80% of this going to developing countries (Jaumotte and Schwerhoff 2021).

In this context, the great reset is inserted, that is, taking advantage of the fact that the global economy was profoundly affected by the crisis caused by the coronavirus, to then finance a recovery within the Environmental, Social and Governance (ESG) parameters, that is, parameters that follow this new matrix that values what is known as stakeholder capitalism, which differs from traditional shareholder capitalism, in defending that not only profit must be taken into account by investors, but other factors, such as environmental impact, social responsibilities, and community contribution. Such a mentality is already becoming the majority in the global financial markets, having profound repercussions for all those who seek to raise funds in the markets, such as national treasuries and companies. Green bonds have recently reached the symbolic \$1 trillion mark, less than 1% of the total global bond market, but their substantial growth indicates that they will reach the majority of this market in the coming decades (CBI 2020).

The \$1 trillion: cumulative progression

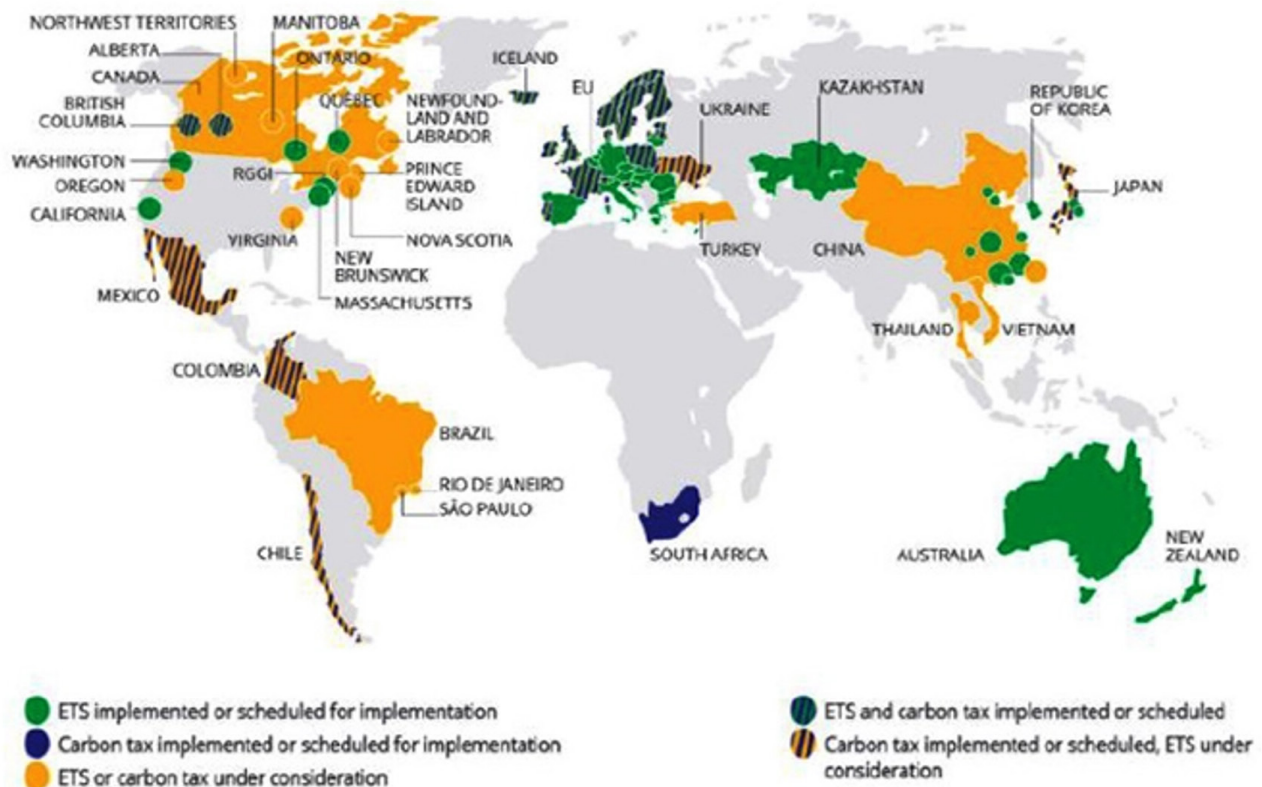
Climate Bonds



(CBI. 2020. Fig 1. Size of the green bond market, between 2007 and 2020).

Quickly, innovations such as the so-called carbon market and even financing ESG criteria and targets used by public financial institutions and international organizations began to grow. They function as mechanisms that force the global economy to slowly adapt to the necessary changes. The carbon market, for example, created in 2005 (CNBC 2021), inaugurated by the European Union, establishes that each country and each company has a previous carbon emission quota, calculated based on average usage patterns from previous years, however, if such entity, country or company, exceeds its limit, it will have to go to the carbon market and buy more credits from other countries or companies that have surpluses of this credit, which have not used the quotas, allocated to them.

This type of arrangement forces countries and companies to adopt strategies that avoid as much as possible their greenhouse gas emissions, thus preferring to adopt changes in their production chain, to buy credit in the market as a last resort. According to preliminary studies, the carbon market will be the largest commodity market in the world and could become the largest market in the world overall (CNBC 2021). Another inductive measure to decarbonize the economy is the carbon tax, which seeks to make the use of energy that emits carbon dioxide increasingly expensive and less interesting to be used in economic activity, another European innovation. The chart below shows where carbon taxes and the trading of carbon credits exist or are expected to exist by the year 2020.



(WB. 2018. Fig 2. Regions or countries of the world that implemented the carbon market in green, planned in orange, and implemented the carbon tax in blue. 2018).

Brazil, as shown in the graph above, is among the countries conducting studies for the adoption of both the carbon credit trading market and the carbon tax. However, it is in a very incipient position, with much work still to be done. Being the second country in Latin America by the size of green assets (GIZ 2020), behind Chile, when using data from May 2020, even though it is the largest economy in the region, showing that in percentage terms, very little of the Brazilian capital market is denominated in assets with the ESG seal on them, in percentage. As shown in the graphic below.



(GIZ. 2020. Fig 3. ESG market in Latin America in 2020).

Another force for change within financial markets are the Central Banks, the most powerful institutions in the financial world are not the main public institutions in charge of such an undertaking (Clark 2021). This is primarily up to governments, in the exercise of their fiscal policy, however, there are actions that Central Banks can take to increasingly stimulate the emergence of green finance in the world (ODI 2021). Among them are the acquisition of green assets in their financial asset purchase programs, the so-called quantitative easing, transforming them into quantitative greening, and the designation so that commercial banks demand fewer guarantees for projects with a sustainable purpose. The evaluation and dissemination of studies that show how harmful climate change can be for the economy, as well as proposals to create a more sustainable society by directing favorable financing for this cause, are also actions that Central Banks can take (Breitenfellner et al. al. 2019).

As usual, among Central Banks, the European Central Bank stands at the forefront of such measures, followed by the Central Banks of the UK, China and Japan, and the US. And this is even more evident when noting that the euro is the currency with the greenest and most sustainable assets denominated in it, among all the currencies in the world (Craven 2021). Together, 83 Central Banks and other financial institutions formed the Network for Greening the Financial System (NGFS). A forum to coordinate global measures on financial regulation aimed at strengthening green finance (Breitenfellner et al. 2019).

All these moves indicate that if the green financial asset market started as a niche, it is nevertheless destined to become the norm. However, as the global economy is so immense and complex, change will be slow. Many factors make the process slow. Among them is the fact that the 200 different countries that make up the global society have to, at the very least, reach a consensus on what rules to adopt to make the green transition possible. Sometimes, some economic sector is very predominant in a given country and with that, it manages to force the government not to adopt certain proposals, or even a president or prime minister who denies climate change can be elected, jeopardizing every effort of the sustainable cause. The more polluting economies will have more impact on the decisions they make, more than countries with smaller economies. It also takes into account the fact that some sectors, such as aviation and the freighter industry, find it more difficult to stop using fossil fuels, due to cost reasons (Breitenfellner et al. 2019).

However, the tone gave even by private sectors of the financial market, as the president of the largest asset manager in the world, Blackrock, with 10 trillion dollars under his management, Larry Fink, who was emphatic in stating that within a few decades all sectors of society, if they want to be financed in the financial markets, will have to show how they are engaging in the ESG cause, either by adopting non-polluting sources of energy, or by efforts to include historically marginalized sectors of society in key positions in the job market, or in the case of niches where the elimination of dependence on fossil fuels is more complicated, that they seek efforts to invest in carbon capture technology or buy carbon credits that allow them to continue their activities, without compromising the larger collective global goal of greenhouse gasses reduction (Bloomberg 2021).

So, we are heading towards a world where even government bonds will need to be sustainable bonds, and be evaluated as such by compliance agencies with sustainable practices. The so-called second option companies, of which Brazil only has two, and whose service is relatively expensive (GIZ 2020). They have the role of certifying to the investor that that investment is sustainable and not greenwashing, that is, that the use of that capital will be dedicated to the effort to seek sustainability. Such an external audit increases the attraction of potential investors to such a project, especially large projects that seek to finance themselves in the international market.

The international financial ecosystem responded to the accusations that capitalism would only lead to the degradation of the planet and, consequently, of the human species itself, with the literal leadership of the process of changing the global energy matrix and combating deforestation, among other measures that seek sustainability. Therefore, every country or company will, as a general rule, only get funding through compliance with ESG standards within a few decades. And this fact makes the ESG issue the most important for every Ministry of Economy and Finance in the world because it makes it clear that fundraising through public debt will have sustainable practices on the part of fundraisers, as fundamental conditions. In this sense, many of the country's public expenditures may, in some way or another, be included within the ESG theme, and therefore, receive financing at more favorable conditions and rates, as the Chilean example will prove (EF 2020).

2. BENEFITS OF ADOPTING ESG PRACTICES.

Para além dos benefícios financeiros da adoção de padrões ASG, que incluem taxas de juros menores, mais prazos e menos exigências de garantias. A adoção de práticas ASG, atua para melhorar a sociedade como um todo. O conceito do stakeholder capitalism, significa que não apenas o lucro deve ser perseguido pelos atores econômicos. Klaus Schwab, fundador do fórum econômico mundial de Davos e autor de obras sobre stakeholder capitalism, resume o significado do termo.

In addition to the financial benefits of adopting ESG standards, which include lower interest rates, longer terms, and fewer collateral requirements. The adoption of ESG practices acts to improve society as a whole. The concept of stakeholder capitalism means that not only profit should be pursued by economic actors. Klaus Schwab, founder of the Davos world economic forum and author of works on stakeholder capitalism, summarizes the meaning of the term below.

Schwab continues in his work *Stakeholder Capitalism: A Global Economy that Works for Progress, People and Planet*, stating that until the late 1970s the values of Stakeholder Capitalism were the norm in much of the Western world. However, another conception of capitalism, Shareholder Capitalism, which counted as one of its greatest exponents, the economist Milton Friedman, who defended that the sole purpose of companies was to always generate more financial returns for shareholders, was the one that triumphed over much of the West in a hegemonic way until the great financial crisis of 2008. Until then, other important aspects of the impact of economic activity on society in environmental and social terms did not receive mention of great importance by the financial market and the business world (Schwab 2021).

This would trigger a crisis of political identity in the West, where more and more sectors of society would be frustrated, with the growing economic inequality, with the deterioration of the environment that leads to the loss of biodiversity, as well as, with climatic adversities such as: droughts, floods, hurricanes and the rise in sea level that hinder economic activity itself, and have become increasingly more frequent.

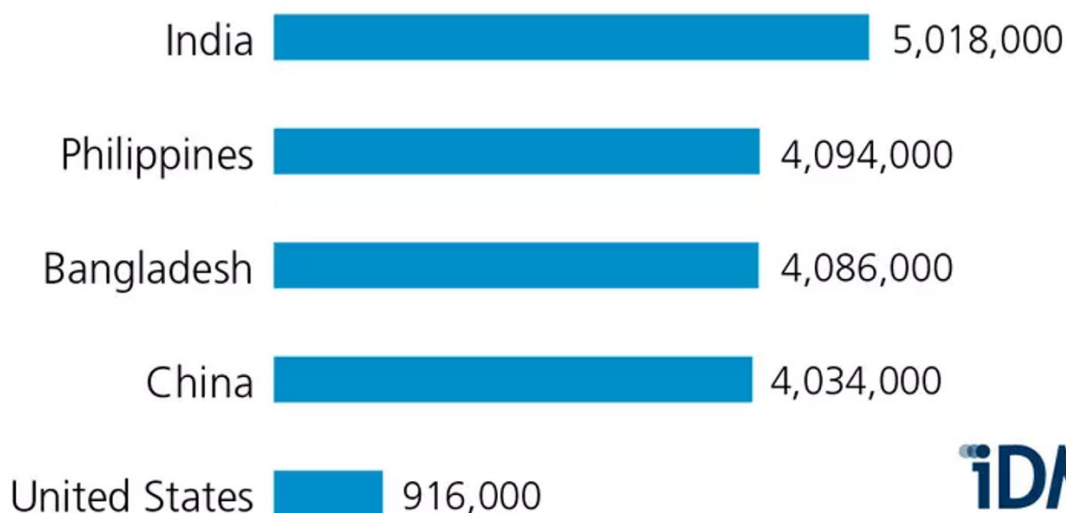
So the message to the global political elite was clear. Capitalism is indeed a positive system that has transformed humanity since its inception, centuries ago. However, it should be inserted within its operating structure, that environmental and social responsibilities are as important as profit itself. Only with such responses, the sense of democratic deficit would be tackled in Western societies (Schwab 2021).

The resulting damage from climate change could cause, according to studies: warmer days, rising sea levels, more acidic oceans, a greater frequency of severe weather events, such as colder win-

ters and hotter summers. Combined with predatory hunting and deforestation of native areas, climate change could wipe out half of the planet’s species within the 21st century (Mckie 2017). The damage to the economy would be as serious as the damage to the environment. Because disruptions in the climate could cause droughts or floods that would damage agricultural production, causing shortages and, therefore, increasing costs of food goods, influencing factors such as inflation, production, and therefore macroeconomic stability (Breitenfellner et al. 2019).). Other economic damage would be hurricanes, fires, and floods that could destroy infrastructure and homes, something that is already happening more frequently around the globe as a consequence of climate change and costing trillions of dollars in long-term damage to the global economy, according to studies of the insurance company, American International Group (AIG) (AIG 2021).

Climate refugees, a relatively recent definition, refers to people who, due to adversities linked to climate change, seek other locations. They are projected to be around 1.2 billion by 2050, according to the Australian research institute’s IEP (WEF 2021). Climate change hits the poorest nations more strongly, which have fewer resources to mitigate its effects and whose economies are linked to agriculture, a sector much more directly sensitive to natural phenomena (UN 2021). The drought and the consequent lack of food make migrating the only option for many people. Another factor arising from such changes concerns the rise in sea level. Nations such as the Netherlands have resources and technology to protect themselves, with the construction of dams and other technologies. However, this is not the reality of many poor nations bordering the Indian Ocean and the Pacific Ocean. Over the past 30 years, the number of people living in coastal areas at high risk of rising sea levels increased from 160 million to 260 million, 90% of which are from poor, developing countries and small island states. For example, in Bangladesh, it is predicted that 17% of the country will be submerged by sea-level rise by 2050 and that 20 million people living there have lost their homes (WEF 2021).

Five countries with the most new displacements by disasters in 2019



(WEF. 2021. Fig 4. Countries with more climate refugees).

Once the 17 sustainable goals proposed by the UN in 2015, known as the Sustainable Development Goals (SDGs) are implemented, to be achieved by 2030, many socio-economic goals are expected to be met. These include the abolition of poverty and hunger, the provision of basic public health services, the provision of mandatory primary and secondary education, gender equality, the provision of clean water for all, the provision of more energy from renewable sources, robust economic growth, and employment opportunities, infrastructure renovation and construction, combating economic inequality, greater sustainability in urban infrastructure, encouraging sustainable consumption and adapting production networks to more sustainable standards, reducing greenhouse gas emissions, protecting to the marine ecosystem, protection of the terrestrial ecosystem, strengthening of democratic institutions around the world and finally a higher level of international cooperation (UN 2021).

As can be seen, the goals established by the UN are extremely broad, touching several domains of life, not necessarily just the issue of the green economy, which green bonds were designed to finance. The capital from green bonds can only be used for energy transition, reforestation, sanitation, or other projects directly linked to the environment. However, the financing needed to reach the goals proposed by the UN also touch social issues, for this reason, there are also social bonds, in this context, sanitation projects, infrastructure, minimum income, affordable housing, public health spending, and public education can be funded through social bonds.

And finally, there are the sustainable bonds for projects with environmental and social impact, simultaneously. All three of these types of bonds are collectively called ESG bonds. Except for military and defense spending, all activities performed by a government can be financed by sustainable bonds (CBI 2020), and there are clear benefits in choosing this type of funding, such as better fundraising conditions for borrowers and best governance, environmental and inclusivity practices in countries and companies that capitalize in this way.

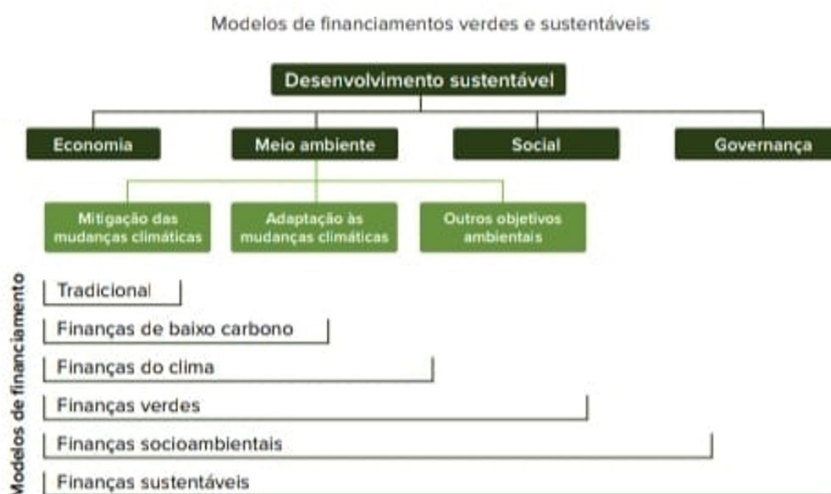


Figura 4: Diferentes modelos de finanças verdes e sustentáveis. Fonte: GIZ baseado no relatório "Financing a Sustainable European Economy (2017)", do Grupo de Alto Nível de Especialistas em Finanças Sustentáveis.

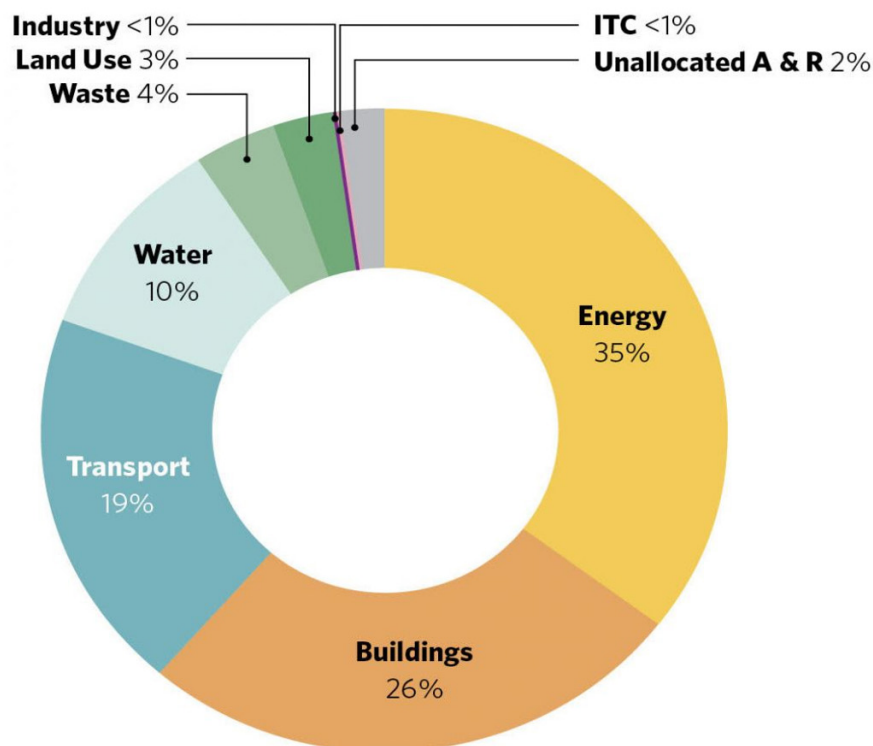
(GIZ. 2020. Fig. 5. Typology of ESG bonds).

The total bond market totals close to 128 trillion dollars (ICMA 2020), recently the sustainable bond market reached the 1 trillion dollar mark, however, soon, between 15% and 20% will be denominated in assets that follow ESG standards over the next 20 years according to financial market estimates (CNBC 2020). Brazil has deficiencies in areas that can have good results from this type of financing, such as in the social area, in addition to combating deforestation. In other countries of the world, the use of capital directed to environmental and social projects has borne very positive results, helping to achieve the goals established by the UN. Estimates from the Basel Institute of Commons and Economics put at least 2.5 trillion dollars needed annually for countries around the world to achieve the 17 sustainable development goals by 2030. To this end, the International Capital Markets Association published its “ High-Level Mapping to the Sustainable Development Goals”, serving as a guide for issuers and investors from the public and private sectors to review their green, social and sustainability bonds with the UN targets as a benchmark (IFC 2020).

At a global level, social bonds, for example, can be used to combat: extreme poverty, which affects more than 700 million people globally, hunger that affects 9% of the global population in some form, and about 130 million severely, a situation worsened by the COVID-19 crisis. They can also be used to fight diseases that no longer kill people in large numbers in the developed world, but continue to kill millions in the underdeveloped world. And finally, in the total eradication of illiteracy that affects about 773 million people in the world, mostly women, as well as ensuring that women’s rights are safeguarded around the world, both in terms of the professional sphere and the civil one (UN 2021).

Green or sustainable bonds, those that have both environmental and social goals, are specific for financing basic sanitation, for example. In 2017, 2.2 billion people lacked safe drinking water and 4.2 billion people lacked sanitation. With around three billion people across the world not having basic hand washing facilities at home. Basic sanitation is one of the areas with the greatest investment demand, both because of the cost of implementing such a service, and because of the deficiency in the current global offer of such services. Electricity supply, in turn, still does not reach around 800 million people in the world, especially in Africa. All these needs could find funding globally in the ESG bond market. The chart below shows which have been the most common destinations of capital raised through the issuance of ESG bonds since 2007.

The \$1 trillion: use of proceeds



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(CBI. 2020. Fig. 6. Destination of resources collected from green bonds since 2007).

As well as that a large part of the current percentage of the energy matrices of the global economy are still non-renewable and polluting, for the most part, about 80% of the total (UN 2021). A transition in the global energy matrix is at the heart of the economic paradigm shift intended for the coming decades. Goals number 13, 14, and 15, among the 17 sustainable goals of the UN, are of special importance for Brazil, they concern the fight against climate change and the protection of terrestrial and marine biomes, respectively. At this point, Brazil, as the country with the greatest biodiversity on the planet, would have no problem financing environmental preservation activities in the country, given the importance given to Brazilian biodiversity by the international community, and in particular to the Amazon rainforest.

The global challenges in the environmental department are great. The last decade, 2010-2019, was the warmest on record (UN 2021). The goals of reductions in greenhouse gases have not been achieved to the point of meeting the goals established by the Paris agreement, mainly by developing countries, which have more difficulty in financing the transition, and claim that they need the use of fossil fuels to complete their economic development process (OXFAM 2021) All this issue illustrates how climate change is a global problem and that it can only be dealt with in a joint and globally coordinated way. And how much poorer nations need financial assistance from richer nations to act on

this issue. With this in mind, the Paris treaty stipulated that the richest nations commit to donating 100 billion dollars to the poorest nations for the realization of the sustainable transition annually, between 2020 and 2025. Such capital, in particular, will have part of its origins through the issuance of sustainable government bonds by rich countries in the global financial market.

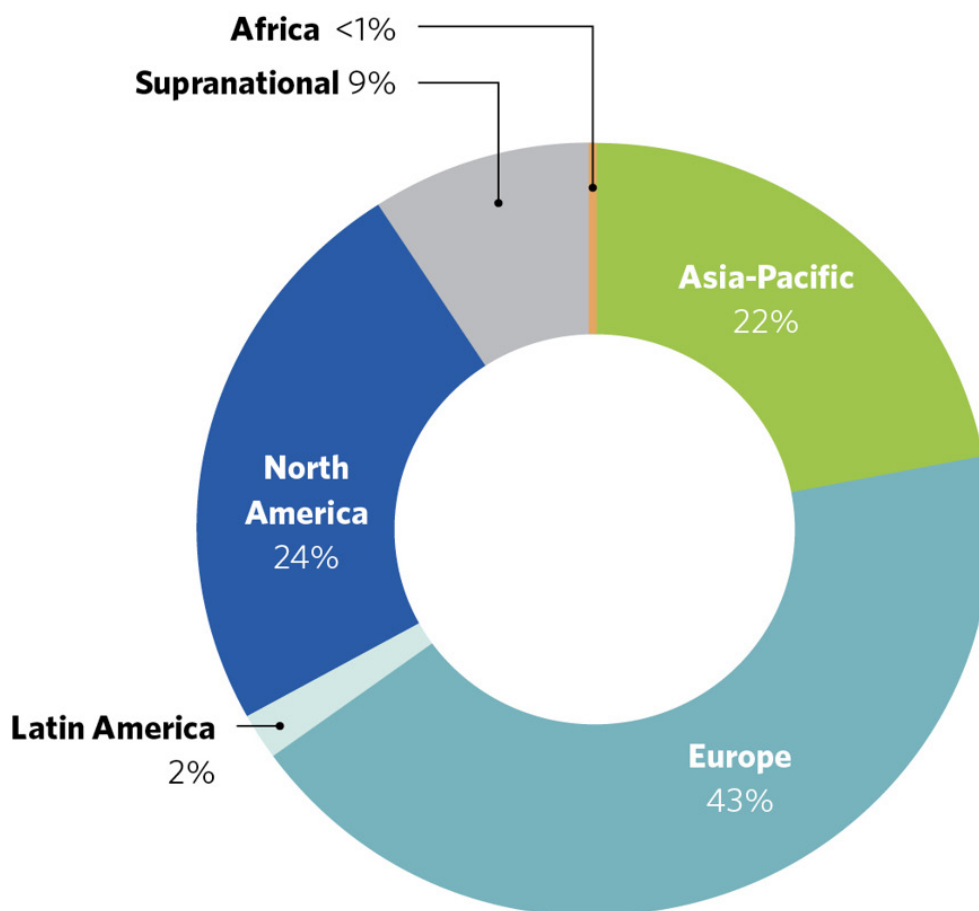
3. COMPARATIVE CASE STUDIES ON THE USE OF SUSTAINABLE PUBLIC DEBT SECURITIES AND CARBON PRICING IN THE TRANSITION TOWARDS SUSTAINABILITY.

As part of the global effort to reduce greenhouse gasses, several national and supranational plans have been designed. And the present chapter intends to detail such plans, and how Brazil can learn from these experiences, which are already in advanced stages in other parts of the world. In this sense, this chapter will bring the experiences of the European Union, China, the United States, and Chile. These examples were chosen for specific reasons. The EU was chosen for being the segment leader, China, and the USA for being the biggest global polluters, and Chile for having, historically, led the sustainable cause in Latin America.

3.1 European Union

The region of the world that is the undisputed leader in the fight against climate change, has an ambitious strategy, the most ambitious on the planet in terms of sustainability, to lead the global effort and even make other countries and regions of the world not so engaged, show efforts to achieve the global common good. And with the implementation of the European Green Deal, it is intended to become the first continent with neutral greenhouse gas emissions in the world. The region was the birthplace of inventions such as the carbon market and carbon tax, as well as the region that is home to the most liquid and deepest sustainable financial market in the world (CBI 2021). The chart below, which illustrates the number of sustainable bonds issued by region, proves Europe's leadership in this regard.

The \$1 trillion: regions



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(CBI. 2020. Fig 7. ESG bond issuance by continent).

In 2019, the European Green Deal initiative was launched, the boldest initiative of its kind in the world. The initiative proposes to use a budget of one trillion euros, coming half of it from the private sector and the other half directly from the EU budget, and aims to make Europe the first continent in the world, neutral in its carbon emissions (CNBC 2021). And to achieve such a daring goal, a profound change both in terms of internal EU legislation and in terms of Europe’s productive structure needs to take place (Belardo 2021). The process has already started and has goals to be achieved by 2050, which is the deadline for achieving neutrality in GHG emissions in the European Union (EU 2021). The European case is interesting for Brazil, as it shows how the private sector can and should combine efforts with the public sector to finance sustainable initiatives. The Europeans intend to stimulate the private sector, establishing a well-designed ESG regulatory framework, which can serve as an example for Brazil and other emerging countries. Europeans explicitly intend to lead the ESG regulatory framework, adopting the most environmentally protective rules possible.

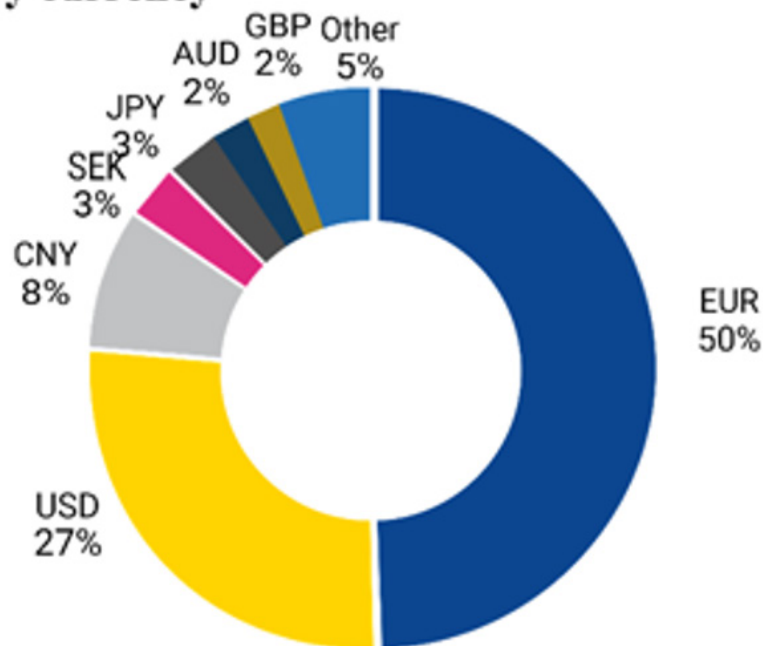
For example, by 2030, greenhouse gas emissions are expected to be reduced by 55% compared

to 1990 in Europe (EU 2021). The strategy sets a series of targets already for 2030, including at least 30 million zero-emission cars that will be in operation on European roads, 100 European cities that will be greenhouse gas neutral, high-speed trains that will double across Europe, group trips scheduled for trips below 500 km that must be carbon neutral. Automated mobility will be rolled out on a large scale, zero-emission maritime vessels will be market-ready, and there are still additional targets for 2035 and 2040 yet to be released by the EU (NF 2021).

Much of the EU’s current emissions originate from energy creation. Therefore, much of the EU’s effort involves making energy matrices renewable (CNBC 2019). And for that, the EU Strategy on Offshore Renewable Energy (ORES) plan was launched. ORES proposes to increase Europe’s offshore wind capacity by 25 times from its current level of 12GW to 300GW by 2050, as well as adding 40GW of other emerging technologies such as floating solar PV, wave, and tidal power. This target will require a large investment, on the order of 800 billion euros between now and 2050, not only in offshore generation but in energy infrastructure, such as networks and ports (NF 2021). 30 billion euros have been invested annually over the last decade in onshore and offshore networks in Europe.

However, to meet the renewable energy targets envisaged by the ORES, €800 billion will be needed by 2050, of which two-thirds will be needed to finance the associated grid infrastructure. Funding for such an initiative is proposed as an objective of the European Green Deal, as well as under the EU Next Generation, the first large-scale EU joint public debt issuance package (NF 2021). The chart below shows the currencies in which ESG assets are denominated, the Euro, despite not being the main currency of the international financial system, leads due to the strong political will of European leaders to become leaders on ESG issues.

ESG by currency

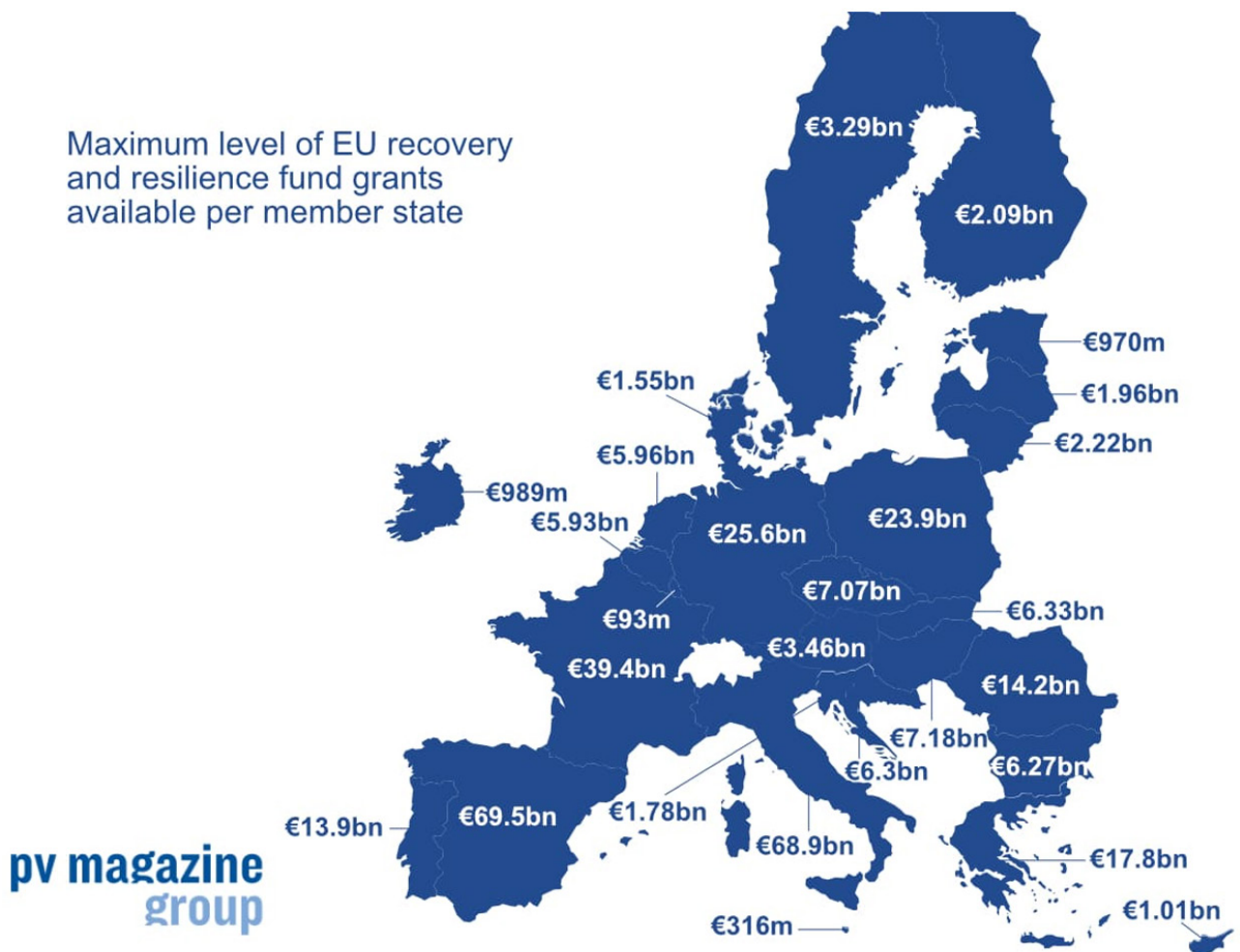


Note: As of April 2021.
Sources: Dealogic, Citigroup

(Bradford. 2021. Fig 8. Coins with the highest amount of ESG assets denominated in them in the year 2021).

After the advent of the crisis caused by the coronavirus, the economy of EU countries took a big hit, as in the rest of the world, and the nature and scale of the crisis caused by the COVID-19 pandemic, increased among the public, the concern about the environmental causes (GIZ 2021). Before the crisis, in 2019, the EU had already announced the package of measures, the European Green Deal. The crisis came to reinforce the need to take even stronger measures in the economy to achieve sustainability goals. The President of the European Central Bank, Christine Lagarde, even said that a good crisis should never be wasted (GZERO 2020). In other words, the economic recovery could be green and sustainable. With this idea in mind, the European Union decided to adopt a measure, which, as mentioned earlier, was an important milestone in the bloc's trajectory, the joint issuance of a massive amount of public debt, around 800 billion euros, the Next Generation EU, and this capital will have 30% of its total destined to implement and accelerate actions for the transition to a green economy, which includes actions for GHG neutralization, and reforestation of large areas of the continent by 2026 (EU 2021).

In addition to using the EU budget itself, private capital will be widely used, to help with the green transition, to achieve such a measure the EU works on the regulation of sustainable investment, with clear rules for the stimulation of private investment. Actually, the EU hopes that its leadership on ESG issues will benefit the euro and increase the currency's influence on the global stage. Since more and more investments will have to meet ESG criteria, and the EU is the region in the world that offers increasingly more of such assets (Craven 2021). The EU strategically seeks to link the expansion of the use of the euro to the expansion of the ESG financial market, the fastest growing financial market segment in the world. Below, the figure illustrates how much each European country will receive from the recovery package, which will be dedicated, among other things, to supporting the transition to a fully green economy by 2050 (Hall 2021).



(Hall, 2021. Fig 9. The amount that each EU member will receive from economic recovery packages, and which has as one of the mandatory destinations, funding for a transition towards sustainability).

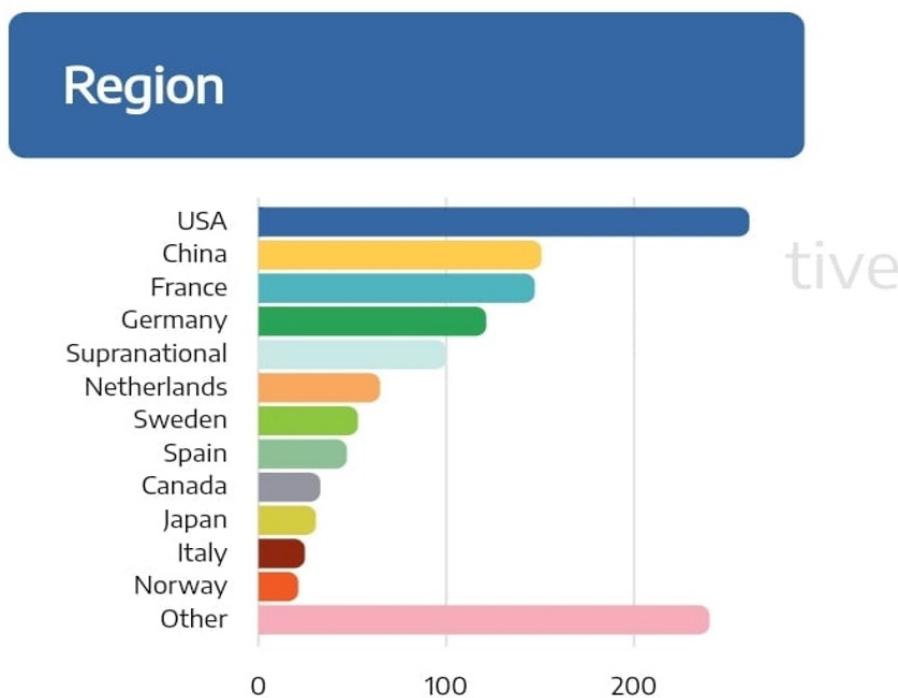
Finally, the EU intends to encourage the rest of the world to follow its lead on sustainable issues, by placing the ESG issue as a condition for signing trade and investment treaties, for example. As well as taxing carbon-intensive activities to finance the green transition and discourage such activities. Brazil could learn from the European example in some instances, the first is the regulation of sustainable investment and the carbon credits trading market, for example. In Brazil, the lack of a satisfactory regulatory framework is one of the biggest obstacles to attracting more capital to this area.

A second example that Brazil can take from Europe, in addition to stimulating investment by private capital through regulatory reforms, is the regulation of the carbon tax, its use provides sources for environmental protection, and allows for cuts on other types of taxes that are levied on consumption, for example, and which, therefore, have more impact on low-income people, and finally, such carbon taxes discourage carbon-intensive activities, forcing economic sectors to seek strategies to reduce or neutralize its environmental impact.

3.2 United States

The USA, the largest issuer of ESG bonds in the world, as shown in the chart below, is, as the largest economy in the world, the largest historical emitter of CO₂, and currently emits around 6 billion GHGs annually (FT 2021). It is the second-largest emitter of GHGs today, emitting 15% of the global total. It is also the country with the highest emission per capita. For all these factors, the US plays a pivotal role in the green finance revolution, in the global effort to decarbonize the economy. In addition to other efforts, such as the reduction of economic inequalities, both between countries and internally. Signatories of the Paris Agreement, by even actively participating in the formulation and initial implementation of the treaty.

The country returned to the same in 2021, after withdrawing in 2017, at the hands of President Joe Biden, who made the fight against climate change one of his main causes. Biden stated that he intends to make the US a leader in the process of global transformation towards sustainability. To this end, the country intends to spend almost 7 trillion dollars by 2030, to reach 2050 neutral in GHG emissions (WH 2021). Global financial markets will have to adapt to meet such a colossal revolution, the financing of the global green revolution. As shown in the chart below, the largest amount of ESG bond issuance by public and private agents in the world comes from the USA.



(CBI. 2021. Fig 10. Sustainable bond issuance by countries).

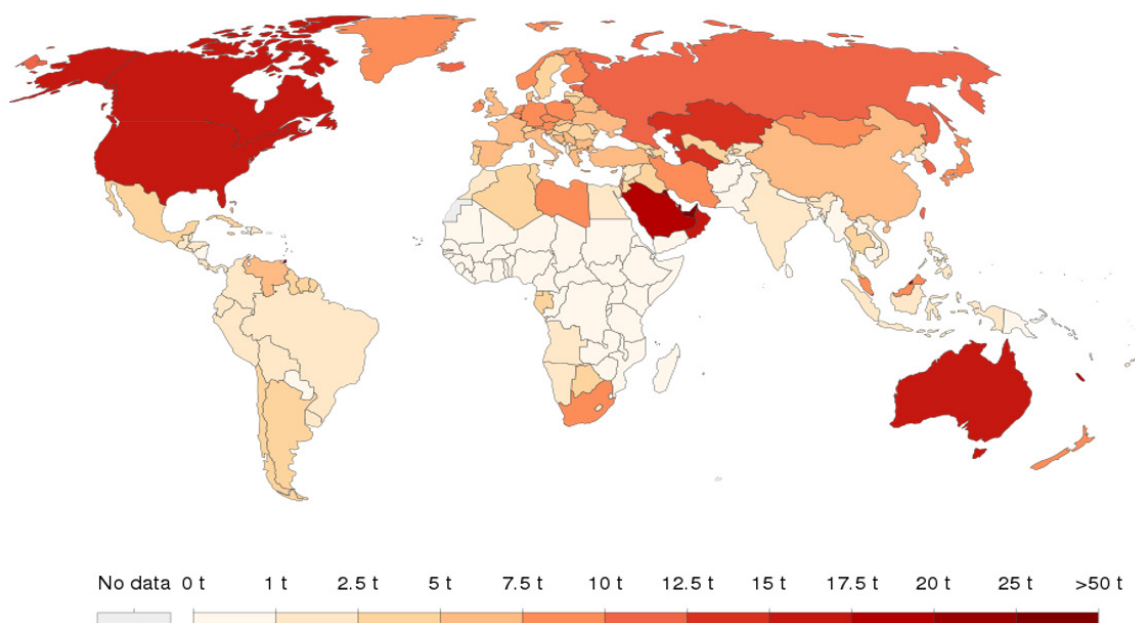
To achieve this goal, the plan outlined by the US includes cutting GHG emissions by half the amount emitted in 2005 by 2030, and fully neutralizing US emissions by 2050. A large part of US emissions come from energy generation, with 60% coming from fossil sources (FT, 2021), to this end, the US administration intends to actively use fiscal policy to encourage the transition of the energy

matrix, by adopting tax exemptions and incentives for wind and solar energy, for example, as well as the elimination of subsidies for the fossil fuel sectors (FT 2021).

Such a movement could serve as an example for the tax reform under discussion in Brazil, the use of fiscal policy to direct the energy matrix transition. Much of Brazil's energy matrix is already clean, but taxes raised from sectors intensive in GHG production could be directed to a fund to preserve native forests, among other green initiatives. As shown in the chart below, the USA, Canada, and countries of the Arabian Peninsula lead in per capita emissions. And this stems, to a large extent, from the fact that these countries have fossil fuels as their main source of energy.

CO₂ emissions per capita, 2016

Average carbon dioxide (CO₂) emissions per capita measured in tonnes per year.



Source: OWID based on Global Carbon Project; Gapminder & UN

(WB 2018. Fig 11. CO₂ emissions per capita in the year 2016).

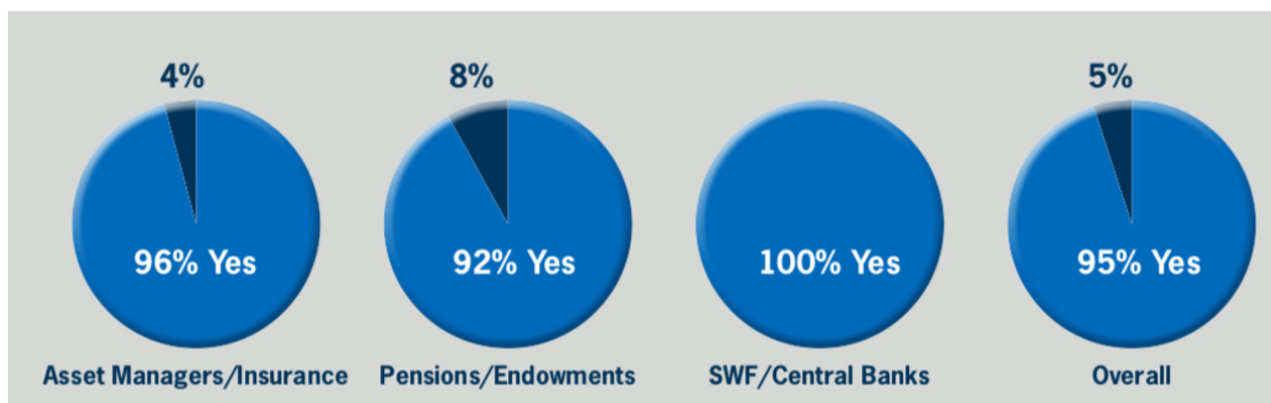
Another fiscal measure, in addition to the US\$2 trillion investment in renewable energy, is the national regulation of the US carbon market (Basar 2020). Currently, each US state has its regulations or none at all. The federal definition of such an instrument would be a strong fiscal impetus for the achievement of environmental goals. The USA is the largest economy in the world, but in relation to the European Union, it has a relative delay in ESG finance issues. However, the country intends to take the lead in this long-term project, with the launch of its first sovereign green bond (Basar 2020). The country's entry would encourage the rest of the world to take the initiative to issue green bonds and it would join the US in a select group of 16 countries, in addition to the European Union, which, supranationally, already do so, as of the end of 2021. Only resources from carbon taxation, or other activities, will not be enough to finance the green transition, the use of sustainable public debt has the

role of filling this gap (Perry 2021).

Currently, the issuance of US ESG bonds occurs, as mentioned above, mostly by private agents, however, the dollar is the currency of the global financial system, it has the most liquid bond market in the world. The US lags behind Europe and the Euro, in this regard more by inertia than potential. US fiscal policy is intended to become completely ESG shaped under the Biden administration. Issues such as socioeconomic inequalities and climate change are the sources of inspiration for the biggest tax reform ever planned in the US in recent years. This involves increasing taxation of Americans with an annual income above \$400,000 a year, ending tax breaks for industries linked to fossil fuels. And the directing of subsidies to sectors, such as the production of electric cars, wind and solar energy, biofuels, as well as investment in techniques that are still relatively incipient, such as the generation of energy from the handling of hydrogen, floating wind energy and techniques for capturing carbon directly from the atmosphere (Basar 2020).

The American case is emblematic of how ESG issues have become one of the most important issues for the global society. The great social discontent with social, racial, and gender inequalities. As well as that, the uncertainty regarding the health of the planet's integrated ecosystem generated massive protests in American society and were crucial components in the 2020 presidential election, where the ESG agenda was highly demanded by the electorate. A 2020 study conducted by RBC Global Asset Management Responsible Investment found that adoption of ESG principles is growing globally, with 75% of respondents integrating ESG principles into their investment and decision-making approach, up from 70% in 2019. However, only 65% of US investors have adopted ESG, compared to 94% in Europe, 89% in Canada, and 72% in Asia. Such data underline the relative American backwardness among developed countries (Basar 2020).

Something aggravated when one takes into account that the American financial market is the largest and most sophisticated in the world. However, at the same time, there is a relative delay on the part of the US. A study carried out by The Risk Management Association, which encompasses various types of asset managers in the US, shows that there is a consensus among financial sector agents that profitability can indeed coexist with the fulfillment of ESG criteria. As shown in the graphic below.



(Basar. 2020. Fig. 12. Percentage by sectors of the financial system that believe that ESG criteria can be aligned with profitability).

There must be a strong appetite on the part of the financial market to finance ESG projects. And this is what finance/economy ministries and national treasury offices around the world depend on to fund ambitious ESG projects. And recent research, such as the one mentioned above, shows that this appetite indeed exists, as well as that pressure from bodies such as the UN and EU, as well as national governments and civil society, will make sectors not yet in line with the ESG theme soon to enter it.

Another point where US leadership is essential is in financing the transition of emerging countries to carbon-neutral economies, and that includes Brazil. Such countries have not yet completed their economic development cycle, do not have as many free resources for investment in such an endeavor, and are particularly vulnerable to climate change. One of the three pillars of the Paris treaty was, precisely, Climate Finance, that is, the commitment to transfer from rich to poor countries around 100 billion dollars annually. However, rich nations are expected to fall as much as \$75 billion short of fulfilling their long-standing pledge to mobilize \$100 billion each year between 2020 and 2025 to help the most vulnerable countries adapt to the effects of climate change. (OXFAM 2021).

The OECD released new data showing that developed countries provided only about 80 billion in climate finance in the year 2019. Based on current promises and plans, Oxfam estimates that rich governments will continue to fall below the 100 billion targets and reach just between \$93 billion to \$95 billion a year, just in 2025, five years after the target should have been met. This means that the poorest countries could lose between \$68 billion and \$75 billion in total over the six-year target period (2020-2025), (OXFAM 2021).

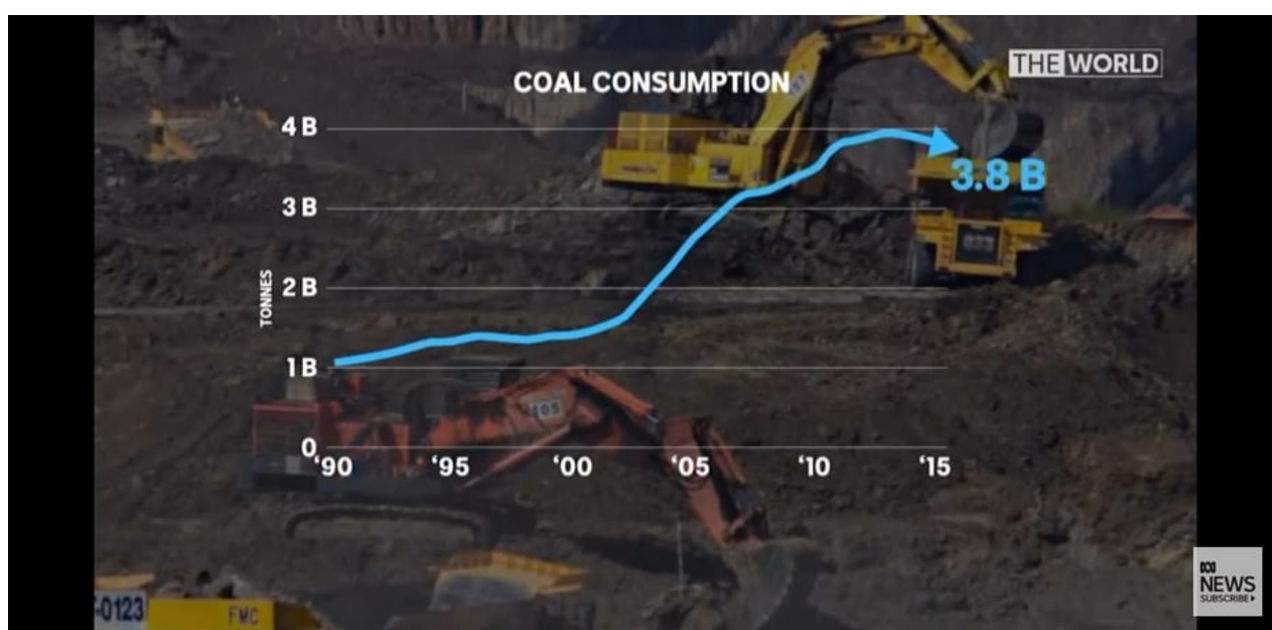
3.3 China

The largest current emitter of GHGs, and also the largest international sponsor of the use of fossil fuel-based energies. China has a big challenge as well as a big incentive to fight climate change and stay in line with the Paris treaty, to which it is also a signatory. The great economic growth experienced by China in recent decades was largely based on the use of fossil fuels, mainly coal, a particularly polluting energy source, which was temporarily banned from 2016. However, when the ban expired in 2018, the construction of new plants increased again. In 2020, China built more than three times more coal-fired power capacity than the rest of the world combined, according to the Global Energy Monitor and the Center for Research on Energy and Clean Air (Maizland 2021).

Not to mention that the Belt and Road Initiative (BRI), the ambitious Chinese project to finance an infrastructure network across Eurasia and parts of Africa with China at the economic center of this large network, has 60% of its projects that finance the energy sector, financing fossil energies. And what is more serious, many of the countries receiving Chinese capital for the financing of the BRI, have shown a considerable increase in their levels of emission of gasses that cause the greenhouse effect. And researchers found in 2019 that the BRI could cause the average global temperature to rise by 2.7

Celsius, significantly higher than the Paris Agreement target of limiting global temperature rise to 1.5 Celsius (Maizland 2021).

This indicates that China is currently the most important country in the world in the fight against climate change. Not only is it the largest issuer in its national territory. But also, the biggest sponsor of the emission of greenhouse gasses in the world. To meet such a challenge, the Chinese set bold goals. Nationally, the Chinese plan to become carbon neutral by 2060, reach their peak in carbon dioxide gas emissions by 2030, and have renewables account for 25% of China's energy needs by 2030, as well as plan to install enough solar and wind power generators to have a combined capacity of 1.2 billion kilowatts by 2030, in addition to increasing forest cover by around six billion cubic meters by 2030 (Maizland 2021).

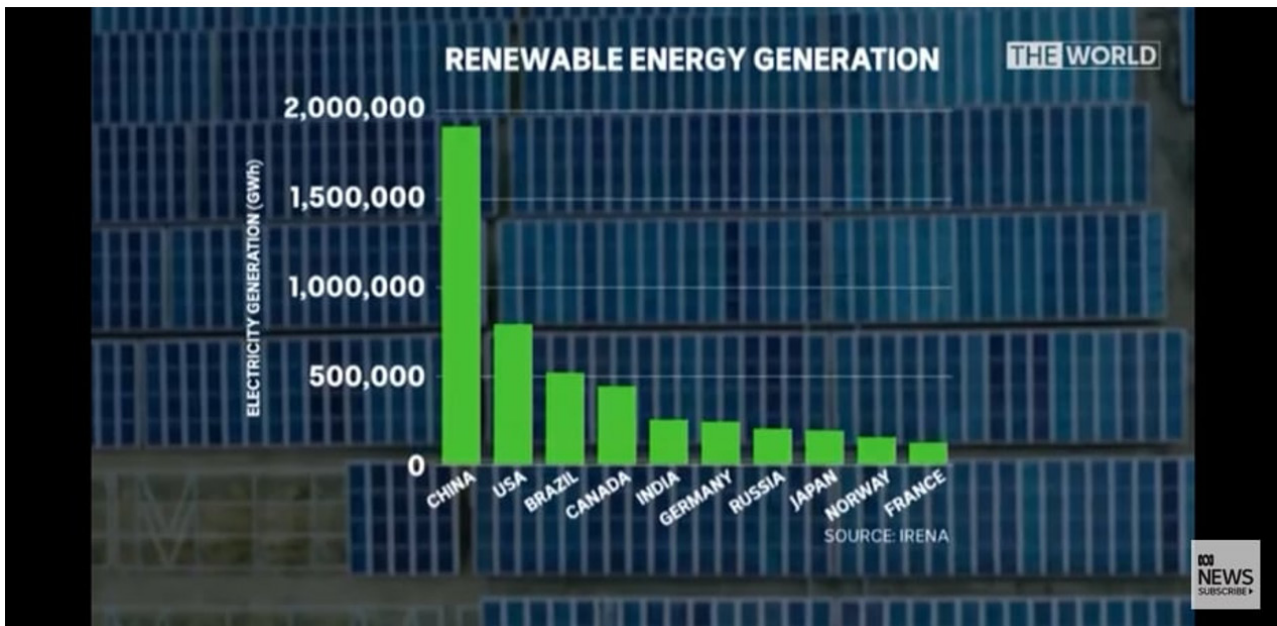


(ABC News. 2020. Fig 13 Chinese coal consumption between 1990 and 2015, in billions of tons).

Internationally, China intends to put an end to the construction of new coal power plants, starting in 2021, Xi Jinping did not go into detail until the end of writing this research. However, it is a big step in the fight against climate change. Whereas China, Japan, and South Korea are responsible for financing 95% of coal mining plants in the world. Coal remains a mainstay for power generation in Asia, which accounts for 75% of global coal demand, according to the International Energy Agency, and without their efforts, the Paris treaty target will not be met (Sullivan 2021).

Ironically, China has been one of the nations that have contributed the most to combating climate change. Being the second-largest ESG bond market in the world and being the largest producer of electric cars in the world. In addition to the leadership in the production of inputs for the construction of solar panels and wind farms. As well as, which is the country that produces the most renewable energy in the world. It is interesting to note that Brazil is the third country on the same list, behind

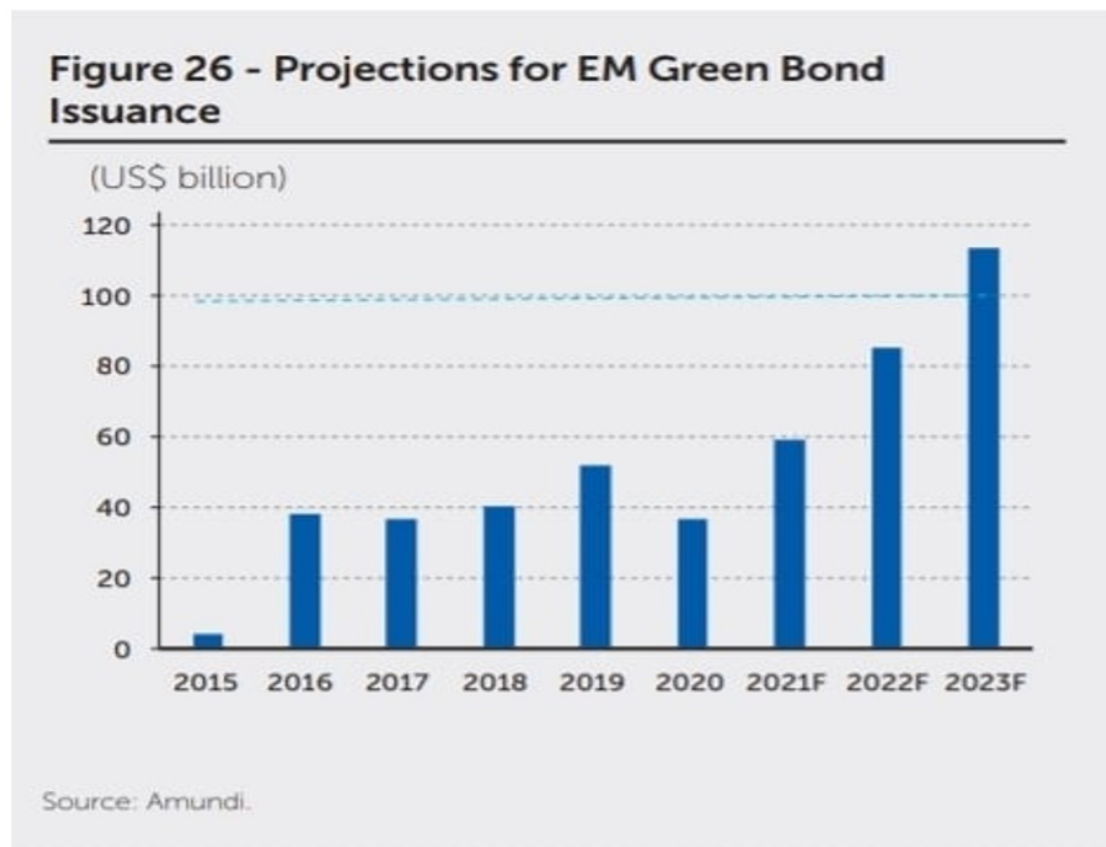
only China and the USA, and this is since Brazil is well endowed with water resources, making up the majority of its energy matrix, as well as having great potential of generation from wind and solar energy, in addition to biofuels.



(ABC News. 2020. Fig 14. Renewable energy generation per GWh in 2021, global ranking).

To finance its transition to a GHG-neutral economy, China is estimated to need a value between about 7 to 20 trillion dollars (Song 2021). The country intends to finance such activities through the newly created environmental tax. In addition to the issuance of green bonds, which in emerging countries should show robust growth in the coming decades, as shown in the chart below. Another important fiscal measure, put in place by the Chinese national treasury secretariat, is the creation of the largest carbon market in the world. In the world today, there are already 45 countries or supranational entities, in the case of the EU, a pioneer in the carbon market segment, operating in this business (CNBC 2021). What sets the Chinese apart from others is, firstly, their scale, to account for the size of the Chinese economy, and secondly, their methodology. Unlike other national mechanisms, China is using emissions intensity, i.e. the number of emissions per unit of energy generated, rather than absolute emissions to help reduce its climate impact (Nogrady 2021).

As emerging economies such as China, India, South Africa, Brazil, and Nigeria hold an increasing share of global GDP and global issues, naturally, the weight of these countries in the ESG bond market and trading rights carbon will grow faster than those of more mature economies. As shown in the figure below.



(IFC. 2020. Fig 15. Projection of ESG bond issuance by emerging markets).

3.4 Chile

Each country or region chosen to feature in this research was chosen for a specific reason. The European Union, for being the absolute leader in terms of sustainability. The USA, for being the most important country in the world and which can, therefore, in addition to contributing enormously to the reduction of total emissions, create financial and technological conditions for the least developed countries to carry out their transitions. The owner of the dollar can make the sustainable financial system liquid enough to finance the global green transition. In addition to the unparalleled capacity for technological innovation, which would make it possible to advance both in the improvement of present technologies, as well as in the introduction of non-existent ones. China was chosen for being the current largest emitter of GHGs, and the largest global funder of projects that emit GHGs. Alone, China emits 30% of the GGE, not to mention the financing of the BRI, which can considerably expand the emission of the countries where the projects are installed. China will play a pivotal role not only for its own sake but also in holding the leadership of the underdeveloped world.

Chile was chosen because it is the most socioeconomically similar country to Brazil and the most advanced in Latin America on ESG issues, at the same time. Being pointed out as the second nation among the most evolved emerging nations in this regard in the world (Leprince-Ringuet 2020). Chile is a medium economy, with a population approximately the size of the state of Minas Gerais. The

geographic characteristics of the country make it particularly vulnerable in terms of climate change, as a large part of its population lives in areas that could potentially be flooded, and because it has a tendency towards desertification, naturally due to the Andes, but climate change can accentuate this process. The country relies on fossil fuels for about 80% of its energy source. To face these challenges, the Andean country launched the Plan de Acción Nacional para el Cambio Climático 2017-2022, the first of its kind in Latin America. Such a plan consists in the aligning of all the Chilean public administration practices in all spheres, to the Chilean NDCs, and in this sense, achieve goals in matters such as sustainable energy, as well as transport, housing, and production systems designed to operate with minimum GHG emissions (MHC 2019).

Chile was the first country in the Americas to issue a sovereign green bond, ahead of the continent's only two developed nations, the US and Canada. Proving that emerging countries can be as or more ambitious in measures that seek sustainability, as rich countries (EF 2020). The country declared that it intends to be the absolute leader of the genre in Latin America, despite being a much smaller economy than Brazil, Mexico, Argentina, and Colombia. Equally demonstrating that size does not prevent it from holding the leadership of sustainable finance. As shown in the chart below, including which countries have already issued their ESG sovereign bonds.



(CBI. 2021. Fig 16. Issuance of sustainable bonds by country, cumulatively, sovereign bonds, marked by a star).

The projects that Chile considers illegal to be financed with ESG bonds, can serve as a benchmark for the National Treasury of Brazil, in its proposal formulations, and they are: the exploration and production of fossil fuels, burning of fossil fuels as a source single power, generation or hybrid

plants with a fossil-related backup of more than 15%, construction of railway infrastructure dedicated to transporting fossil fuels, nuclear power generation, electricity transmission infrastructure and electricity systems where an average of 25% or more is generated by fossil fuel, alcohol, weapons, tobacco, gaming or palm oil industries, production or trade in any product or activity deemed illegal under national or international laws or regulations, conventions and agreements to which Chile participates, deforestation and forest degradation (MHC 2019).

Another aspect in which Brazil could learn lessons from Chile is the methodology used by the Chilean National Treasury to assess the eligibility of a given project through the issuance of ESG bonds. Where Chileans look at the project's environmental objectives, cost, and possible benefits, and finally, whether any aspect of the project would make it infeasible to use. The main pillar of a good ESG bond issuance plan is the Bond Framework, that is, the clarification of how each project will contribute to the NDCs, and how the investment risks will be covered.

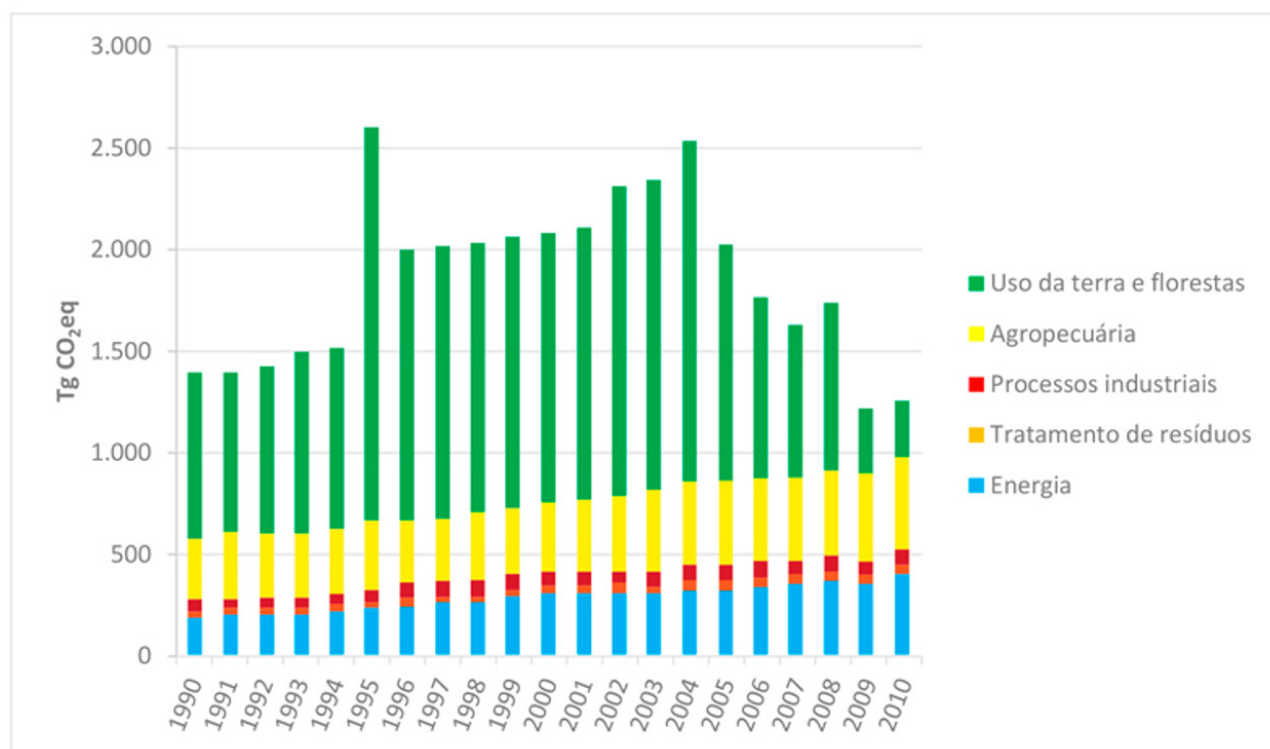
Since the beginning of the issuance of ESG bonds in 2019, 16% of Chilean public debt issued has been denominated in ESG bonds, in this way the country can raise funds at lower interest rates, the lowest ever in its latest issuances of dollars and euros denominated ESG bonds. In 2021, 400 million euros in green Chilean government bonds maturing in 10 years at a yield of 0.399% were issued, as well as 750 million dollars in 10-year green Chilean government bonds at a yield of 1.962%. While a traditional Chilean 10-year bond pays a yield of 6.530%. The adoption of the ESG issuance contributes to the management of Chilean public debt. For the same 10-year bond, the Chilean Treasury saves approximately 70% in funding (MHC 2021). Obtaining the necessary capital to finance efforts to do its part to save the planet, and finally, by entering the sustainable market, the government of Chile creates a benchmark that private Chilean companies use to raise capital, and this dual movement, from Chilean public and private actors entering the ESG financial market, has turned the mid-sized Andean country into the ESG powerhouse of Latin America. The case of Chile proves that political will is the main defining element of the success of the ESG theme (BNamericanas 2021).

4. THE POTENTIAL OF SUSTAINABLE FINANCE IN BRAZILIAN PUBLIC FINANCE.

Brazil will require a large sum of resources to achieve neutrality in GHG emissions, according to the International Finance Corporation (IFC), a member of the World Bank Group, it will take 1.3 trillion dollars for Brazil to be able to comply with the NDC measures and targets (GIZ 2020). This amount can be achieved through two fiscal channels that will be addressed in this research's chapter. Firstly, through the issuance of ESG bonds, something that Brazilian companies have been exploring more frequently, gradually, in addition now to studies by the Special Secretariat of the National Treasury (SETO) of Brazil, which is working on creating a framework for the issuance of the first sovereign Brazilian green/ESG bonds (SETO 2021). Second, fiscal policy, and the tax reform currently under debate in the Brazilian congress, are crucial in this new development.

The international scenario, led mainly by the EU, and more recently by the US, has even established mechanisms to encourage the rest of the world to follow in its footsteps, for example, the EU proposes the creation of a carbon tariff, which seeks to tariff, carbon highly intensive goods in their production, to encourage producers to seek less polluting means if they want to remain competitive in the common European market (EU 2021). And the US indicated adopting the same strategy (Friedman 2021). Other examples, where the EU and the US have shown that they intend to lead the green cause at a global level, is the fact that the ESG agenda is a vital condition for the signing of trade agreements and foreign investments. Examples like this show that the risk of breaching ESG commitments proves prohibitive in this new phase of global finance.

Brazil has both advantages and disadvantages within the ESG theme. Brazil is one of the few countries in the world whose most energy needs come from a clean, hydroelectric matrix because Brazil is the largest holder of freshwater reserves in the world and has an abundant amount of rivers suitable for the construction of dams. (EPE 202). Brazil has, although underutilized, a lot of potential for wind, solar, and energy, besides biofuels. The exploration of such domains would further increase the renewable percentage of the Brazilian energy matrix, and the country could even become a net exporter of clean energy. The announcement by US President Joe Biden of his intention to donate to the countries that make up the Amazon biome in South America, in a sum of 20 billion dollars, for environmental preservation (Mongabay 2021). As well as the advent of the Institutional Investors Group on Climate Change (IIGCC), a group consisting of more than 200 organizations from 14 different countries that together have 34 trillion dollars in assets to help in the green transition of the global economy (WRIBRASIL 2021). Prove the international appetite for financing environmental preservation.



(EPE. 2021. Fig 17. Sources of greenhouse gas emissions in Brazil, between 1990 and 2010).

On the other hand, the obstacles faced by Brazil on this issue include, the severe fiscal limitation and the lack of robust regulation in this area (GIZ 2020). However, both issues can be resolved in the same way, with the creation of a taxonomy. The creation of such a mechanism would give investors the required legal certainty. In addition, the global economy is drenched in liquidity, resulting from the massive fiscal and monetary packages put in place by most nations of the globe in response to the COVID-19 crisis. Thus making foreign fundraising easier (WB 2020).

Brazil, with the right framework, and appetite from national and foreign investors, can get these sustainable project proposals off the ground (WB 2018). As the present research intends to demonstrate. Studies carried out by the FIBRAS project under the sponsorship of GIZ, a German international cooperation agency, indicate that it is particularly difficult for foreign investors to operate in Brazil due to the difficulty in opening accounts, account transactions, remittances, and capital repatriation. Efforts to simplify this sector have already been made, such as the proposed bill on the exchange rate framework, proposed by the Central Bank of Brazil, which seeks to update the current code and is currently being debated by the National Congress (GIZ 2020).

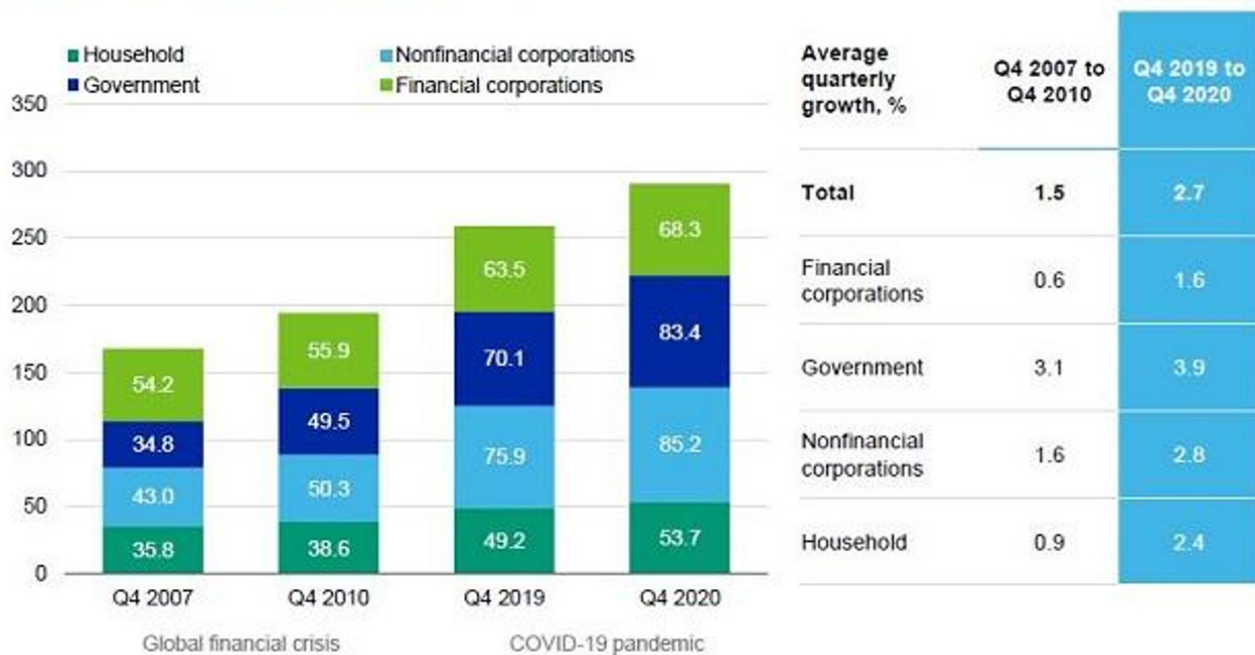
Another economic measure, which would help the growth of the ESG financial market in Brazil, is more extensive tax benefits for companies that decide to finance themselves through the issuance of ESG bonds, as is the case in the US and Chile. Currently, the Brazilian law 12,431, of 2011, provides for tax exemption for national and foreign individuals in some types of fixed income, and three of them have been used in the green market, such as, incentivized debentures, certificates of real estate

receivables (CRIs), and Investment in Participations (FIP), they all have already had such a use. The Agribusiness Letter of Credit (LCA) and the Real Estate Letter of Credit (LCI) are two other types of financial instruments that could be used in the Brazilian financial market for ESG purposes, but such operations have never occurred to date (GIZ 2020).

Another point, where public policies can facilitate the flourishing of green finance in Brazil, is the mapping of projects included in the Investment Partnership Program (PPI). The Ministry of Infrastructure indicates that there are potential projects within PPI, which demand 1.6 trillion reais in the coming years. The Climate Bonds Initiative (CBI), together with the Ministry of Agriculture and the Ministry of Infrastructure, mapped a set of projects that could be financed through the issuance of green bonds. For infrastructure in the country, according to the CBI, close to 16% of the 95 projects included in the PPI have green potential in four sectors: low-carbon transport, renewable energy, sustainable management of water resources, and sustainable waste management. For the primary sector, the opportunities reach around 163 billion reais, in six niches and they are, the implementation of the forest code, livestock, agriculture, renewable energy, forestry, and transport (GIZ 2021).

Part of these projects can be adapted to become eligible to receive ESG investment. The seriously deteriorated fiscal scenario indicates that the participation of national and foreign private investment is a pivot in the Brazilian sustainable transition (GIZ 2020). The advent of the coronavirus crisis in 2020 has had a violent impact on economies around the globe, as well as national public finances, increasing global debt by about 32 trillion dollars more compared to previous levels (Wadhwa 2021).

Global debt outstanding by sector (\$US trillion)



Sources: Moody's Investors Service and IIF

(Wadhwa. 2021. Fig. 18. Total Global Debt).

Strikingly restricting the fiscal margin of several countries, such as the case of Brazil, which had about 75% of GDP in public debt before the coronavirus crisis and rose to levels above 85% after (SETO 2021). A high level for a middle-income country, something that has worried investors, causing a devaluation of the real against the dollar, as well as an increase in long interest rates. Faced with such a scenario, with acute budget constraints, and abundant investment needs of the Brazilian economy, in sectors such as infrastructure, basic sanitation, agriculture, transport, and in increasing the productive capacity of the renewable energy matrix.

A study led by WRIBRASIL points out that the adoption of a sustainable economic model would generate for Brazil: more than 2 million jobs by 2030, an additional GDP of almost 3 trillion reais, by 2030, 12 million hectares of recovery of degraded pastures, extra tax revenue of almost 800 million reais, helping the country to recover its primary surpluses and thus reducing the volume of debt to GDP. And finally, a 42% reduction in GHG emissions. Such an economic boost would be possible due to improved productivity and greater attraction of foreign investment to Brazil (WRIBRASIL 2021). Access to the growing sustainable capital market presents itself as the route to be taken in this great reset, where the economy emerging from the coronavirus crisis must be a greener, more sustainable, and inclusive economy (WEF 2021).

4.1. Brazilian public debt securities ESG: The Brazilian Sustainable Bonds.

Aware of the pivotal need to enter the sustainable sovereign debt market. The National Treasury Secretariat announced the desire to issue the first Brazilian public debt bond in 2021 (SETO 2021). To this end, it develops the taxonomy, the rules that will be in force for a future Brazilian Sustainable Bond and/or Brazilian Green Bond. The present research sought, above all, from previous experiences, to estimate the impact of this type of policy. Chile, for example, has 16% of its total public debt issued in ESG bonds since 2019 (MHC 2021), with the great advantage that this 16% has lower interest rates compared to the same types of traditional bonds, 70% on average lower, the lowest rates in the entire history of the Andean country's intake. The Chilean goal is to make the majority of its debt entirely ESG in the coming decades. And this proves to be a global trend.

The Chilean government designed its framework, based on the publication Green Bonds Principles, published by the International Capital Markets Association (ICMA). And as having such a source, the Chile plan has four central points: the standardization of the use of money collected from emissions, the description of the selection of projects, the management of the resources collected, and, finally, the approach to external certifiers. The present research advocates that Brazil should adopt the Chilean model, which is in line with the most accepted sustainable finance practices globally. In such a model, all projects must comply with the UN's sustainable development goals. The government of Chile guarantees the payment of the bonds, regardless of whether the project is successful or not, this express statement assures investors and lowers the interest rates on funding.

Another point where the Brazilian Treasury could take the Chilean as an example would be the formation of an inter-ministerial committee to evaluate the decision of what can or cannot be financed via ESG bonds. Due to the breadth of the ESG agenda, it is recommended that the working group in charge of evaluating projects to be financed through ESG bonds, be inter-ministerial so that each entity can contribute with its respective expertise, in the various areas covered by the theme. Finally, two elements end up defining a well-executed framework strategy. Accountability to investors and civil society, in addition to contributing to the democratic participation of the population as a whole, it also prevents greenwashing. And to further ensure the quality of the reported data, the opinion of an external evaluator, the so-called second opinion, is highly recommended, it eliminates any doubts about the quality of capital expenditure.

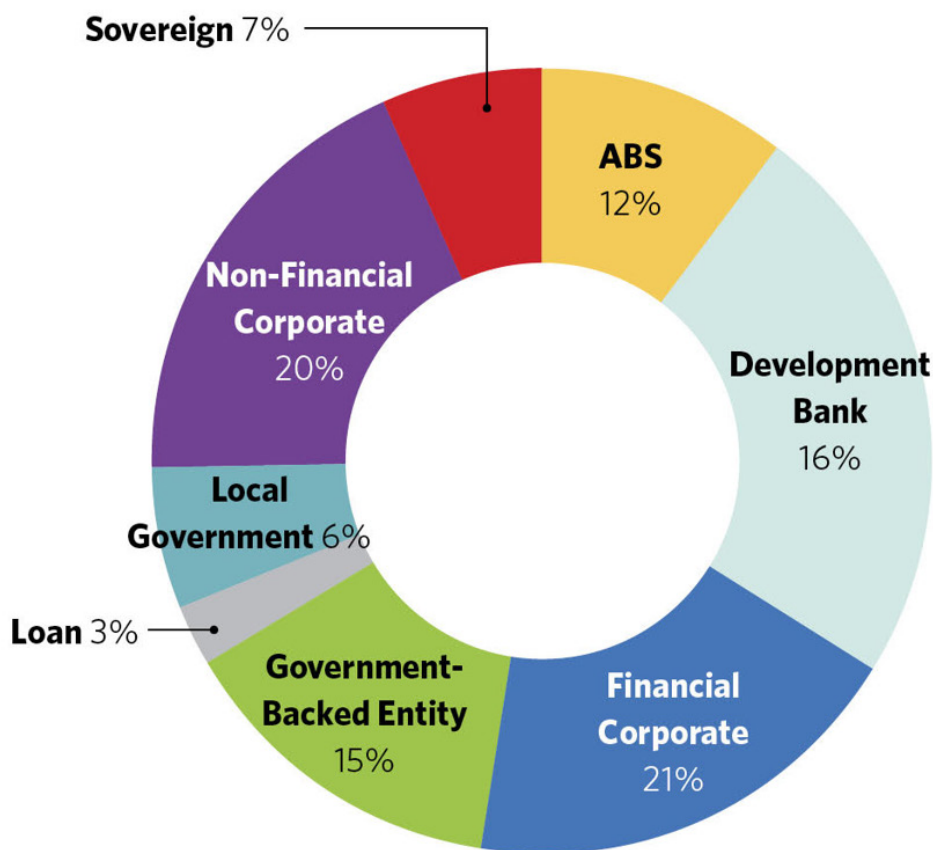
The Brazilian public debt reached 82% of GDP in October 2021. The substantial increase in it, since 2020, has caused the Brazilian yield to have risen substantially, with Brazilian 10-year bonds reaching yields of 11 % at the end of 2021 (SETO 2021), due to fiscal uncertainties on the part of the financial market regarding Brazilian fiscal health. At the same time, Brazil needs to make investments to the most diverse sectors of its economy, and an increase in yield makes debt management even more complex, and this is where the ESG agenda comes in. Chile achieved a substantial 70% discount on its 10-year bonds by adopting the ESG model on its fixed-rate bonds. Keeping due proportions between the two countries, Chile and Brazil, such as the fact that Chile has only one-third of its GDP in public debt. The present research attests that Brazil could obtain an excellent discount on its funding, if they were ESG, something that could reach 70%, as in the Chilean case. This phenomenon is explained by the fact that investors are willing to have smaller profits if it means that something is being done for the good of the planet.

Brazil could also innovate and launch the world's first Forest Bond, which would have funds raised exclusively for the protection of Brazilian forests, such a bond would have great international demand and the country could raise funds at its lowest rate in history. A study carried out by the University of Switzerland, ETH Zurich, calculated that Brazil is one of the 5 countries where a total of one trillion new trees can be planted, around 50 million hectares in Brazil alone would be, according to the study, in perfect conditions for such an undertaking, as they would be areas used neither for agriculture nor for the expansion of urban areas. Brazil could reforest this space and sell the carbon sequestration value of these new trees on the international carbon market, profiting billions of dollars in the process and most importantly, preserving the environment (Irving 2019).

Brazil is the country with the most important biodiversity on Earth, and that is why it has one of the greatest potentials for attracting green capital in the world. The massive attraction of foreign investment would strengthen the real against the dollar, helping to contain inflationary pressures, and ultimately providing the Brazilian economy with much-needed capital to resume investments in infrastructure, scientific research, and social assistance, such as Auxílio Brasil, which can be financed,

at more affordable costs, with the issuance of social bonds for instance. The chart below shows the percentage of emissions by financial market actors. It proves that the total of sustainable sovereign bonds still makes up a small percentage of the total.

The \$1 trillion: green bond issuers



© Climate Bonds Initiative 2020

(CBI. 2020. Fig 19. Securities issuance by financial market sectors, since 2019).

4.2. Green Tax Reform

The “Green Tax Reform” is a working group, formed within the scope of the Environmentalist Mixed Parliamentary Front. Proposed some topics for the National Congress to consider, such as that the Tax Reform, being discussed as of 2021, having as some of its the guiding principles: the consideration of the principles of prevention, the polluter-pays, the protector-receiver and the differentiated tax treatment according to the environmental and climatic impact of products and services and during their elaboration and delivery processes (GTRFV, 2021). The establishment of a fund is also foreseen in the reform, a fund that has as investment goals the areas that encompass sustainability. And that has, among other sources of revenue, the income from taxes levied on intensive activities of carbon emissions, as already done in the EU and something that also intends to be adopted by the USA and China.

The adaptation of existing taxes with the ESG guise is also the subject of discussions, a new version of the Contribution for Intervention in the Economic Domain (CIDE), which is a special contribution tax of the exclusive competence of the Union provided for in the Federal Constitution (Article no. 149), that would be a steering tax with the linked collection, which is perfect for this arrangement, currently, the CIDE already focuses on the fossil fuel chain, the so-called CIDE Combustíveis. The environmental CIDE may aim to focus on carbon-intensive sectors and feed the green fund (GTRTV, 2021).

The end of subsidies and other tax benefits for unsustainable sectors is also found as a basic proposal for the green tax reform, in line with what has already been adopted in the EU, USA, Chile, and China. As of 2021, two proposals for Tax Reform are under discussion in Congress, the one from the Chamber, PEC 45, and the other from the Senate, PEC 110. The proposal from the Chamber intends to unify and replace ICMS, IPI, ISS, PIS, and Cofins and transform it into the Goods and Services Tax (IBS), a federal tax. The Senate proposal considers a subnacional IBS that unifies and replaces 9 taxes, which are, ICMS, IPI, ISS, PIS, PASEP, Cofins, IOF, CIDE-Combustíveis, Salário-Educação (Gularte 2021). The proposal of the Green Tax Reform Working Group proposes the partial return of the IBS, according to the reduction of the emission of greenhouse gasses, that is, the creation of the Ecological IBS.

The ecological IBS would allocate a portion of 0.5% (half percent) of the resources from the IBS to municipalities that have Conservation Units (federal, state, or municipal), indigenous lands, investment in sewage sanitation and solid waste collection and recycling, and that have implemented measures to reduce their carbon emissions. This percentage will be increased by 0.5% every 2 fiscal years from the first year in which the IBS is due until it reaches 2.5% (GTRTV 2021, p. 11).

In addition, as determined by the National Policy on Climate Change (PNMC), established by Law 12,187, of 2009, article 6, fiscal and tax measures must be applied to encourage the reduction of emissions and the removal of GHGs, including differentiated rates, exemptions, compensation, and incentives, to be established in a specific law, as one of its implementation instruments (GTRTV, 2021). It is worth noting once again that one of the objectives of fiscal policy, sometimes does not concern the collection of funds itself, but the control of stimulus or discouragement of society's behavior, through taxes, the so-called steering fiscal principle.

The tax rearrangement is vital for Brazil to comply with its NDC and to have a reduction in GHG emissions by about 37% in 2025, compared to 2005 levels, and by 2030 the reduction should be 50%. Complete neutrality in carbon emissions would come in 2050 (MRE 2020). As it allows both

fundraisings together with the issuance of sustainable bonds, it also can influence consumer decisions. The proposal defends the gradual elimination of subsidies to the so-called dirty sectors, those based on fossil fuels (EPE 2020). The Institute of Socioeconomic Studies (INESC) found that the annual average of subsidies to the oil, gas, and coal sectors, in the period from 2013 to 2017, was in the order of 68.6 billion per year, that is, 1% of the Domestic Product Gross (GDP) of the country, adding up to the end of the period, R\$ 309.36 billion for tax expenditures and 33.33 billion for direct expenditures (GTRFV 2021).

A study conducted by researcher Maria Alice Móz Christofolletti from USP, concluded that subsidies given to the energy sector since 2003 have increased GHG emissions by 11% (LUNA 2021). The gradual dismantling of such subsidies is beneficial in achieving sustainable goals. The present research attests that these subsidies should be directed to the renewable energy sectors. The same study projected that if a carbon tax were instituted in Brazil, based on household consumption in 2009, at around US\$80 per ton emitted, the country's emissions would fall by 4.2%. However, such a tax would have a much greater impact on the poor than the rich, as it is a consumption tax. With the poorest people losing an average of 0.1% of their purchasing power compared to the 0.06% lost by the richest. (LUNA 2021). If such a tax were implemented in Brazil, the present research recommends that other taxes levied on consumption be reduced to the same extent, to mitigate the impact of a carbon tax on the poorest population.

FINAL CONSIDERATIONS

The present research sought to address the issue that is considered by many, to be the most important issue of the global society in the 21st century. The global transition to a low carbon economy. As well as, the fight in the mitigation of social inequalities at a global and national level. What is conventionally called, the ESG agenda. A movement led initially by the UN, and that gradually was included in the agenda of countries, companies, and civil organizations. Some events were extremely catalytic and in a way, and a “wake-up call” for humanity, signaling that the way we live is not sustainable, as we will not have another planet to consume resources and live beyond this one. As well, the current situation of social inequalities, gender, and race, will create social problems, and popular dissatisfaction will become increasingly common. The coronavirus pandemic has strongly influenced the importance of the ESG agenda in the global economy.

To turn global society green friendly, in the sense of using sustainable energy sources, that is, energy sources that are not depleted from consumption, and that are not net GHG emitters, huge actions have to be made globally. The second aspect of sustainability is the social aspect. It is not sustainable to live in this way, with large parts of global society being deprived of basic rights and needs, such as access to basic education, basic health, sanitation, employment, and, finally, a preserved environment. The preservation of the environment is the guarantee that future generations will have a planet on which to grow and perpetuate the human species, for many years to come. The present research focused on the financing of the decarbonization of the global economy, as well as the fulfillment of the UN’s sustainable development goals. Specifically, the Brazilian case, and as Brazil is not very advanced in relation to other economies of similar size, the research extensively used relevant international experiences, such as those of Chile, China, the USA, and the EU, for, from there, to build modeling of the Brazilian case.

The EU leads the ESG agenda, and this is because the continent is already a rich and highly developed region, which allows thinking about long-term issues, once its basic needs are already met. Europeans also see the green agenda as their chance to gain more dominance and prestige in global finance, by becoming the global ESG hub, rivaling the US, which despite being the most important economy in the world, lags far behind the EU, but under Biden, tries to take the leadership of the ESG agenda at the global level. The city of Rio de Janeiro is currently working on the idea of becoming Brazil’s green financial hub, rivaling the traditional center of São Paulo.

The case of the EU and Rio show how the ESG agenda can be the passport to the financial prominence of cities or regions. The other two international examples are brought in in the present research, China and Chile come from the emerging world. China, by the way, is the most important nation in the fight against climate change in the world, as it alone emits a third of the GHG gasses emitted globally, as well as financing the largest volume of infrastructure works in the world, mostly in

the emerging world. Currently, China is already the second-largest national ESG market in the world, and it is starting to direct its actions within the ESG theme.

Chile was the most useful example to think about the Brazilian case, as it is a country like Brazil, Latin American, and middle-income. Chile breaks the paradigm that a country needs to be highly rich and developed to invest in the ESG agenda. But most importantly, Chile shows how the adoption of the ESG agenda can be beneficial both for public finances, as well as, by extension, for the Chilean economy. The use of ESG financing has substantially lowered the cost of borrowing from the Chilean treasury to record levels, both in its euro and dollar borrowings. As well as the increase in the rate of foreign investment into the Chilean economy, notably in sectors linked to sustainability, the Chilean government's actions served as a model for the Chilean private sector. In addition to improving other non-economic aspects, such as the lower level of GHG emissions, which in Chile contribute to the country's fight against desertification and the combat against pollution of Chilean air and water quality.

The great merit of this research, the innovative and unprecedented point, was the fact that here, we sought to quantify how much fiscal benefits the country would have with the adoption of both the issuance of ESG public bonds and the green tax reform. In an unprecedented way, the present research estimated how much the adoption of ESG bonds would lower the cost of funding, based on examples from other countries, and the reduction of about 70% in the cost of funding for one of the types of Chilean bonds, shows that ESG funding has great potential to help manage Brazilian public debt. Economic growth and compliance with Brazil's international commitments involve the country's adoption into this new reality of modern finance. Furthermore, another merit of the present research was to suggest new ESG financial products, such as Brazilian Sustainable Bonds, Brazilian Green Bonds, and Forest Bonds. In addition to the adaptation of old ones such as LCA and LCI. The present research argues that the financing of the Brazilian sustainable transition passes through two fiscal pillars, the green tax reform, which can finance and shape the economy, and the issuance of ESG bonds. And finally, the adoption of these practices will assure the global financial market that Brazil is serious about ESG issues, unlocking trillions of dollars in investment for its economy and contributing to the global effort to preserve this planet, which the human species has been calling home since its emergence.

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