The Brazilian Financial System and the Green Economy

ALIGNED WITH SUSTAINABLE DEVELOPMENT

CENTER FOR SUSTAINABILITY STUDIES
AT GETULIO VARGAS FOUNDATION (GVces / FGV-EAESP)

PREPARED FOR UNEP AND FEBRABAN IN THE FRAMEWORK OF INQUIRY INTO THE DESIGN OF A SUSTAINABLE FINANCIAL SYSTEM
The Brazilian Financial System and the Green Economy

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Alignment with Sustainable Development

The Brazilian Financial System and the Green Economy

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An initiative of
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ACRONYMSS

ABC: Low Carbon Agriculture
ABRAPP: Brazilian Association of Closed Pension Funds
Anater: National Agency for Technical Assistance and Rural Extension
Aneel: National Electric Energy Agency
AUM: Assets under Management
Bacen: Central Bank
BB: Banco do Brasil
BN: Biological Nitrogen Fixation
BNDES: Brazilian Development Bank, also known as the National Bank for Economic and Social Development
CAR: Rural Environmental Registry
CCS: Carbon Capture and Storage
CNseg: Brazilian Insurance Confederation
CSI: Corporate Sustainability Index
ESG: Environmental Social and Governance
FCO: Midwest Constitutional Fund (Fundo Constitucional do Centro-Oeste)
FIP: Equity Investment Fund
FNO: North Constitutional Fund (Fundo Constitucional do Norte)
GDP: Gross Domestic Product
GHG: Greenhouse Gases
ILPF: Agriculture-Forest Integration
NE: New Energy
PAP: Livestock Agricultural Plan
PDE: Ten-Year Plan for Energy Expansion
PNRS: National Plan for Solid Waste
PPCDA: Plan for Prevention and Control of Deforestation in the Amazon
PRI: Principles for Responsible Investment
PRONAMP: National Support Program for Medium-size Rural Producers
PSI: Principles for Sustainable Insurance
SAF: Agroforestry Systems
SFN: Brazilian Financial System
SHP: Small Hydroelectric Plant
SN: National Integrated System
STJ: Superior Court of Justice
SPD: Direct Planting System
UNICA: National Union of Cane Sugar Industry

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At the beginning of 2014, the United Nations Environmental Program (UNEP) launched a global research initiative regarding the factors, public policies and innovations capable of accelerating and amplifying the allocation of financial resources to initiatives that would facilitate a faster transition towards a green and sustainable economy. This inquiry involves field research to better understand the reality of a group of countries, identify restrictions and opportunities, and gather opinions and suggestions. We are pleased with the fact that Brazil has been selected as one of these countries, which is a recognition of our leadership position in this area.

In order to contribute to the research coordinated by UNEP, FEBRABAN established a partnership with the Center for Sustainability Studies at Getulio Vargas Foundation (GVCes) – one of the most recognized research centers in the area of sustainability in the country –, to develop studies about this subject.

Three studies were prepared and are presented in this document. The first, The Brazilian Financial Sector Institutional Context in the Transition to Sustainable Development looks at the legislation, regulation, and public policies aimed at socio-environmental themes related to the financial sector. The second study, Current Financing for the Green Economy in Brazil, provides an initial estimate of the financial assets already allocated to the green economy, as well as a methodological proposal for the survey and monitoring of the respective flow of assets. The third and final study looks at two important segments of the Brazilian economy and their process of transition to a greener economy: renewable energy and agriculture.

These studies constitute an innovative project. For the first time, a survey of the volume of financial assets that are subjected to special scrutiny regarding socio-environmental risks, as well as those allocated to projects that facilitate the transition to a more sustainable economy, is being presented. This baseline scenario, using 2013 as a reference, will be refined after the study has been debated.

In addition to the quantitative survey mentioned, the GVCes study describes our institutional framework, covering the legislation and regulations specifically directed at the financial sector.

The banking sector has never been indifferent to the new challenges of environmental sustainability, and has been among the most active sectors in Brazil in the incorporation of green economy principles into its operations.

In 2009, Brazilian private banks signed the Green Protocol that had already been signed by public banks in 1995. The banks do not recognize a conflict between development and sustainability. In 2009, Brazilian private banks signed the Green Protocol that had already been signed by public banks in operations. The benefits of sustainable development and the negative consequences of environmental degradation do not respect boundaries. Today, some countries do more than others do. Some emerging nations make efforts to avoid repeating the mistakes made by developed countries in the past in their own development process. However, international leadership must come from those countries that are more developed, wealthier, larger and stronger. The UNEP the principal multilateral organization in the environmental area, has the mission and responsibility to promote the strengthening of this global leadership.

Murilo Portugal
President
FEBRABAN - BRAZILIAN FEDERATION OF BANKS.
I. INTRODUCTION

UNEP launched, in January 2014, an ‘Inquiry on the Design of a Sustainable Financial System’, aiming at discussing innovation in public policies, regulatory framework and successful international initiatives capable of speeding up the allocation of resources by the financial system to the Green Economy.

UNEP defines Green Economy as an economy that results in improved human well-being and social equity, while significantly reducing environmental risks and ecological scarcities.

A global initiative designed to be run over an eighteen-month-period, the Inquiry aims at engaging and outreach public policymakers, regulators, financial market actors and other stakeholders in the financial sector on designing and channeling capital to a green economy. Its main focus is on the ‘rules of the game’ in the financial system – norms, policies, regulations, incentives and standards – and how they can contribute to expand financial resources for the Green Economy.

In order for the Inquiry to meet its goal, it is pivotal that global level discussions are based on robust data that does reflect realities in national contexts. For such and as part of the Inquiry, UNEP started a process to research national scenarios in Bangladesh, Brazil, China, India, Indonesia, South Africa, Uganda, the United Kingdom, the United States and some countries in Europe.

As member of the Inquiry Council - and representing the engagement of the Brazilian Financial Sector in the discussion of a Brazilian agenda for sustainable development -, FEBRABAN has been actively engaged in the discussions proposed by UNEP and leads the research on the Brazilian context, in the framework of the Inquiry. FEBRABAN has commissioned the Center of Sustainability Studies (GVces) at Getulio Vargas Foundation to carry out the studies that will support Brazil’s discussions and propositions in the framework of the Inquiry.

The goal of this present document is to identify in the Brazilian scenario relevant aspects for the Inquiry purpose, based on three complementary studies: current resource allocation in the ‘Green Economy’, the country institutional and regulatory framework, and the relationship between finances and sustainability in two sectors and in two topics: agribusiness, renewable energy sources, biodiversity and cities.

It is important to mention that this version of the document contains the suggestions made during the public consultation process held on September, 2014.

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III. ASSUMPTIONS

Propositions and discussions presented throughout this work are based on six assumptions:

1. UNEP FRAMEWORK ON GREEN ECONOMY AND THE CONCEPT OF SUSTAINABLE DEVELOPMENT.

UNEP defines Green Economy as an economy that results in improved human well-being and social equity, while significantly reducing environmental risks and ecological scarcities. For UNEP, a Green Economy is low carbon, resource efficient and socially inclusive.

The concept of Green Economy proposed by UNEP was adopted in sector analyses – particularly in Study 2 – in order to ensure methodological consistency with national researches being carried out in UNEP framework. Throughout the studies, the expression ‘Green Economy’ was used as a reference to the concept proposed by UNEP. It is worth noting, however, that the studies focused on the environmental dimension of the Green Economy concept. This was due to constraints in time and data access. Future improvements in the studies will be necessary so the social dimension can be properly considered.

Nevertheless, throughout the studies, strategic discussions and propositions presented were based on the following concept of sustainable development.

Sustainable development is the process through which we move towards sustainability. Critical aspects for sustainable development are: (i) economic – an economically sustainable system should be capable of continuously producing products and services, managing their level of governmental and external debt, avoiding sector unbalances that may harm industrial and agricultural production; (ii) environmental – an environmentally sustainable system should be capable of keeping a stable base of resources, avoiding over-exploitation of renewable resources or environmental degradation and the use of non-renewable resources only to the extent to which investments are made on proper replacement; it includes keeping biodiversity, atmosphere stability and other ecosystem functions not usually classified as economic resources; (iii) social – a socially sustainable system should be capable of being fair in the distribution of income and opportunities, providing proper social services, including health and education, equal treatment for different genders, and the government should participate and act responsibly.

2. THE FINANCIAL SYSTEM PRODUCES PUBLIC GOODS.

The financial sector is critical for the development of a country. It is particularly worth noting the role of banks, which, by capturing cash deposits, play a fundamental role in the economy, since they: i) facilitate the intermediation between savers and investment projects; ii) monitor the execution of capital investments funded by them; iii) contribute to a more efficient resource allocation in the economy; iv) play a critical role in monetary stability, and; v) provide efficient payment services, reducing transactional costs and offering convenience to the society as a whole. Thus, because they produce public assets, the financial system resilience is a key concern in the agenda of regulators and society.

3. UPTON CHANNELING CAPITAL IN THE FINANCIAL SECTOR FOR SUSTAINABLE DEVELOPMENT, THE RISK/RETURN BINOMIAL MUST BE ADJUSTED.

Given the importance of the financial sector for monetary stability and its potential to produce systemic crises, there should be no trade-offs between resilience in the financial sector and resource allocation for sustainable development. Channeling capital from the financial sector for sustainable development needs to co-exist with the concepts of prudence and resilience that guide the agent decision-making in the sector and the process of supervision of their regulators.

4. MARKETS AND THE UNION PLAY DIFFERENT AND COMPLEMENTARY ROLES IN THE PRODUCTION OF WELFARE.

Markets may fail and are known for their limitations when it comes to producing welfare. Therefore, markets and the Union play different and complementary roles in a more efficient allocation of resources and production of welfare. Efficiency of the free market in coordinating the economic scenario and allocating resources is less than optimal when there are failures in the market (imperfect competition, externalities, information asymmetry and presence of public goods). In order to remedy them, it is necessary to design and deploy public policies that adopt one or more combinations of the following: use of economic tools, creation of markets for externalities, command-and-control solutions, and other means of transferring property rights. Therefore, the Union plays a critical role in remedying market failures, in applying redistributive and anti-cyclical policies, and in fostering new industries.

5. ECOLOGICAL BOUNDARIES IMPLY RISKS AND OPPORTUNITIES THAT ECONOMIC DECISIONS AND THE SOCIAL DEVELOPMENT AGENDA IN BRAZIL MUST CONSIDER IN AN INTEGRATED MANNER.

Crossing ecological boundaries and their consequences (such as reducing the stocks of freshwater, extreme and unpredictable climate events, large production of solid waste in urban environments, pollution, biodiversity loss, and massive degradation of ecosystems) have significant impact on a country economic performance and social development. Therefore, such boundaries shall be considered along with public and private economic decisions, prices of goods and services, social development agenda, particularly under the public policies perspective.

6. THE PROPOSITIONS CONTAINED IN THIS WORK REPRESENT A KICK-OFF AND WILL BE EXTENSIVELY DISCUSSED WITH THE SOCIETY.

The purpose of this work is to present a set of propositions based on data collected and reflections made by the team involved along its elaboration. It represents, therefore, a starting point for an extensive discussion with the society on channeling financial resources for sustainable development.
Alignment with Sustainable Development: the Brazilian Financial System and the Green Economy

Executive Summary
IV. EXECUTIVE SUMMARY

In order to be able to elaborate proposals for channeling capitals from the Brazilian Financial Sector (SFN, in Portuguese) - both from credit and financing, and from investments - towards sustainable development, it was necessary to understand the institutional context to which the Green Economy belongs in the Brazilian Financial Sector. There is no such a thing as a sector operating in institutional vacuum, and it was necessary to understand connections between SFN regulatory framework and the Brazilian legal scenario when it comes to environmental protection, since such connections may act either as incentives or barriers to the goal desired. This analysis was also encouraged after the Brazilian Central Bank published, on April 25th, 2014, Resolution 4,327, that deals with financial institutions socio-environmental responsibility, listing guidelines that shall be observed in order for SFN institutions to establish and deploy Socio-environmental Responsibility policies. Thus, with the objective of understanding the SFN institutional framework concerning topics related to sustainability and encouraged by the content of Resolution 4,327, the scope of Study 1 focused exclusively on banks and their corresponding credit and financing activities. Also, due to recent legal doctrine and judicial reviews on the responsibility of banks in case of environmental damages, we chose to analyze environmental aspects in this study. Other approaches to SFN institutional aspects are possible and desirable - such as insurance and investments, and social issues analyses-, although they were not the aim of this work.

Also, in order to make suggestions on how to foster funds towards the Green Economy, it was important to understand what resources are currently allocated in the so-called Green Economy and their enablers. It is necessary to have a reasonably clear starting point in order to assess it and propose ways to change it. This was the purpose of Study 2, quantitatively map resources allocated, on December 31st, 2013, in the Green Economy and their enablers. In order to make it possible, data collection methodologies were proposed for the segments analyzed: credit and financing (financial institutions, constitutional and non-reimbursable funds), investments (pension funds, investment managers, and private equity funds – PE funds) and insurance.

Thus, both Studies 'The Brazilian Financial Sector Institutional Context in the Transition to Sustainable Development' and 'Current Financing for the Green Economy in Brazil' should be read as a whole: while the former tries to figure out how the institutional environment can encourage SFN capital channeling to sustainable development, the latter lists amounts allocated to the Green Economy on December 31st, 2013, by SFN actors.

The Study 'Brazilian Finances: a Strategic 2020 Agenda for Renewable Energy and Agriculture', on the other hand, observes the real economy - focused on agriculture, renewable energy, biodiversity and cities - and analyzes what advances will be needed towards sustainable development in these sectors and topics and, within this discussion, how SFN can contribute to the transition to sustainability. Therefore, whereas the first two studies focus essentially on SFN, the third one analyzes the real economy and its relationship with SFN. Besides, the study also covers - although it is not exactly an economic sector -Cities, since they have been increasingly seen as a privileged locus for action and production of experiences when it comes to sustainability, as they concentrate growing populations, resources, economic activities and political leadership, showing greater agility and autonomy than at the State level.

AGRICULTURE AND RENEWABLE ENERGY

Agriculture and renewable energy are broad sectors and, for this reason, it was necessary to identify within each one the activities and/or sub-sectors that were more relevant for the study and, among them, specific focus for analysis. Such definitions took into account five key factors:

- Strategic relevance for the Brazilian economy.
- Relevance for SFN, as a source of business and operating area.
- Whether they met the 'Green Economy' criteria as defined by UNEP.
- Existence of concrete experience and of some institutional framework, even though incipient or incomplete.
- Availability of information, such as database and practical or academic literature.

Applying these factors to the sectors defined, the analysis scope turned out as follows:

Renewable Energy: We chose the 'new energy' segment, focusing on small-scale distributed solar energy generation. It is a segment on which global investments have been increasing in recent years, whereas in Brazil nothing has actually been done, in spite of legal provisions that at least point to that direction. Strategically analyzing it, it seems in the 2020-2030 timeframe there is a non-negligible risk that Brazil will miss a promising window of opportunity. In case of development of the sector, there will be great need for SFN involvement, in its corresponding areas.

Agribusiness: We chose low-carbon agriculture as the segment, focusing on ABC Program, which is a governmental initiative to channel rural credit resources to a set of technologies and agricultural practices, whose common goal is to reduce environmental impact from food production, while improving productivity and reducing greenhouse gas emissions in the field. Thus, Brazil benefits not only from honoring its international commitments on climate negotiations, but also from anticipating demands for sustainability in food production and requirements for the international trading, which are likely to emerge in the 2020-2030 timeframe.

SUMMARY OF THE STUDIES MAIN REFLECTIONS AND CONCLUSIONS

'THE BRAZILIAN FINANCIAL SECTOR INSTITUTIONAL CONTEXT IN THE TRANSITION TO SUSTAINABLE DEVELOPMENT' AND 'CURRENT FINANCING FOR THE GREEN ECONOMY IN BRAZIL' (STUDIES 1 AND 2)

As a result of combined analyses of the studies 'Current Financing for the Green Economy in Brazil' and 'The Brazilian Financial Sector Institutional Context in the Transition to Sustainable Development', it is possible to propose an agenda for advancements in SFN towards sustainable development for the 2015 – 2020 period. Here we present eight recommendations, from the most strategic level to the tactical level. Recommendations 1 and 2 have a global strategic scope; 3, 4 and 5 have a national strategic scope; and 6, 7 and 8 cover tactical recommendations for banks, investors and insurance companies, based on the results observed from assessments for Study 2.

RECOMMENDATION 1

GLOBAL. HAVE GLOBAL DISCUSSIONS ON CAPITAL ALLOCATION FOR SOCIO-ENVIRONMENTAL RISKS.

In July 2011, the Brazilian Central Bank published Circular 3,547 establishing...
procedures and parameters related to the Internal Process of Capital Adequacy Assessment – ICAAP. In that circular, BACEN requires that the institution demonstrate how it considers the risk of exposition to socio-environmental damages in its assessment process and in the calculation of capital needed for risks. As demonstrated by the historical analysis of economy-environmental crises can be significant sources of monetary and financial instabilities. As the supervisor of the financial system, it makes sense that the Brazilian Central Bank carefully manages a significant source of risk that may systematically affect the Brazilian economy. However, such discussion should also be held at the global level in a coordinated manner, particularly in the Basel agreements framework, so there is a coordinated effort on the central banks side to incorporate this topic into their national regulations, otherwise it would be an obstacle for Brazilian banks competitiveness when compared to their international counterparts. It is also worth noting that valuing socio-environmental risks, because they are externalities, is still a boundary in economic sciences and, therefore, only a coordinated effort in the economic, social and academic environment academia, the society, the government and private institutions will be able to contribute to measuring and standardizing the assessment and records of such risks in financial institutions balance sheets. Standardizing the assessment of such risks is critical not only for having proper systemic risk management, but also to ensure equality of conditions for the financial system actors in a global level, when it comes to capital allocation requirements for socio-environmental risks.

**RECOMMENDATION 2**

**GLOBAL, GLOBALLY STANDARDIZE AND MONITOR RESOURCES ALLOCATED TO THE GREEN ECONOMY.**

In order for UNEP efforts to be effective when it comes to the global coordination of propositions to channel the financial sector capital to the Green Economy, it is necessary to estimate the amounts allocated globally. Thus, it is critical to develop a standardized assessment methodology that can be widely spread and used by the inquiry participant members, ensuring consistency and comparability of data. Ideally, such assessment would be annually conducted in such a way to create a database with allocated resources - and the conditions that foster or hinder their advancement - to support: i) proper management based on consistent and comparable data about socio-environmental impacts on the financial system resilience; ii) creation of cost-effective economic tools to enable transition to a Green Economy; iii) high-quality information for decision makers and citizens regarding adverse externalities generated by the current mode of production and consumption.

**RECOMMENDATION 3**

**BRAZIL, REDUCE LEGAL UNCERTAINTY RELATED TO THE SOCIO-ENVIRONMENTAL DUE DILIGENCE OF THE BRAZILIAN FINANCIAL SYSTEM AGENTS.**

From the 1980s on - aligned with the international movement for environmental protection - there were significant advancements in the Brazilian legislation when it comes to the Union protectorship over the environment. From that period, we can highlight Law 6.938/1981, which established the National Policy on the Environment, and the 1988 Federal Constitution, which extended the principles of environmental defense and preservation and established the triple protectorship of the Union over the environment: administrative, civil and criminal protectorship. Since then, other legislative frameworks expanded environmental protection. It is worth mentioning two of them: i) the new Civil Code (Law 10.406/2002), which mentions, in Article 927, the objective civil responsibility where there is no need to prove fault to demand responsibility in case of environmental damage; and ii) Law 9.605/1998, the Environmental Crimes Law, which deals with administrative, civil and criminal responsibility of agents (individuals and businesses) who damage the environment or refrain from avoiding such practice when they could act to prevent the crime. On the other hand, in Brazil there have been legal doctrine and judicial reviews extending the chain of people responsible for environmental damages, including the financial institutions involved, even though indirectly, with the project that caused the environmental damage.

Legislative framework must advance in Brazil, including extensive discussion with the industry agents and the society, in order to set rules regarding the socio-environmental due diligence required for financial institutions. The current legal uncertainty may pose a significant barrier to capital channeling advancement for sustainable development.

**RECOMMENDATION 4**

**BRAZIL, STRENGTHEN DIALOGUE WITH PUBLIC AUTHORITIES TO IMPROVE ECONOMIC TOOLS THAT FOSTER INNOVATIVE SECTORS RELATED TO SUSTAINABLE DEVELOPMENT.**

Given its natural characteristics, Brazil has potential for developing a country strategic agenda to advance in the Green Economy agenda to be developed and to be considered a global differentiator for Brazil, the society as a whole needs to be engaged, in particular public authorities. Government plays a key role in developing and designing economic tools capable of remedying many failures - especially adverse socio-environmental externalities -, adjusting pricing to reflect real social and environmental costs of products and services, and fostering new and innovative industries that operate with sustainable development in mind.

**RECOMMENDATION 5**

**BRAZIL, FOSTER DIALOGUE BETWEEN PROFESSIONAL ASSOCIATIONS ON TOPICS RELATED TO SUSTAINABLE DEVELOPMENT.**

For this agenda to advance at SFN, observing the uniqueness of the various agents comprised in it, it is critical to foster the synergy between industry professional associations (ABRAPP, CNSEG and FEPRABAN), and other individual actors (banks, investors, insurance companies etc.) to exchange experiences and standardize assessment and management tools for socio-environmental topics, reducing costs and increasing the scale and speed of actions.

**RECOMMENDATION 6**

**BRAZIL, TACTICAL RECOMMENDATIONS FOR BANKS IN THEIR CREDIT AND FINANCING ACTIVITIES.**

In order for the integration of socio-environmental risks to advance in the banks (although this is the industry agent that has advanced most in the topic), it is critical this is not considered a specific, parallel or niche agenda, but rather transversal to all financing activities, taking into consideration the relevance per operation and customer. It is also critical to build tools capable of facilitating the process of socio-environmental risk analysis, reducing costs involved in these processes. And, finally, financial institution managers should actively monitor the effective deployment of their socio-environmental policies in different organizational levels and activities.}

**RECOMMENDATION 7**

**BRAZIL, TACTICAL RECOMMENDATIONS FOR PENSION FUNDS AND INVESTMENT MANAGERS.**

Considering socio-environmental issues may pose significant risks not totally incorporated to the analyses of asset managers and that it is their fiduciary duty to manage and safeguard their investors’ wealth, it is critical they deem the socio-environmental risk analysis as strategic. For such, we suggest pension funds increase their integration of
socio-environmental risk analysis, through more precise mandates and active monitoring, inducing demand on investment managers. Another recommendation is to develop tools to facilitate the process of socio-environmental risk analysis.

**RECOMMENDATION 8**

**BRAZIL: TACTICAL RECOMMENDATIONS FOR THE INSURANCE INDUSTRY.**

Considering socio-environmental issues represent sources of risk and potential financial losses that should be taken into account by insurance companies, it is necessary to conceptually align material topics for the industry in their different subsectors, building socio-environmental management frameworks.

**BRAZILIAN FINANCES: A STRATEGIC 2020 AGENDA FOR RENEWABLE ENERGY AND AGRICULTURE (STUDY 3)**

**RENEWABLE ENERGY**

The analysis of the renewable energy sector in the Brazilian Finances: a Strategic 2020 Agenda for Renewable Energy and Agriculture study (Study 3), gives a current diagnosis of this sector in Brazil and provides recommendations on how SFN can contribute for its advancement. Among the recommendations, we highlight:

- For public policymakers (both financial and non-financial policies, directly related to SFN agenda):
  - Establish tax policies that allow for greater competitiveness for new energy sources vis-à-vis fossil energy sources.
  - Extend the inclusion of NEs (new energy sources) in public energy auctions for the National Integrated System.
  - Re-establish legal and contractual certainty for investments in this industry.
  - Promote NEs and energy efficiency in the strategic agenda and public opinion.
  - Extend and make BNDES existing financing more accessible to NEs.
  - Create funds to support the development of technologies and production of knowledge related to NEs.
  - Eliminate ICMS taxation on the supply of the network by small systems.
  - Make the existing legal infrastructure effective (i.e., facilitate installation and connection of generators to the network).
  - Implement measures as incentives to the market, such as feed-in tariffs.

- For private and public banks, investors and insurance companies:
  - SFN engagement agenda in order to foster the so-called new energy sources in Brazil includes qualifying their agents in this industry, not only for them to design innovative products and services, but also to develop applicable analysis standards and processes. It also includes channeling more resources for new energy sources (NEs), either demanding resources from BNDES and offering resources in conditions that are more aligned with the needs of NE projects, directly or indirectly, or developing projects targeted at NE investors. It is worth pointing out that banks, investors and insurance companies can contribute to eliminate Brazil’s lag on solar energy, researching experiences in other countries (Germany, Portugal, USA, Japan) and designing proper products for small-scale distributed solar energy generation.

- For SFN trade associations:
  - in order to contribute to the advancement of new energy sources in Brazil, trade associations can mobilize different SFN sectors on a strategic agenda for alignment with Sustainable Development, fostering the green economy and representing different SFN sectors at regulators, managers and public authorities, for this strategic agenda.

  - For SFN regulators and managers:
    - we recommend prioritizing the analysis and decision on regulatory aspects that affect investments on NEs (i.e.: capitalization requirements and proper guarantee modes for financing projects in small-scale distributed generation).

**AGRICULTURE**

As for the Agriculture sector (Study 3), the main recommendations of the study are presented below and are organized around major obstacles related to the advancement of the ABC Plan and detailed in accordance with the different actors who work on the advancement of the ABC Plan in Brazil.

**RECOMMENDATION 1**

**STIMULATE THE SUPPLY AND DEMAND FOR DEMANDED AND EXECUTED RESOURCES:**

Despite committing BRL157 billion, which will be available through rural credit for the period 2010-2020 with funds from BNDES and other financial institutions, until July 2014 - i.e., after four growing seasons - the ABC Program only allowed for the contraction of financing of BRL8.12 billion, showing a small demand for the lines offered, which will require a strategic outlook for the coming years. Even considering only the volume available for 2010/2011 to 2013/2014 harvests (BRL13.05 billion), the rate of implementation of the program (62%) also shows the need for non-negligible tactical and operational improvements.

**RECOMMENDATION 2**

**ACCELERATE THE PARADIGM SHIFT IN THE CREDIT BORROWING PROCESS:**

From the point of view of agricultural financing, the ABC Program represents a paradigm shift for all parties involved. Lines of traditional rural credit financing were always directed to finance specific and concrete items, such as agricultural machinery, seeds, fertilizers etc. In these cases, the internal processes to analyze the framework boil down to checking specific codes for each fundable item. Differently, the ABC Program intends to finance an installation process for technologies and practices that assist in mitigating Greenhouse Gas (GHG) emissions in agriculture, i.e., the big difference is that the resources from the program will finance a set of actions that meet a goal and not isolated items. It is strategic, in those early years, ensuring the ABC Program an interest rate that is attractive enough and able to stimulate taking credit through it, rather than from other lines.

**RECOMMENDATION 3**

**ENCOURAGE THE PROVISION OF RESOURCES FOR THE ABC PROGRAM FROM PRIVATE BANKS:**

The total contracted operations during the crop year 2013/2014 amounted to BRL3.03 billion, BRL2.7 billion via Banco do Brasil (over 90%) and BRL286.12 million from BNDES. Banco do Brasil is the major player in the distribution of resources from the ABC Program. To ensure competition in the program, it is necessary to reduce the high transaction and compliance costs for the taking of ABC credit from private banks and public banks with BNDES, thus ensuring competitiveness in the bank industry.

**RECOMMENDATION 4**

**PRIORITIZE THE AMAZON AND THE REHABILITATION OF PASTURELANDS:**

Efforts should be undertaken to increase the borrowing of credit from the ABC Program in areas where the introduction of the planned innovative technologies may offer greater gains in the GHG mitigation. This will occur through a climate intelligence program in agriculture to indicate priority areas for the implementation of government actions, from...
the analysis of vulnerabilities and risks arising from climate change. These intelligence efforts could develop criteria for prioritizing areas in the states aimed at adaptation mitigation actions based on a synergy between the goals of Federal and State Plans, such as PPCDAm, State Plans to Control Deforestation, water conservation plans etc. In particular, it is suggested that the focus of the implementation of the ABC Plan is 535 municipalities with low stocking rate on pasture, 112 of them in the Amazon. Thus, the effect of land-saving, equivalent to 71 times the current rate of deforestation in the Amazon, is tapped, consequently fulfilling the objective of the plan, which includes reducing deforestation pressure in the Amazon region and increasing the efficiency of livestock in that region and other regions in Brazil.

RECOMMENDATION 5
INCREASE THE CAPILLARITY OF TECHNICAL ASSISTANCE AND ACCESS TO INFORMATION ON THE ABC PROGRAM FOR RURAL PRODUCERS:

Ensuring there is allocation of resources for research, training and dissemination of technologies proportional to the disbursement with equalization from the Treasury is a strategic issue. Therefore, it is necessary to expand and accelerate the training programs for technical assistance and rural extension network in regards to the practices recommended in the ABC Plan, particularly in the Amazon, thus ensuring Anater’s effective role in disseminating the program and the benefits of the recommended technologies, in order to shorten the distance between the new technology and its assimilation by the producer. It is also necessary to address the current lack of knowledge about the existence of the program and its lines by farmers, technical assistants, and financial agents, expanding outreach efforts. This could be achieved, among other initiatives, through the creation of a Web portal providing relevant information to the government, farmers, financial officers and other segments of civil society, as a part of the communication and transparency strategy.

RECOMMENDATION 6
ADVANCE ON THE FINANCIAL MONITORING OF THE PROGRAM:

Despite efforts by the Brazilian Central Bank and BNDES - not to mention civil society, through ABC Plan Observatory –, the financial information on the ABC Plan is not being presented in a disaggregated way, for investment purposes. It is necessary, according to transparency and accountability principles, that this information is regularly made available to sociedad for the effectiveness of the program can be evaluated. As indication there has been some advancement in that matter. BACEN announced that, as of 2015 (season 2015/2016), information on the ABC Program will be available for investment purposes.

RECOMMENDATION 7
ADVANCE ON THE PHYSICAL MONITORING OF CARBON REDUCTION THROUGH THE ABC PROGRAM:

The same way, investments in the physical ability to monitor the reduction of carbon by ABC agricultural practices, which is the ultimate goal of the program, are needed. For this, the process of creating the Multi-Institutional Virtual Laboratory of Climate Change must be accelerated, the network of chemical analysis of the soil laboratories must be expanded a baseline carbon stock in soils of different regions of the country must be established, and a geo-reference on the areas being funded must be obtained. This is similar to what is done in the PPCDAm (Plan for Prevention and Control of Deforestation in the Amazon), where there is constant monitoring of deforestation by satellite images.

Considering the importance of the ABC Plan for the competitiveness of the Brazilian agricultural sector, as well as its innovative character, there is a clear agenda both for public policies, and for advancements in the national public and private financial sector agenda. The seven recommendations presented above were organized below according to the different players who can act for the growth of the ABC Program in Brazil. Agents and / or institutions that can contribute to the advancement of the aforementioned recommendations:

Government:

Expand the communication effort of the ABC program to technical assistants, rural producers and financing agents on the economic, social and environmental benefits of the recommended technologies.

Ensure that the production arrangements that ensure reduction of greenhouse gas emissions also allow for an incremental income for farmers, in order to make the producers’ adherence to the new system attractive.

Expand and accelerate the training of technical assistance and rural extension network in regards to the recommended practices from the ABC Plan.

Ensure Anater’s effective role in the dissemination of the program and recommended technologies in order to shorten the distance between the new technology and its assimilation by the producer. It is also necessary to address the current lack of knowledge about the existence of the program and its lines by farmers, technical assistants, and financial agents, expanding outreach efforts. This could be achieved, among other initiatives, through the creation of a Web portal providing relevant information to the government, farmers, financial officers and other segments of civil society, as a part of the communication and transparency strategy.

Private and public banks:

Support the strategic agenda for the advancement of the ABC Program, with the aim of stimulating demand for program resources.

Negotiate the reduction of transaction costs between private banks and BNDES, including access to public database which facilitates access to information on projects to be funded according to the ABC Program.

Increase the number of trained staff in the ABC Program.

Train the productive sector on how to create and submit projects.

Support the strategic agenda for the advancement of the ABC Program, with the aim of stimulating demand for program resources.

Increase the number of trained staff in the ABC Program.
SFN trade associations:
- Monitor the progress of this agenda (induction).

SFN Regulators:
- Monitor the progress of this agenda (induction).
- Advance on the monitoring and transparency of amounts allocated by SFN for the ABC Program.

BIODIVERSITY

Brazil stands out as the second country with the largest forested area in the world, with 13% of the globe’s forests, and the country with the largest area of tropical forests. The biggest Brazilian forest biomes are the Amazon Forest and the Atlantic Forest, which are known for their great biodiversity. Both, and particularly the Atlantic Forest, have suffered from a long process of conversion to other uses, especially to agriculture and urban expansion. Forest ecosystems generate a series of benefits called ecosystem services that, despite being essential for economic development, are not adequately valued and, consequently, have not been considered in current economic plans and models. These ecosystem services translate not only into the supply of logging and non-logging products, but also into the regulation of natural processes, such as the ones that determine the quality and quantity of water resources, atmospheric carbon capture and the regulation of rainfall systems, as well as cultural benefits, particularly tourism.

A new economic development model that prioritizes activities directly related to the forests and that cover the diverse ecosystem services associated with them appears to be the best option to conciliate socio-economic development with the conservation of Brazilian forests and biodiversity. More importantly, the sustainable exploitation of the forests should reduce deforestation pressures on the forests themselves, as in this model the forests would be considered a necessary factor for the generation of a continuous flow of wealth and no longer be just another obstacle to this end. Under these terms, four guidelines are presented for the promotion of economic development associated with the sustainable use of Brazilian forest resources: i) legislation demanding management plans based on sustainable exploitation of logging and non-logging products; ii) add value to forestry products, encouraging the development of industries to process these products; iii) foster tourism, expanding ecological tourism; iv) foster research on biodiversity, in order to explore its economic potential combined with preservation efforts.

It is worth noting that Brazil already has some emergent ecosystem service segments which, if leveraged and encouraged, could channel resources for preservation. Among those segments, we highlight the following, in different levels of development:
- Forest bonds (based on environmental reserve quotas as established in the New Forest Code, Law 12.651 from May 25th, 2012).
- Reverse logistics, encouraged by the National Plan on Solid Waste (PNRS) - Law 12.305 from 2010, including Credits for Reverse Logistics for Packaging (CLRs) issued by waste picker cooperatives and that can be purchased by companies with obligations under the framework of the PNRS.
- Greenhouse gases, still limited to voluntary market, but having potential to operate in the Brazilian Emissions Reduction Market (MBRE), as envisaged in the National Plan on Climate Change (PNMC, Law 12.187/2009).
- Freshwater rights, still at an initial stage, but counting on voluntary initiatives, such as the Water Producer Program from the National Water Agency, that has 16 projects in varying stages of development and states.

Here, we can clearly spot a leadership agenda for SFN, since the development of these segments represent gain opportunities for the sector, while contributing to the preservation of Brazilian natural resources.

CITIES

Cities are key for the progress of sustainability, not only because they host a large portion of the world population (globally, urban areas are home to around 50% of the population and are estimated to reach 60% by 2030), but also because they tend to be the center of economic production. As economies grow, production tends to be concentrated in certain geographic areas, and some cities and states account for most of the economic production. Spatial concentration of production is highly influenced by economies of scale, which results in a process of agglomeration, migration and specialization. “Agglomeration” economies attract people and resources, including financial resources. Such process poses a wide range of challenges, among them the challenge to ensure quality of life in the cities and urban areas located more distant from the economic production. Therefore, cities and their national connections – their economic and social networks, both national and international – are at the heart of the debate about economic growth, development and sustainability.

The challenge to accommodate so many people in cities is huge and creates pressure on demands for housing, electric energy, mobility, access to potable water, basic sanitation, infrastructure and basic services, just to name a few. Such demands and the change in spatial concentration patterns – for people and economic production –, combined with the need for sustainability, led to a movement called “Smart Cities”. Smart cities are resilient and sustainable, capable of adapting, responding rapidly and efficiently to changes and external threats, such as climate change, disasters, storms, hurricanes, and meet the basic demands for food, energy, or any other type of security.

In the future of the cities towards sustainability, key investments are required on:
- Technology – The so-called Information and Communications Technology (ICT), which facilitates management of urban services and infrastructure, information sharing, decision-making process on the side of public and private managers and citizens, and prevention and quick response to problems, such as extreme climate events.
- Different modes of collective urban transport, particularly the ones that are less carbon-intensive, such as train and subway.
- Decentralization, monitoring and efficiency in the production, distribution and consumption of electric power in large cities, focusing especially on smart grids.
- Advances in urban agriculture, aiming at enhancing food safety, creating jobs and improving the population health.
- Advances in education, so citizens understand the relationship between urban and rural environments and play their role as critical consumers, aware of how their consumption habits can be relevant to social and environmental impacts.

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THE BRAZILIAN FINANCIAL SECTOR
INSTITUTIONAL CONTEXT IN THE TRANSITION
TO SUSTAINABLE DEVELOPMENT (STUDY 1)
V. THE BRAZILIAN FINANCIAL SECTOR INSTITUTIONAL CONTEXT IN THE TRANSITION TO SUSTAINABLE DEVELOPMENT (STUDY 1)

INTRODUCTION

The purpose of this study is to analyze the institutional context to which the Brazilian Financial Sector belongs, and how such context dialogues with the transition to sustainable development. Its main goal is to support action propositions in order to speed up capital channeling from the financial sector to sustainable development, considering the Brazilian institutional framework. There is no such a thing as a sector operating in normative and regulatory vacuum; therefore, the discussion on the role of the Brazilian financial sector in the transition to sustainable development must take into account the reality of the laws, court decisions and existing standards, since they may act either as incentives or barriers to the goal desired.

It is important to emphasize that the original motivation for this study is also associated with the fact that the Brazilian Central Bank published, on April 25th, 2014, Resolution 4,327, that deals with financial institutions socio-environmental responsibility, listing guidelines that shall be observed in order for SFN institutions to establish and deploy Socio-Environmental Responsibility policies. Thus, encouraged by the content of Resolution 4,327, the scope of this study focused exclusively on banks and their activities related to credit channeling, insurance and investments, and social issues analysis—although they were not the aim of this study.

This current study is divided as follows: first, we present the evolution in the Brazilian normative scenario when it comes to environmental protection. Then, we present: the discussion about environmental protection in the Brazilian Financial System, the role played by the Brazilian Central Bank (BACEN) on the regulation of environmental topics in the sector (and, concerning this matter, reflections on the relationship between the Basel accords and the so-called Green Economy), conclusions and recommendations.

HISTORY OF ENVIRONMENTAL PROTECTION LAWS IN BRAZIL

The current Brazilian normative scenario, when it comes to environmental issues, is the result of a long evolution process. When Brazil was a Colony of Portugal, the environmental issue was included in the legislation; however, it had the sole purpose of protecting the interests of the Portuguese Kingdom. After Brazil became independent, in 1822, a new legal order was established, including the Civil and Criminal Codes. Starting, then, with the establishment of the first Penal Code in Brazil, the figure below briefly presents some of the critical milestones in environmental protection laws in Brazil up to date:

9 Based on Batizel, 2008

The first Brazilian Penal Code was elaborated in 1830 and established administrative and criminal penalties in case of damage caused by illegal deforestation and logging in public lands. The first Brazilian Republican Constitution, enacted in 1891, defended unlimited rights to property, punishing any offenses against the Kingdom or the land interests of the ruling class. In 1916, the Civil Code shyly included elements of environmental protection (upon mentioning the respect to interests of property neighbors) and also regulated the use of water.

In 1934 there were significant advancements in environmental protection in Brazil. The new Constitution in 1934 covered the legislative competence on certain natural resources and the economic exploitation of water acknowledging its economic value. In 1934, a Decree (24,645/1934) was published to restrain animal abuse, and also a Forest Code was published (Decree 23,793/1934), having become a legal protection for the environment, defining as crimes and criminal offenses any damages caused to forests. In the same year, the Hunting Code (Decree 24,645/1934) and the Water Code (Decree 24,643/1934) were also written, enabling public authorities to control and encourage industrial use of water.

The 1937 and 1946 Constitutions determined the Union had authority to economically exploit the natural resources under federal government responsibility. In 1940, when the Penal Code came into effect, the environmental issues were still of minor concern. Following the trend of the global movement for environmental protection, Brazil started creating legal norms that would directly involve preservation, pollution control and environmental degradation. Among the key legal milestones, we highlight: (i) Law 4,132/1962, which determines cases of land condemnation for public purposes, soil protection, preservation of water springs and bodies of water, and creation of reserved forests; (ii) Law 4,504/1964, which determines the Land Statute, establishing its social function; (iii) the Forest Code (Law 4,771/1965), updating a previous instrument, dated from 1934. Still in the 1960s, other laws were enacted, such as the Laws of Fauna Protection (Law 5,197/1967), the Code of Fishing (Decree Law 22/1967) and the Code of Mining (Decree Law 22/1967).

FIGURE 1. SELECTED MILESTONES IN THE HISTORY OF ENVIRONMENTAL PROTECTION LAWS IN BRAZIL

ALIGNMENT WITH SUSTAINABLE DEVELOPMENT
After the United Nations Conference on the Human Environment, held in Stockholm in 1972, there were some advancements in the Brazilian legislation when it comes to environmental protection, establishing corrective measures on the industry side in the Brazilian territory in case of damages caused to the population and contamination of the environment (Brazilian Law 143/1975). In 1977, we can also emphasize Decree 79.437, which, by enacting the International Convention on Civil Liability for Oil Pollution Damage, introduced strict liability for environmental harm.

Up to the 1980s, environmental protection was seen as a minor, isolated and eventual topic. From the 1980s on, aligned with the international movement for environmental protection, there were significant advancements in the Brazilian legislation in that matter. In that period, we can highlight Law 6,803/1980, which establishes guidelines for industrial zoning in critically polluted areas; Law 6,938/1981, which established the National Policy on the Environment, stating principles for protection and safeguard of the environment, and creating instruments for environmental protection (such as the Statute of Environmental Impact – EIA). The law aforementioned adopted the concept of strict civil liability as a way to charge the agent for damages caused to the environment. Many other laws were enacted in the same period, with similar approaches. Law 7,347/1988 – the Law of Public Civil Action – established a system to protect diffuse interests, among them environmental issues. It determined measures to avoid or prevent ecological harm, hold the polluters civilly liable and making them redress the damages caused, applying penalties to the ones who caused the damage.

The 1988 Constitution extended the principles of environmental defense and preservation, and established the triple protectorship of the Union over the environment: administrative, civil and criminal protectorship; thus, there is a dedicated chapter on environmental matters in the Federal Constitution. Therein, the Federal authorities and the local authorities (municipalities) are held responsible for defending and preserving the environment for current and future generations. After the 1988 Constitution, other laws were enacted with the purpose of protecting the environment. Among them, we highlight: (i) Law 9,433/1997, also known as National Plan on Water Resources, which creates the National System on Water Resource Management, determining – among others – that water resource management shall always provide for multiple uses of the water and that, in the event of scarcity, priority shall be given to the use of water resources for human and animal consumption; and (ii) Law 9,605/1998, which deals with administrative, civil and criminal responsibility of agents (individuals and businesses) who damage the environment or refrain from avoiding such practice when they could act to prevent the crime.

In the 2000s, we highlight the law on radioactive waste (Law 10,308/2001) and biosafety, regulating aspects concerning genetic engineering (Law 11,005/2005). In 2002, the new Civil Code (Law 10,406/2002) introduced new instruments for redress, including situations of harm against the environment with strict liability, regardless of neglect. This norm covers the civil pillar of the triple protectorship over the environment. In 2008, the National Plan on Climate Change (Law 12,187, December 29th, 2009) was approved, and it establishes the principles, objectives, guidelines and instruments related to climate change, including adaptation and mitigation.

In the 2000s, we highlight the National Plan on Solid Waste (Law 12,305/2010), which determines solid waste integrated management, the responsibility of the generators and public authorities and applicable economic instruments; and the new Forest Code (Law 12,651/2012), which rules on the protection of vegetation, areas of permanent preservation, additional protection reserve, forest legal exploitation, supply of forest-based raw material, among other topics, and establishes economic and financial instruments to meet its goals.

There are legal doctrines and judicial reviews that extend the chain of people responsible for environmental harm up to the Federal Constitutional and public economic authorities involved – even though indirectly – with the policy that caused the environmental damage.

With the purpose of mapping legal decisions and case laws related to constitutional actions in the framework of Regional Federal Courts (Tribunals Regionais Federais), State Courts of Justice (Tribunais de Justiça Estaduais), Superior Court of Justice (Superior Tribunal de Justiça - STJ) and Federal Supreme Court (Supremo Tribunal Federal – STF), we conducted a research on legal databases. The purpose of the research was to identify recent decisions (after 2003) recognizing responsibility of banks in case of environmental harm. We found six decisions concerning this topic. Among the actions researched, we highlight the most recent ones:

10. In 2003, a public civil action on earthwork removal and potential buildings on the mangrove, characteristic reforestation of the mangrove. Superior Court of Justice reporting judge was Minister Herman Benjamin. In STJ decision, there is a chain of

The research was conducted using a selection of keywords (environmental harm, environmental law, joint liability; socio-environmental issues; financial system; bank; Green Protocol; Notice 4; Central Bank; PSIGA - Socio-Environmental Responsibility Policy; Socio-Environmental Risk Policy; deforestation; public financing; public financial subsidies; preventive socio-environmental measures on credit extension) and limiting applicable legislation (Equator Principles; Green Protocol) art. 5, LVIII, 120; VI, and 225; FC, arts. 4 and 14, Law 4,829/65; art. 22 § 1, 3, 6, 7 and 8; Law 4,945/1966; art. 2, Federal Law 5,686/1972; art. 4, Decree 72/1973; art. 10, 12, 14; § 1 and II; Law 6,938/1981; arts. 1, I and IV; and 5, I, Law 7,347/1988; arts. 50 and 59, Law 8,778/1991; arts. 2, 70 and 71; VI, 8, IV, 1998; Law 9,605/1998; art. 1, Decree 6,324/2007, art. 17, 18 and 54, Decree 6,514/2008; Forest Code; CNP-Resolution 354/2008; BACEN Resolution 4,327/2004; CONAMA Resolutions 001/98, 09/98 and 237/97. For complete research results, please refer to Annex I.

causation established between the financial institution and the environmental harm, and, once this chain is established, there is strict liability to redress the damages caused.

In 2006, an ordinary action on redressing environmental damages caused by the mining company Companhia Mineira de Metais; STJ ruling judge was Minister Josè Delgado. In STJ decision, it was determined that, if there is proof the financing institution was aware of the environmental harm or of the beginning of the existence of environmental harm, and still granted intermediate or final parcels lending resources for the mining project, the financing institution will be jointly liable along with the other defendants for the damages caused to the environment.

Therefore, there are court decisions in Brazil pointing to the attribution of strict and joint liability to institutions that cause environmental damages, as well as other court decisions in the opposite direction. Undoubtedly, such elements become internalization mechanisms for environmental externalities, as well as relevant elements in the analysis of socio-environmental risks present in the operation of financial institutions in Brazil. At the same time, lack of accurate information about the limits of responsibility attributed to the parties involved (such as financing institutions, borrowers and regulatory agencies) is a factor of legal uncertainty.

Thus, the role the Brazilian Central Bank plays in disciplining the socio-environmental responsibility of financial institutions acts as a significant risk mitigating aspect for SFN.

THE BRAZILIAN CENTRAL BANK AND THE REGULATION OF SOCIO-ENVIRONMENTAL TOPICS AT SFN

Article 192 of the Brazilian Federal Constitution establishes The Financial System shall be structured in a way to foster balanced development in Brazil and act on behalf of collective interests. Then, according to the Brazilian Constitution, the financial system has public purposes. The Brazilian Central Bank (BACEN) shall act to maintain, regulate and supervise SFN in order to ensure its robustness, efficiency and public interests.

From 2008 on, there have been significant advancements in the regulation of the financial system in regards to socio-environmental topics. Three key objectives have led the Brazilian Central Bank to incorporate socio-environmental aspects to the financial sector regulation: risk mitigation, higher integration of the financial system with public policies designed in other areas of the Union, and improved efficiency in the sector. These objectives facilitate channeling capital to the Green Economy.

Risk mitigation:
Socio-environmental aspects may pose significant risks to loan operations, financing, investments and insurance. Therefore, BACEN regulation in this sense aims at contributing to reduce risks in credit, market, operations, liquidity and others.

Higher integration of the financial system with public policies:
As mentioned above, the Brazilian regulatory framework has been evolving towards socio-environmental protection. In the context of organizations regulated by BACEN Resolution 4332/2014, the socio-environmental responsibility policies will help to transversally integrate financial institution policies, their corresponding business plans and governance, also allowing for better alignment with the relevant regulatory framework.

Improved efficiency in the sector:
Given court decisions attributing strict and joint liability to financing institutions of projects that cause environmental harm, the regulation of the topic by BACEN contributes for banks to have clearer understanding of their socio-environmental responsibilities and due diligence. Another reason for BACEN regulation on these topics is to ensure the competition in the sector is based on similar conditions when it comes to socio-environmental responsibility, since voluntary agreements have their reach limited to certain SFN activities and operators.

We present below some BACEN Resolutions and Circulars that directly regulate topics related to socio-environmental aspects.

<table>
<thead>
<tr>
<th>Resolution/Circular</th>
<th>Bank operations impacted</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Resolution 3,545/2008</td>
<td>Rural Credit - environmental compliance in the Amazon</td>
<td>Applies to the Amazon biome. Requires financial institutions to demand from credit borrowers documentation proving environmental compliance.</td>
</tr>
<tr>
<td>Resolution 1,815/2009</td>
<td>Rural Credit - sugar cane expansion</td>
<td>Links agro-industrial credit to the Agro-ecological Zoning for expansion and industrialization of sugar cane. Prohibits financing for crop expansion in the Amazon and Pantanal biomes, as well as in the Upper Paraguay River Basin, among other areas.</td>
</tr>
<tr>
<td>Resolution 3,876/2010</td>
<td>Rural Credit - slave labor</td>
<td>Prohibits rural credit granting either to individuals or businesses who keep workers in conditions similar to slaves, according to the List of Employers elaborated by the Ministry of Labor and Employment.</td>
</tr>
<tr>
<td>Resolution 4,008/2011</td>
<td>Credit for mitigation and adaptation to climate change</td>
<td>Rules on the financing of projects aiming at climate mitigation and adaptation, backed by resources from the National Plan for Climate Change (PNMC).</td>
</tr>
<tr>
<td>Circular 3,547/2011</td>
<td>Internal Process of Capital Adequacy Assessment - ICAP</td>
<td>Requires that the institution demonstrate how it considers the risk of exposure to socio-environmental damages in its assessment process and in the calculation of capital needed for risks.</td>
</tr>
<tr>
<td>Resolution 4,327/2014</td>
<td>Financial Institutions Socio-Environmental Responsibility</td>
<td>Rules on guidelines that shall be observed upon establishing and deploying socio-environmental responsibilities by SFN institutions.</td>
</tr>
</tbody>
</table>

THE BASEL ACCORDS

The evolution of the Basel accords is an important topic in the heart of the international financial sector agenda. The Basel accords – prudential international regulation – cover capital minimum requirements for financial institutions in order to deal with risks associated to their activities. They are globally agreed upon by the members of the Basel Committee on Banking Supervision (BCBS), in line with the Bank for International Settlements (BIS), and count with the participation of Central Bank representatives from many industrial nations and emerging markets, including Brazil, Russia, India and China14. In Brazil, the Basel Accords are implemented by the Brazilian Monetary Council and BACEN, with specific regulation. We list below the key milestones associated with the Basel Accords and specific regulations of the Brazilian Monetary Council and BACEN on their implementations (not intended to be an exhaustive list).

Basel I, 1988. Designed for internationally active banks, it set out the minimum capital requirements of financial institutions with the goal of minimizing credit risk (at least 8% of capital based on a percent of risk-weighted assets).

14 Currently, the Basel Committee on Banking Supervision (originally formed by G7 members) counts with Central Bank representatives from Argentina, Australia, Belgium, Brazil, Canada, China, France, Germany, Hong Kong, India, Indonesia, Japan, Korea, Luxembourg, Mexico, the Netherlands, Norway, Pakistan, Peru, Philippines, Poland, Portugal, Russia, Saudi Arabia, Singapore, South Africa, Spain, Sweden, Switzerland, Turkey, the United Kingdom and the United States. (BIS)
However, it is pivotal to ensure that financing to innovative projects, which naturally pose more risks, does not expose the financial system to resilience. Governments shall jointly act to establish economic instruments encouraging projects aligned with sustainable development, ensuring the growth of new and innovative industries (adjusting the risk/return binomial and the institutional conditions to attract private capital) and also redressing adverse social and environmental externalities.

CONCLUSIONS

- Environmental protection in the Brazilian regulatory framework has been getting more rigid since the 1980s. In SFN, such behavior has been observed in some STJ court decisions establishing the channel of causation between the financing institution and the environmental damage caused by the borrower, and in some cases strict and/or joint liability is attributed according to the damage caused.

- Since 2006, BACEN has been regulating SFN operators’ socio-environmental responsibility. Such process reduces risks and fostering competition in the sector based on less asymmetric parameters from the socio-environmental perspective — since self-regulating standards have limited reach —, also contributes for transparency in bank socio-environmental due diligence when making decisions on credit. This process may positively contribute to a clearer definition of SFN extended responsibilities.

- Since banking produces public goods (because it contributes to money circulation in the economy and to monetary stability), it requires rigid risk management. When such management fails, systemic crises emerge, like the ones we had in 1930 and 2007, producing very high social costs.

- Banks play a critical role in financial intermediation, since they channel money from savers to investment projects in the economy as a whole. Therefore, there is a tight connection between financial markets and the real economy. Banks capture short-term resources through cash deposits, which can be withdrawn at any time by depositors, or through notice account deposits, with medium-term to be withdrawn, and lend these resources at longer terms. Financial sector supervision aims at ensuring banks with great amounts of cash deposits and notice account deposits and a large portfolio of investments have proper risk management and guarantee funds in case immediate liquidity is necessary, after all, crises in the bank system paralyze and affect the whole economy. The evolution of Basel Accords from 1988 to 2010 — from Basel I to Basel III — demonstrates how Central Banks are getting more demanding on prudential regulation, aiming at strengthening the risk management process at financial institutions, ensuring enhanced resilience in case of crises (which affects, for banks, the allocation of capital buffer, liquidity rate and leverage ratio, and contribution for systemic risk). In this process, and especially with the deployment of Basel III, longer-term credit operations and assets that are not highly liquid will require higher capital buffer from banks. If, on one hand, such measures are critical for preserving resilience in the financial systems, on the other hand they may imply banks will offer a smaller amount of resources to fund long-term projects — including also those projects aligned with the so-called Green Economy — which tend to be bolder, since they are more innovative when compared to projects in traditional sectors.

BIBLIOGRAPHICAL REFERENCES


VI. CURRENT FINANCING FOR THE GREEN ECONOMY IN BRAZIL (STUDY 2)

INTRODUCTION

The objective of this study is to map the resources of the Brazilian Financial System currently mobilized for a transition towards the Green Economy and its principal trends. To this end, methodologies were proposed for the measurement of resources currently allocated to the so-called “Green Economy and its enabling conditions” in Credit and Financing, investments and insurance and through the application of these methodologies, primary data was obtained from the institutions studied which are participants in the Brazilian Financial System (banks, pension funds, and insurance companies). Secondary data was also used in our analyses. As a result, products and services identified as “green products” were mapped, as were the number of resources subjected to socio-environmental risk analysis, specific policies, or voluntary agreements to which the institution was a signatory. Thus, not only were resources classified as “green products” analyzed, but also how the institutions studied are developing enabling conditions for the transition to the Green Economy.

For this study, we adopted the concept of Green Economy as proposed by UNEP in order to ensure methodological consistency with other national studies that are being coordinated within the framework of the Inquiry.

Below is a brief background of the socio-environmental themes in the self-regulating SFN and the results and analyses for the Credit and Financing, investment and insurance sectors. Following this, conclusions are presented.

CONTEXT

The financial sector has a fundamental role in inducing the productive sector towards the so-called Green Economy in both its role as a financial intermediary – through credit operations – as well as an institutional investor and insurer. To understand the advances and challenges of this transition for the financial industry, it is necessary to analyze its context and dynamics, its particularities and the actors who have fundamental roles in the Brazilian Financial System (SFN). The figure below illustrates the socio-financial theme of the SFN.

FIGURE 2: TIMELINE FOR THE GREEN ECONOMY IN THE BRAZILIAN FINANCIAL SYSTEM

Over the last decades, the financial industry in Brazil has made important advances – locally or as part of the context of international initiatives – with respect to the integration of socio-environmental aspects into daily business decisions. Brazil has demonstrated important leadership regarding the principal international sustainability agreements for the financial sector such as the Equator Principles, Principles for Responsible Investment, and more recently, the Principles for Sustainable Insurance. While there is still a long road for advances and formalizations ahead, it is already possible to see that this is not perceived as a reversible trend and that the Brazilian Central Bank already views socio-environmental risks as having a relevant role in financial operations and must therefore be adequately monitored by institutions active in the country.

The transition of the SFN (Brazilian Financial System) to the Green Economy for the credit, investment and insurance industries depends on: i) a profound dialogue about making socio-environmental aspects a tangible and material part of strategy and management practices for each industry; ii) the engagement of the organizations leadership about the theme; and iii) collaborative work among the organizations, their trade associations and their stakeholders.

The principal objective of this study is to map the initiatives, practices and products of the credit, investment and insurance industries that consider Green Economy aspects, as well as the number of resources that are subject to socio-environmental risk analysis policies and methodologies.

We will look at not only “designated” lines of credit and “green products” but will also analyze socio-environmental integration practices among financial institutions, institutional investors and insurance companies.

The figure below shows the scope of the principal themes addressed in this study.

FIGURE 3. DATA SCOPE FOR STUDY 2
THE BRAZILIAN FINANCIAL SYSTEM AND THE GREEN ECONOMY

METHODOLOGY

The methodology used in the study seeks to identify the different levels of activity in the Brazilian Financial System towards a Green Economy. Therefore, a methodology was proposed with different levels of analysis of the amounts allocated to the Green Economy and its enabling conditions in 12/31/2013. The methodology proposed begins with a more encompassing perspective (the policies and voluntary commitments adopted by the institution under analysis), to the more specific (their products and thematic services). The figure below conceptually illustrates the proposed methodology:

![METHODOLOGY Diagram](image)

The objective of this study was to quantify, for each level of the proposed methodology, the corresponding amounts of the 12/31/2013 database. Each segment analyzed (Credit and Financing, investments and insurance) had the above methodology adapted to their particularities. The study was undertaken through an analysis of primary information obtained through responses to a questionnaire sent to the institutions and an analysis of secondary information from public documents, reports and other documents.

Below are the principal results for each segment analyzed:

CREDIT AND FINANCING

INTRODUCTION

- The Brazilian Financial System has undergone an intense period of change, particularly since the financial crisis of 2008 and the subsequent slowdown in the international economy. The principal objective of Brazilian economic policy during this period was to encourage the local economy using, in addition to traditional economic policy mechanisms, State-owned financial institutions – notably the Brazilian Development Bank (BNDES), Caixa Econômica Federal (CEF) and Banco do Brasil (BB). These institutions, in executing the government’s investment plans, play an increasingly relevant role in the financing of the Brazilian economy as follows:

- **BNDES**: Mais long-term financing agent in Brazil focusing on infrastructure projects, particularly energy. There has also been an increase in the resources directed towards financing small and medium businesses as well as incentives for innovation and entrepreneurship.

- **Banco do Brasil**: the largest financial institution in Latin America, the Banco do Brasil is the principal financial institution for agribusiness in the country with over a 60% market share in this segment.

- **Caixa Econômica Federal**: the principal financial institution for urban development and infrastructure investment guidelines, Caixa is the federal government’s bank for financing housing and sanitation with a 78% participation in the real estate credit sector. It is also responsible for the distribution of the government’s assistance and income transfer programs such as the Family Grant program (Bolsa Família).

Despite the important and increasing activity of public financial institutions in the SFN, the public sector responds for 51% of the volume of resources in the System, according to Central Bank data. The participation of the private sector in national loans is essential and its analysis is crucial to understanding the SFN and its positioning in relation to the Green Economy.

For this reason, public and private banks active in the Brazilian credit market were selected, accounting for at least 80% of the volume of loans provided within the SFN. They are: BNDES, Caixa Econômica Federal, Banco do Brasil, Itaú Unibanco, Banco Bradesco, Banco Votorantim, HSBC and Banco Santander.

The themes and information provided from these institutions look to provide a better understanding of the different possible activity levels for the banks regarding the Green Economy and are illustrated below. The information referring to Level 1 describes all of the sustainability policies of the financial institution. Level 2 looks at socio-environmental risk policies and the volume of resources subjected to socio-environmental screening for large projects and which go through high-risk evaluations as in the case of initiatives such as the Equator Principles, and which create enabling conditions for a transition towards a Green Economy. Level 3 takes a thematic and sectorial approach to the credit lines in accordance with the UNEP’s definition of a Green Economy, which can be seen in institutions through their policies and processes. Finally, the responses and information related to Level 4 address the amount of specifically themed products and services as described in Annex I. The investigation was made through an analysis of primary information obtained from responses to a questionnaire sent to the institutions, and an analysis of secondary information from public documents, reports and other documents.

![PROPOSED METHODOLOGY Diagram](image)
The Brazilian financial system and the Green economy

RESULTS
CREDIT AND FINANCING: FINANCIAL INSTITUTIONS

| TABLE 2. AMOUNTS ALLOCATED TO THE “GREEN ECONOMY AND ITS ENABLING CONDITIONS” IN 12/31/2013 IN THE CATEGORY CREDIT AND FINANCING. |
| Result | 2013 BRL m | 2013 USD m 16 |
| Level 1 Balance of credit operations Brazilian Financial System | 2,715,000 | 1,256,944 |
| Balance of credit operations - legal entities | 1,464,000 | 677,778 |
| Balance of credit operations - individuals | 1,251,000 | 579,167 |
| RESULTS Level 2 Socio-environmental risk Policies and Processes - high risk sectors (Contracted Amounts) | 170,984 | 79,159 |
| Equator Principles (Contracted Amounts) | 9,757 | 4,517 |
| Level 3 Sectoral Lines - (Contracted Amounts) | 37,347 | 17,290 |
| Renewable Energy - except Large Hydroelectric Projects | 6,319 | 2,925 |
| Energy Efficiency | 8,794 | 4,071 |
| Sustainable Transport | 12,646 | 5,855 |
| Sectoral Lines - (Disbursed Amounts) | 31,736 | 14,335 |
| Renewable Energy - except Large Hydroelectric Projects | 8,367 | 3,874 |
| Renewable Energy - Large Hydroelectric Projects | 9,991 | 4,626 |
| Sustainable Transport | 5,351 | 2,459 |
| Level 4 Thematic Products and Services (Contracted Amounts) | 137,504 | 63,659 |
| Thematic Products and Services (Disbursed Amounts) | 116,573 | 51,969 |

In this section, the policies, initiatives, processes, tools and products actually available in the eight financial institutions researched in this study, will be analyzed first. Afterwards, constitutional and non-reimbursable funds will be analyzed. The results will be presented in an aggregate manner with the intention of constructing an inventory of the resources available for the Green Economy in the SFN, as well as presenting the principal trends, challenges, and best practices of the Brazilian financial industry.

LEVEL 1: SOCIO-ENVIRONMENTAL POLICIES AND PROCESSES
Brazilian banks in general have developed crosscutting and comprehensive policies for considering socio-environmental aspects in the processes for accepting new clients, credit limit evaluations and granting and monitoring of these loans. It was possible to identify, through an evaluation of information and documents from the institutions studied, what socio-environmental aspects are already part of the important initial screening of clients at the financial institutions. The requirements demanded by the banks range from the provision of documents related to environmental licenses, consultations using specific tools, and lists such as the “slave labor black list”, among other criteria.

Additionally, all institutions studied have a socio-environmental risk analysis policy that goes from the requirement of legal compliance guarantee from the clients, ranges to risk mitigation processes, to the identification of new opportunities. Important support for the dissemination of this practice in the SFN sphere is BAGEN Resolution 4:327, published on April 25th, 2014. This requires financial institutions under its regulatory jurisdiction to have a Socio-Environmental Responsibility Policy, as well as a governance structure for these aspects, a socio-environmental risk management system and an action plan for the adequate monitoring and mitigation of these risks.

LEVEL 2: EQUATOR PRINCIPLES AND/OR SOCIO-ENVIRONMENTAL PROCESSES FOR OPERATIONS WITH GREATER SOCIO-ENVIRONMENTAL RISK
The information obtained for Level 2 of this study looked to measure the financing amounts covered by socio-environmental risk analysis policies in which these are relevant and therefore require more detailed analysis and procedures than those in Level 1. The credit amount subject to these policies and methodology analysis among the institutions studied is BRL171 billion.

Due to methodological differences in the monitoring of this amount among institutions, the values collected do not represent the total for the industry and are therefore a conservative estimate. It is important to highlight that much of the loans covered by these operations do not directly fund the Green Economy, but are configured as enabling conditions for risk mitigation and opportunity generation for the same end.

Adhesion to the Equator Principles
In addition to socio-environmental risk policies, an additional analysis was made of the amounts allocated according to the criteria required by the Equator Principles. All of the institutions studied, with the exceptions of the BNDES and Banco Votorantim, are signatories to the Equator Principles. In 2013, BRL9.76 billion in credit operations were contracted under these Principles safeguards. These safeguards cover a gamut of diligence and a series of themes that not only look to diminish socio-environmental impacts but, if coordinated in a responsible manner, generate opportunities for improvements to the local economy, increased income and quality of life in communities directly impacted by this financing.

The new version of the Equator Principles increases the scope of credit analysis with these safeguards. In addition to projects in the category of Project Finance, with outlays of more than US$10 million, the Equator Principles III also require institutions to consider socio-environmental risk in the concession of corporate credit over US$100 million if the financial institution in question is responsible for at least 50% of this amount.

While the BNDES is not a signatory to the Equator Principles, the institution does have a socio-environmental policy built into framework processes that use the categories laid out in the IFC Performance Standards17 as well as sectoral guidelines with a series of specific safeguards.

LEVEL 3: POLICIES AND SECTORIAL LINES OF CREDIT
Level 3 of the study of the banks took a sectorial and thematic approach to the lines of financing which follow the UNEP definition of the Green Economy and can be seen in the institutions through their policies and processes.

The amount of credit contracted for these sectorial lines is BRL37.3 billion. It is worthwhile highlighting that of these amounts the more relevant sectors were sustainable transport, renewable energy – except large hydroelectric Projects, sustainable transport, energy efficiency, and renewable energy - large hydroelectric Projects.

While this is a widespread process among the institutions, the sector as a whole is lacking the data and tools that would allow an in-depth analysis of clients, without which, this process will incur costly transaction costs and a reduction in the competitiveness of the institutions active in the Brazilian market.

16 Foreign exchange rate – R$ 2.16/ US$ 1.00, according to data from the Brazilian Central Bank
17 IFC Performance Standards are socio-environmental safeguards that provide guidelines for socio-environmental risk analysis for financial institutions. For more information on the guidelines, please refer to http://www.ifc.org/wps/wcm/connect/topics_ext_content/ifc_external_corporate_site/ifc_sustainability/ifc_risk_management/risk_management/performance_standards/environmental_and_social_performance_standards_and_guidance_notes
energy efficiency and renewable energy (except large hydroelectric projects), with 34%, 24% and 17% respectively. The amount already disbursed over this period was BRL31.4 billion, to the renewable energy (large hydroelectric projects), renewable energy (except large hydroelectric projects) and sustainable transport sectors with 32%, 27% and 17%.

The results shown in Level 3 represent a conservative estimate. Some institutions do not use this approach that follows the same guidelines as the UNEP, but have specific policies, processes or guidelines for some productive sectors, generally for greater socio-environmental risk and corporate governance (ESG). However, it is important to note that these amounts covered were analyzed according to ESG risk analysis screening covered in Levels 1 and 2 of the proposed methodology.

The sectorial policies of the institutions studied are as follows:

**TABLE 3. INSTITUTIONS AND SECTORS COVERED BY SPECIFIC SOCIO-ENVIRONMENTAL POLICIES**

<table>
<thead>
<tr>
<th>Institution</th>
<th>Sectors Covered by Specific Socio-Environmental Policies</th>
</tr>
</thead>
<tbody>
<tr>
<td>Itaú Unibanco</td>
<td>Production or trade of firearms, munitions and explosives; extraction and production of timber and production of firewood and charcoal from native forests; fishing activities; extraction and industrialization of asbestos; real estate, protein processor</td>
</tr>
<tr>
<td>Santander</td>
<td>Energy (including hydroelectric); water (e.g.: treatment of potable water, sanitation, sewage treatment and selected infrastructure); forests</td>
</tr>
<tr>
<td>HSBC</td>
<td>Agricultural commodities; freshwater infrastructure (supply and sanitation); energy (generation, transmission and distribution)</td>
</tr>
<tr>
<td>Banco do Brasil</td>
<td>Agriculture; civil construction; electrical energy; mining, petroleum &amp; gas, and transport</td>
</tr>
<tr>
<td>BNDES</td>
<td>Livestock, sugar &amp; alcohol; electrical energy generation</td>
</tr>
</tbody>
</table>

**LEVEL 4. PRODUCTS AND THEMATIC SERVICES**

The final level of detail of this study looks exclusively at the amounts of credit destined for specific products and services, considered thematic in accordance with UNEP definitions of Green Economy. All of the financial institutions possess at least one thematic product or service that can be considered as a catalyst for this new economy. These products range from direct loans for energy efficiency and renewable energy to forestry working capital and low carbon agriculture. For a complete inventory of the socio-environmental products and services considered in this study, please refer to Annex I.

According to the survey of the eight financial institutions analyzed in this study, an amount of BRL317.5 billion was contracted in thematic products and services. The total amount disbursed in this period was BRL116.6 billion. The contracted amount is the provision for the disbursement of approved capital but it does not explain in which period this will be disbursed. The resources disbursed signify capital already destined for the Green Economy in the study’s cut-off period. The credit portfolio refers to the sum of the credits to expire, plus expired credits and loss on the operation, if this occurred.

As highlighted in the explanation of methodological aspects, there are levels in which it was impossible to gauge results or amounts given the absence of information or the inexistence of comparable norms among the institutions studied. Therefore, while Level 4 should be more specific and niche-oriented, compared to Levels 1, 2, and 3, and while showing a resource amount less than the other levels, many times the numbers collected do not show this result. In addition to the methodological question addressed previously, there is still the challenge that many of the products and services are not categorized by the actual institutions as socio-environmental, “green”, or as catalysts for this new economy even though they have this aim or indirect impact. Therefore, they could not be considered for the terms of this study.

**RESULTS ANALYSIS**

The results of these levels of analysis demonstrate that policies and crosscutting practices already exist that incorporate socio-environmental risk, creating enabling conditions for a Green Economy. Additionally, programs, lines and specific products were identified that seek to contribute to this new economy. There is, however, a lack of comparable information among the institutions, little quantitative detail, and products and services that are not counted as “green” but that could contribute to this new economy, as well as verification difficulties that hamper the socio-environmental risk analysis process.

All of these points hamper arriving at a total amount of resources available for financing the Green Economy. However, it was possible to identify signposts to be followed and tendencies that could help to reach this new economy. In this case, BACEN Resolution 4,327 from April 25th, 2014, which discusses policies and processes for the analysis and management of socio-environmental risks in institutions under its regulation, can be highlighted. With this, not only operations under the safeguards of the Equator Principles or high-risk sectors, but all areas of activity and operation of the banks subject to Central Bank regulation, must consider socio-environmental aspects in their financial decision-making processes. These social and environmental aspects should consider the principles outlined in BACEN Resolution 4,327/2014. Additionally, traditional products and services can create enabling conditions for the Green Economy if they are monitored to guarantee their conformity with socio-environmental risk policies and safeguards.

Regarding the monitoring of this market, it is necessary to undertake efforts to guarantee the effective implementation of these policies and processes. It is also necessary to standardize the way this information is managed and collected in order to foster transparency and effective monitoring of this subject among Brazilian financial institutions. Finally, standardization is also important to maintain competitiveness among the institutions and, through this prism, it is fundamental that public policy provides a level playing field and guides the positioning of the sector.

**RECOMMENDATIONS:**

- Extension of socio-environmental analysis policies and processes to all layers of financing, taking into consideration the type of operation and client.
- Monitoring of the effectiveness of institutions’ socio-environmental policies and processes.
- Improvement of tools that facilitate the process of socio-environmental risk analysis.

**CREDIT AND FINANCING: CONSTITUTIONAL AND NON-REIMBURSABLE FUNDS**

In addition to the credit and financing provided by the principal financial institutions in the country, constitutional and non-reimbursable funds, that also seek to contribute to the transition of the SFN to the Green Economy, were analyzed. Constitutional funds have the objective of fostering development in different regions of the country through productive activities. The Ministry of Integration, the organ responsible for these funds, determines operating guidelines and delegates management to financial institutions active in the fund’s respective region with the Banco do Brasil responsible for the management of the Midwest Constitutional Fund (FCO), the Banco do Nordeste for the Northeast Constitutional Fund (FNE), and the Banco da Amazônia for the North Constitutional Fund (FNO).

Non-reimbursable funds are funds generating resources that are applied in specific and restricted manner, without the need of reimbursement on the part of the recipients of these resources; and may be generated by the reversion of part of the profits from
financial institutions, government budgets, among others. For this study, constitutional and non-reimbursable funds were selected that have socio-environmental aspects in their constitutions or regulations and are listed below. The information was obtained from publicly available information as well as a closed questionnaire to the following institutions:

- Fundo Constitucional do Norte (FNO) - North Constitutional Fund
- Fundo Constitucional do Nordeste (FNE) - Northeast Constitutional Fund
- Fundo Constitucional do Centro-Oeste (FCO) - Midwest Constitutional Fund
- Fundo Amazônia - Amazon Fund
- Fundo Social - Social Fund
- Funtec - Fundo Inovação Tecnológica - Technological Innovation Fund
- Fundo Socioambiental (FSA) - Socio-environmental Fund
- Fundo Clima (FNMC) - Climate Fund
- Fundo Nacional do Meio Ambiente (FNMA) - National Environment Fund
- Fundo Brasileiro para a Biodiversidade (FUNBIO) - Brazilian Fund for Biodiversity
- Fundos Setoriais - Sectorial Funds
- Fundos Eletrobrás - Eletrobrás Funds

From a methodological point of view, tendencies and practices were analyzed at two levels. Information referring to Level 1 addresses all of the non-reimbursable fund's socio-environmental guidelines. As for Level 2, it addresses the amount of thematic lines as laid out in Annex II. The investigation was also made through an analysis of primary information obtained from responses to a questionnaire sent to the institutions and an analysis of secondary information from public documents, reports and other documents.

### RESULTS

#### TABLE 4. AMOUNTS ALLOCATED TO THE GREEN ECONOMY BY CONSTITUTIONAL AND NON-REIMBURSABLE FUNDS

<table>
<thead>
<tr>
<th>Level 1 SOCIO-ENVIRONMENTAL GUIDELINES</th>
<th>Results 2013 BRL m</th>
<th>Results 2013 US mm</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thematic Lines - Constitutional Funds</td>
<td>11,432</td>
<td>5,292</td>
</tr>
<tr>
<td>Thematic Lines - Non-Reimbursable Funds</td>
<td>712</td>
<td>330</td>
</tr>
</tbody>
</table>

#### LEVEL 2 THEMATIC LINES

Level 2 of this study addresses the thematic lines of the constitutional and non-reimbursable funds that directly contribute to the transition to the Green Economy. For non-reimbursable funds such as the Fundo Amazônia (Amazon Fund), or the Fundo Socioambiental (Socio-Environmental Fund), that by their very nature already possess socio-environmental attributes, all of the allocations of resources from these funds were considered to be incentives for the Green Economy. The total amount of socio-environmental lines contracted in 2013 from constitutional funds was BRL 11.4 billion. The total amount contracted in 2013 from non-reimbursable funds analyzed was BRL 712 million. It is important to note that not all of the non-reimbursable funds provide information of contracted amounts and therefore the total amount includes only the thematic lines from the funds from which information was available.

### RESULTS ANALYSIS

As described in the analysis of loans, a greater transparency and comparability is needed among constitutional and non-reimbursable funds in order to guarantee a clearer monitoring of the increasing amounts contracted for a Green Economy. In addition to this, it is essential that the amounts disbursed be monitored in order to guarantee the effectiveness of the resources allocated to these non-reimbursable funds.

### INVESTMENTS

#### INTRODUCTION

The investment industry in Brazil has some peculiarities due to the country’s history of high interest rates and inflation. The profile of the Brazilian investor is conservative, which results in a channeling of investments into government bonds, which represent around 60% of the assets managed by pension funds and managers analyzed in this study. The BM&FBOVESPA has an average market capitalization of BRL24 trillion, and average daily trading of BRL7.4 billion. There are 454 listed companies with a high liquidity concentration in large companies. The capital market also translates into low liquidity in the secondary corporate credit market that has begun to develop in recent years and counts on strong investor incentive and the stock exchange itself for expansion.

Of the environment, social and corporate governance (ESG) themes, corporate governance is that which is best incorporated into investment decisions by asset managers and institutional investors, particularly pension funds. With an active presence on management boards, direct investment, and participation in sectors such as infrastructure and civil construction, these institutions began looking at governance back in the 1990s. There is still a great debate regarding the treatment of social and environmental aspects, as can be seen in studies and research about the theme, as well as over the definition and quantification of the impacts on the performance of managed assets.

While the scenario above can be considered challenging for the industry, other strategies and tendencies in the Brazilian investment market point in an optimistic direction regarding the treatment of ESG aspects in decision-making processes by institutional investors and investment managers. The country was a pioneer in the formation of a Signatory Network for the Principles of Responsible Investment (PRI)\[^{19}\], which today has 56 signatories that account for 60% of the assets under pension fund management and 70% of the resources managed by investment managers in Brazil. The collaborative work of the Network is strongly focused on the transversal integration of aspects in the analysis and managements of assets, a strategy predominantly found among the cases analyzed for this study.

Regarding responsible investments in Brazil, the first niche products launched were the Fundo Éthical (Ethical Fund) in 2001, the Itaú Excelência Social (Itaú Social Excellence) fund in 2004 and other products that followed the launch of the BM&FBOVESPA SE (Corporate Sustainability Index or CSI) in 2005. The funds, which address the theme of sustainability or corporate governance, total 33 products (17 investment funds and 16 equity funds) with a total of BRL1.5 billion managed in December 2013.

In the same manner as in financing, we looked to analyze policies, initiative, processes, and investment strategies of the Financial System Analysis and the Green Economy.
tools, and products that represented what is actually available in the Brazilian investment market. As ESG aspects in the investment industry are principally organized through the PRI, this was chosen as the first level for detailing the enabling conditions for a Green Economy. The sample of the institutions studied in this segment consists of signatories to these Principles, in their two investor representative categories: asset owners (pension funds) and asset managers (investment managers).

Secondary information was used for the study of pension funds and asset managers and a questionnaire was also sent to associates of the Brazilian Association of Closed Pension Funds (ABRAPP), who was very interested in contributing to the study with information about Brazilian pension funds, issued a notice reinforcing its support for the study and extending the invitation to all of its associated entities. Six non-signatory institutions responded to the questionnaire and their results are also presented separately from the signatories. The pension funds considered in this study are:

<table>
<thead>
<tr>
<th>PRI Signatories</th>
<th>AUM BRL m 2013</th>
</tr>
</thead>
<tbody>
<tr>
<td>Calpos</td>
<td>634</td>
</tr>
<tr>
<td>CENTRUS</td>
<td>8,241</td>
</tr>
<tr>
<td>Economus</td>
<td>4,628</td>
</tr>
<tr>
<td>Faelita</td>
<td>1,421</td>
</tr>
<tr>
<td>Fasek</td>
<td>229</td>
</tr>
<tr>
<td>Furtuz</td>
<td>12,430</td>
</tr>
<tr>
<td>Funcof</td>
<td>22,616</td>
</tr>
<tr>
<td>Funcof</td>
<td>55,414</td>
</tr>
<tr>
<td>Fundação Itau Unibanco</td>
<td>18,287</td>
</tr>
<tr>
<td>Infraprev</td>
<td>2</td>
</tr>
<tr>
<td>Petroo</td>
<td>66,060</td>
</tr>
<tr>
<td>Povi</td>
<td>171,084</td>
</tr>
<tr>
<td>Real G</td>
<td>11,076</td>
</tr>
<tr>
<td>Sistal</td>
<td>7,000</td>
</tr>
<tr>
<td>Vala</td>
<td>16,984</td>
</tr>
<tr>
<td>Total</td>
<td>396,106</td>
</tr>
</tbody>
</table>

% of Total Market: 62%

<table>
<thead>
<tr>
<th>PRI Signatories</th>
<th>AUM USD m 2013</th>
</tr>
</thead>
<tbody>
<tr>
<td>Calpos</td>
<td>294</td>
</tr>
<tr>
<td>CENTRUS</td>
<td>3,815</td>
</tr>
<tr>
<td>Economus</td>
<td>2,143</td>
</tr>
<tr>
<td>Faelita</td>
<td>658</td>
</tr>
<tr>
<td>Fasek</td>
<td>106</td>
</tr>
<tr>
<td>Furtuz</td>
<td>5,755</td>
</tr>
<tr>
<td>Funcof</td>
<td>10,470</td>
</tr>
<tr>
<td>Funcof</td>
<td>25,655</td>
</tr>
<tr>
<td>Fundação Itau Unibanco</td>
<td>8,466</td>
</tr>
<tr>
<td>Infraprev</td>
<td>1</td>
</tr>
<tr>
<td>Petroo</td>
<td>30,583</td>
</tr>
<tr>
<td>Povi</td>
<td>79,206</td>
</tr>
<tr>
<td>Real G</td>
<td>5,128</td>
</tr>
<tr>
<td>Sistal</td>
<td>3,241</td>
</tr>
<tr>
<td>Vala</td>
<td>7,863</td>
</tr>
<tr>
<td>Total</td>
<td>183,382</td>
</tr>
</tbody>
</table>

% of Total Market: 62%

The themes researched seek to construct a panorama of the responsible investment industry in Brazil by way of an analysis of asset categories that incorporate ESG opportunities and risks in equities (listed shares) and fixed income (corporate credit) among pension funds as well as investment managers. At this time, no integration of ESG risks in government bonds were awarded for being an incipient theme even among global investors and there are no practices among Brazilian investors.

The methodology seeks to differentiate between the amounts allocated for a Green Economy among diverse levels (in this case evaluated by assets under management), beginning with PRI signatories (Level 1), to consequent integration of ESG risks in investment decisions of the manager (Level 2), to specific investments in CSI companies (Level 3), and finally specific products and services (Level 4).

Among the asset managers, the source of information for this study was the PRI Transparency Report. Of the largest signatory managers, CAIXA and HSBC Investments were not considered as they had not responded to the PRI questionnaire in 2013 and for responding with global aggregates, respectively. Therefore the asset managers considered in this study are:

<table>
<thead>
<tr>
<th>PRI Signatory Managers</th>
<th>AUM BRLm 2013</th>
<th>AUM US$m 2013</th>
</tr>
</thead>
<tbody>
<tr>
<td>BB DTVM</td>
<td>534,770</td>
<td>247,579</td>
</tr>
<tr>
<td>Bradesco Asset Management</td>
<td>308,276</td>
<td>148,331</td>
</tr>
<tr>
<td>Itau-Unibanco Asset Management</td>
<td>155,556</td>
<td></td>
</tr>
<tr>
<td>Santander Brasil Asset Management</td>
<td>57,131</td>
<td></td>
</tr>
<tr>
<td>SUL America Investimentos</td>
<td>18,229</td>
<td></td>
</tr>
<tr>
<td>Votorantim Asset Management</td>
<td>8,435</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>1,357,003</td>
<td>628,242</td>
</tr>
</tbody>
</table>

% of Total Market: 62%
The asset owners that are PRI signatories in Brazil have assets under management of BRL396.1 billion, which corresponds to about 62% of the total volume of supplementary closed pension entities. Of these, the main pension funds in the market should be highlighted: Previ (BRL171 billion), Petros (BRL66 billion) and Funcef (BRL55 billion). It is important to note that most pension funds analyzed have between 10-50% of their assets under management allocated to government bonds, for which ESG risk analysis is not incorporated. This segment is fundamental for the advancement of the Green Economy in Brazil due to its relevance in the Brazilian economy itself and its ability to influence best practices in the investment industry and the real economy through the integration of ESG aspects in its investment process and, particularly, through asset selection, assessment and allocation to investment managers.

### LEVEL 2

#### INTEGRATION PRACTICES OF ESG ASPECTS IN THE INVESTMENT PROCESS

The discussion of corporate governance is more widespread among institutional investors than social and environmental themes; a tendency observed in the Brazilian investment industry as a whole. The research conducted among the supplementary pension entities showed that non-PRI signatory institutions did not show policies, methods, or practices for integrating these aspects into their investment strategies and even among the signatories, great discrepancies were observed in the depth, the themes addressed, and the effectiveness of the implementation of responsible investment policies. Eight supplementary pension entities adopted responsible investment policies or inserted the theme into their investment policies. This number dropped to four pension funds when we consider the adoption of a specific methodology for ESG risk evaluation, and to only two pension funds who declared that they used the index as a benchmark for specific mandates or strategies in the investment process. Due to the way in which the allocated resources are calculated and low quantitative disclosure, it was not possible to determine the amount that responded to ESG aspects in the investment process.

#### Investment Policies:

The Brazilian Network of PRI Signatories has a working group exclusively for pension funds, which encourages the integration of ESG aspects in the policies of the pension funds and practically all of the signatories have a responsible investment policy. The content of the policies however, varies significantly among the institutions. Everything from aspirational policies to documents that mentioned the objectives, references, themes, and the approach to the different asset classes were analyzed.

### TABLE 7

<table>
<thead>
<tr>
<th>Assets Under Management According to the Proposed Methodology</th>
<th>AUM 2013 BRL$m</th>
<th>AUM 2013 US$m</th>
</tr>
</thead>
<tbody>
<tr>
<td>Market Total Level 1</td>
<td>640,327</td>
<td>640,327</td>
</tr>
<tr>
<td>Analyzed PRI Signatories Level 2</td>
<td>Not possible to determine amounts</td>
<td>Not possible to determine amounts</td>
</tr>
<tr>
<td>Signature Level 3</td>
<td>33,485</td>
<td>33,485</td>
</tr>
<tr>
<td>Investments in CSI Companies Level 4</td>
<td>3,041</td>
<td>3,041</td>
</tr>
</tbody>
</table>

### Methodologies for Integration:

There is no uniformity regarding the strategies and methodologies for integration. Generally, the search for ESG information is made through consulting and analyzing sustainability reports from the companies being invested in. As a methodological principle, the Global Reporting Initiative, GRI, is used the most by investors for studies of companies being invested in as well as, in some cases, the publication of their own annual reports, as occurs with Infraprev, Previ and Valia, for example. Some pension funds, which account for a significant parcel of supplementary pension assets, use the BM&FBOVESPA's Corporate Sustainability Index, CSI, as a reference for the responsible allocation of assets. According to the questionnaires received from the entities, 30.2% of equities undergo a socio-environmental and corporate governance screening among the PRI signatories. For resources invested in fixed income (corporate credit), the percentage falls to 4.8%, because the most part is allocated to government bonds, which are not ESG risks scrutinized.

### Selection and Evaluation of Managers:

The selection and monitoring of managers is a relevant activity for Brazilian pension funds as they often outsource the management of resources through the formation of exclusive funds or through the purchase of shares in open funds. Among the holders of resources that are PRI signatories, the percentage of resources allocated to investment managers varies around 10% of equities (listed shares) and 5% for fixed income assets (private credit). Although the resources managed by third-parties, in just these two classes of assets, are around BRL56 billion, robust criteria for the integration of ESG in the selection and monitoring of managers are not shown in the entities’ public records. The initiatives reported are generally the encouragement of the adoption of the PRI among managers, or the consideration of responsible investment criteria and practices when they are contracted. An important challenge for Brazilian pension funds is the insertion of these criteria into performance evaluation, mandate monitoring, and closer monitoring of asset analysis and management on the part of the managing institutions.

### Shareholder Activism:

Shareholder activism is also a manner of integrating ESG risks. While many entities have written socio-environmental responsibility policies or integrated ESG aspects, the same volume of pension funds do not demonstrate this in their voting, engagement and shareholder activism practices. While they declare that corporate governance is a pillar of their investment strategy, a good part of the pension funds do not have voting at general shareholder meetings and rarer still are those that integrate the socio-environmental theme into their shareholder participation strategies.

### INVESTMENT IN CSI COMPANIES

For pension funds, the Corporate Sustainability Index (CSI) is an important reference in the integration of responsible investment practices into their investment processes. Some pension funds declared that they used the index as a benchmark for specific mandates or even as decision criteria in the allocation of assets, particularly in equities. Among the pension funds that responded to the questionnaire sent out as part of this study, 10.8% of assets in equities are invested in companies that participate in the corporate sustainability index of the Brazilian stock exchange which corresponds to a volume of BRL33.5 billion (BRL21.4 billion in their own portfolios and BRL12.1 billion in resources managed by third-parties.). The table below shows the volume and percentages of equity portfolios allocated in CSI participating companies of pension funds that responded.
TABLE 8. VOLUME AND PERCENTAGE OF EQUITIES INVESTED IN CSI COMPANIES

<table>
<thead>
<tr>
<th>Questionnaires</th>
<th>% of CSI Companies</th>
<th>AUM Total of Respondents BRLm</th>
<th>OWN USDM</th>
<th>INVESTMENT MANAGERS USDM</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total</td>
<td>21,390</td>
<td>12,095</td>
<td>311,422</td>
<td></td>
</tr>
<tr>
<td>Signatories</td>
<td>21,350</td>
<td>12,041</td>
<td>295,809</td>
<td></td>
</tr>
<tr>
<td>Non-signatories</td>
<td>40</td>
<td>34</td>
<td>15,612</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Questionnaires</th>
<th>% of CSI Companies</th>
<th>AUM Total of Respondents BRLm</th>
<th>OWN BRLm</th>
<th>INVESTMENT MANAGERS BRLm</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total</td>
<td>9,903</td>
<td>5,600</td>
<td>144,177</td>
<td></td>
</tr>
<tr>
<td>Signatories</td>
<td>9,884</td>
<td>5,575</td>
<td>136,549</td>
<td></td>
</tr>
<tr>
<td>Non-signatories</td>
<td>19</td>
<td>25</td>
<td>7,228</td>
<td></td>
</tr>
</tbody>
</table>

LEVEL 4

THEMATIC FUNDS AND SPECIFIC MANDATES FOR RESPONSIBLE INVESTMENTS

A good part of the pension funds that are signatories to the PRI are adopting the transversal integration strategy of the Principles in their investment management and strategies. Even considering the predominance of integration strategies among pension funds, some asset classes such as Private Equity Funds (PE) still predominantly count on the strategy of thematic fund launches. Among the respondents to the questionnaire sent to the pension funds, it was noted that there existed BRL3 billion invested in specific funds, of which BRL2.4 billion were allocated to holding funds and the remaining BRL600 million in equities or fixed income funds. The allocation of resources in holding funds will be discussed later in a specific section and recorded separately from the resources allocated to equities (listed companies) and fixed income (corporate credit) as presented in this section.

INVESTMENT MANAGERS

TABLE 9. ASSETS UNDER MANAGEMENT ACCORDING TO THE PROPOSED METHODOLOGY

<table>
<thead>
<tr>
<th>Results</th>
<th>AUM 2013 BRLm</th>
<th>AUM 2013 USm</th>
</tr>
</thead>
<tbody>
<tr>
<td>Market Total</td>
<td>2,401,000</td>
<td>1,114,352</td>
</tr>
<tr>
<td>Level 1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Analyzed PRI Signatories</td>
<td>1,357,003</td>
<td>628,242</td>
</tr>
<tr>
<td>Market Percentage of Analyzed</td>
<td>56%</td>
<td>55%</td>
</tr>
<tr>
<td>Signatory</td>
<td>70%</td>
<td>70%</td>
</tr>
<tr>
<td>Level 2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Not possible to determine amounts</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Level 3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Not possible to determine amounts</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Level 4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Thematic Products and Services</td>
<td>1,882</td>
<td>732</td>
</tr>
</tbody>
</table>

LEVEL 1

PRI SIGNATORIES

The principal asset managers in Brazil are associated with large retail banks and are often responsible for the management of the reserves of insurance market companies linked to the same financial conglomerate. Due to financial constraints, some asset classes are important actors in this industry and they interact with institutional investors, high-net-worth individuals, and retail, and have a strong influence over suppliers in the investment industry such as market analysts, system and information tool providers for the market, and companies receiving investment, among others. Investment managers who are PRI signatories represent a total of BRL1.4 trillion or 56% of managed assets in the Brazilian market. Just as among pension funds, there is a predominance of government bonds among investment manager assets. Through an analysis of Transparency Reports, we observed that four of the six institutions analyzed had over 50% of their equity in this asset class. Listed shares are accounted for less than 10% of the assets for four of the investment managers, and between 10% and 50% in another two institutions. Investments in fixed income (corporate credit), represented higher percentages than shares according to PRI asset declarations. Two managers confirmed that they had less than 10% in corporate bonds, while three declared that their portfolio contained between 10% and 50% of this class of assets among total assets.

LEVEL 2

INTEGRATION POLICIES AND METHODOLOGIES

With the advance of PRI discussions, however, some managers are mobilizing to adopt transversal integration practices for ESG aspects in their investment strategies. The form of integration varies among managers, who have adopted some of the following strategies in their decision-making process:

- Development of a qualitative rating of ESG aspects that are analyzed in parallel with economic-financial aspects and that can be applied by managers such as:
  - Definition of types of investment for a specific class of assets.
  - Weighing of resource allocation in a determined asset (e.g. participation in the issue of debentures).
  - Incorporation of stock prices through insertion into a valuation model (e.g.: weighing of capital or beta cost of a share).
  - Development of probability scenarios, in which analyses of share price sensitivity to ESG aspects are incorporated into the recommendations of analysts for management.
  - Adoption of the Corporate Sustainability Index (CSI) portfolio, as a benchmark for responsible investments in order to define niche investment products or as a methodological basis for analyzing companies in the portfolio.

As well as integration strategies, the existence of a policy of responsible investment, methodologies for evaluating ESG aspects and engagement practices were used by investors to show they were considering the theme in investment decision-making. Three institutions said they had responsible investment policies and two said that they integrated these policies into their investment process or manual. However, from the information provided, it was not possible to quantify the exact percentage of assets these institutions had that were completely integrated with ESG risks.

LEVEL 3

INVESTMENT IN CSI COMPANIES

Due to the disparities among the ways in calculating allocated resources and low quantitative disclosure, it was not possible to determine investment amounts in CSI companies by investment managers.

LEVEL 4

RESPONSIBLE INVESTMENT FUNDS

Among asset managers, all of the institutions analyzed in this study had strategies to launch products with a "green seal" for sustainable funds and/or corporate governance. The liquid assets of these products however, had very little participation in relation to the total of the equity funds, the asset class to which they are normally included and less yet if we consider the total of assets managed by institutions in the industry as a whole. ANBIMA (Brazilian Association of Financial and Capital Market Entities), responsible for the self-regulation of the investment fund industry in Brazil, has a Sustainability/Governance category for equity funds. The list of funds classified in this category, independent of whether or not they are managed by the institutions participating in this study, can be found in Annex III. The total of BRL1.5 billion, which considers only investment in equity funds, has remained stable for the last number of years. The main challenges in increasing the participation of responsible investment funds in Brazil according to investors and market agents is the difficulty in defining the impact of ESG aspects on the performance of companies, the lack of demand on the part of institutional clients and, generally, the instability of the Brazilian stock market.
PRIVATE EQUITY FUNDS - PE

In addition to fixed income and equity investments, there is another type of investment that investment managers and pension funds in which PRI or non-PRI signatories can invest – Private Equity Funds (PE funds). These funds can also be a thematic investment and therefore can be considered within Level 4 of the proposed methodology. As these funds were not considered in the above analysis, double counting did not occur. The PE fund is characterized principally by its active participation in the companies or businesses in which it invests. It is constructed with a restricted membership and the resources under its administration are for the acquisition of shares, debentures, subscription bonuses, or other convertible or changeable titles and shares into shares of publicly held companies, with participation in the decision processes of the company invested in. According to a study by ABVCAP (Brazilian Association of Private Equity & Venture Capital) and KPMG, the sectors that are the greatest focus for managers are sectors that contribute to the Green Economy, cleantech, renewable energy, energy, information technology and infrastructure sectors.

TABLE 10. ASSETS UNDER MANAGEMENT PE FUNDS

<table>
<thead>
<tr>
<th>Results</th>
<th>AUM 2013 BRLm</th>
<th>AUM 2013 US m</th>
</tr>
</thead>
<tbody>
<tr>
<td>PE - Market Total</td>
<td>147,392</td>
<td>68,237</td>
</tr>
<tr>
<td>PE - Thematic Funds</td>
<td>21,573</td>
<td>9,987</td>
</tr>
</tbody>
</table>

A compilation was made of all the Private Equity funds listed with CVM, the Brazilian Security and Exchange Commission, besides those financial institutions analyzed, dedicated to activities that could generate positive, direct and indirect economic impacts, on society through fostering education, increasing infrastructure, generating renewable energy and preservation of biodiversity, among other strategic themes. In this way, we know that investments in PE that have a profile for the transition to a Green Economy, are 15% of the total of resources allocated for this type of investment, or BRL21.6 billion. The annex provides more information about the PE funds analyzed.

RESULTS ANALYSIS

Even though the Brazilian Network of Signatories to the Principles of Responsible Investment have been the first to organize globally, there are still great challenges for integrating these aspects into the daily workings of investments by institutional investors and asset managers. Among the signatories, there does exist a good level of formalization of investment policies and processes but, in some cases, they still show themselves to be very general and with little practical demonstration of how institutions apply these criteria in their investment decisions. Large management institutions have taken the lead in this debate and developed robust socio-environmental risk measurement and evaluation methodologies for investing in companies, which has provided an important step forward in recent years. However, closed supplementary pension entities, important to the Green Economy, cleantech, renewable energy, energy, information technology and infrastructure sectors.

The volume of resources allocated in companies that are part of the CSI and its mention in the Transparency Reports of the PRI show that, in spite of the fact that equity funds show little significant liquid assets, the index is an important tool for the institutional investor when making a decision about investing in this class of assets. It is necessary, therefore, to reinforce that the integration of these ESG aspects must be expanded to other asset classes beyond the stock market. The participation of institutional investors is crucial for investment portfolios in real estate, private equity, and corporate debt securities.

Finally, the actions of investors must work toward increasing engagement with those companies being invested in. In this way, more relevant, uniform and comparable data can be demanded from the companies in a timelier manner and from their peers. The greater availability of information is definitely a fundamental support that investors will use in the short-, medium- and long-terms in their investment decision-making processes.

RECOMMENDATION:

- Increase the importance of socio-environmental risk analysis in pension funds through precise mandates with active management generating demand within the industry for integration of socio-environmental risks.
- Build tools that facilitate the process of socio-environmental risk analysis.

INSURANCE

INTRODUCTION

The insurance industry in Brazil shows a strong expansion and growth scenario. Represented by the Brazilian Insurance Confederation (CNSeg), discussions in the sector are divided along lines of activity of each insurance company. The sector covers four segments that are represented within CNSeg by their respective independent federation:

- FenSeg: represents insurers concerned with the development of specific activities in the classes of insurance called “damage insurance”.
- FenaPrev: represents insurers who act in areas of life insurance and/or open supplementary pensions.
- Fena Saúde: represents insurers specializing in health and operators of other modalities such as group medicine and group odontology.
- FenaCap: represents capitalization companies active on national territory.

In addition to the federations listed above, also participating in this debate is the Seguradora Líder dos Consórcios do Seguro DPVAT (Leading Insurer of Personal Injury caused by Motor Vehicles Insurance Consortiums), which is responsible for administering mandatory vehicular insurance, from payment collection to compensation payments to transit accident victims. In Brazil, DPVAT insurance is a product with unique characteristics that offers coverage for the country’s entire population as well as foreign victims of traffic accidents occurring on national territory. Compensation is paid independently of guilt and therefore can be considered within Level 4 of the proposed methodology. As these managers but also in their performance monitoring and evaluation in a precise, clear manner and with active monitoring. Increasing the integration of socio-environmental risk analysis in investment decisions is a way of contributing to the risk mitigation of future potential losses, guaranteeing the longevity of investments and being in line with the fiduciary duties of these institutions. Consequently, this increased demand for integration will be an important driver in the stability of the entire industry.

The Corporate Sustainability Index (CSI), the principal sustainability index of the Brazilian stock market, demonstrates itself to be an important reference and benchmark for responsible investment in the stock market, particularly for pension funds in this scenario.
The insurance sector is becoming more and more important in the Brazilian economy, with annual revenue increases climbing from 2.8% of GDP in 2001 to 3.56% in 2012, according to data from the sector regulator, the Superintendence of Private Insurance (SUSEP), led by the general insurance and supplementary health insurance segments. The sector is highly regulated and the activity of the Superintendence of Private Insurance (SUSEP) is responsible for the control and monitoring of the insurance, open private pension, capitalization and reinsurance markets. It is linked to the Ministry of Finance and has representatives in the Ministries of Justice, and Social Welfare and Assistance, as well as representation at the Brazilian Central Bank and the Security and Exchange Commission. In addition to SUSEP, the supplementary health insurance sector is also regulated by the National Health Agency (ANS).

Regarding the impact of this sector on the Green Economy, the industry can be analyzed in two distinct ways: by considerations of socio-environmental aspects in processes, insurance products and the relationship with the value chain, and by the huge volume of resources managed by these institutions, which make up their guarantee reserve funds. Therefore, in looking to measure the major impacts and contributions from the sector, information will be analyzed with respect to the insurers’ corporate practices and management of their reserve funds. Today, the insurers seek to integrate socio-environmental aspects into their activities through an institutional accord, the Principles for Sustainability in Insurance, PSI. These Principles were launched during Rio+20, in 2012, and have eight signatories in Brazil, the country with the highest number of signatories in the world.

In addition to supporting the PSI in Brazil, the Brazilian Insurance Confederation, CNseg, in its position as debate mediator for the Brazilian insurance industry, began a project in 2013 with the objective of mapping substantive aspects in all segments of activity in the sector to identify environmental, social and governance aspects that most impact their activities.

Since there is an agreement in the insurance industry like the PSI, similar to that signed by investors (PRI), the sample of institutions that will be analyzed in this study is composed of signatories to these Principles, their practices, and initiatives for the Green Economy. To understand the initiatives of the insurers in relation to their reserve management practices, an activity similar to that of the investment market, signatories were selected from the PSI list who are also signatories of the PRI. Despite not being signatories, other insurers, especially those linked to large financial conglomerates, have the practice of outsourcing the management of this volume of reserves. In the case where these practices are identified, and managers are part of the same financial conglomerate and signatories to the PRI, the information will be analyzed given that their investment managers are signatories such as Itaú Seguros, Bradesco Seguros and BB Mapfre. Therefore, the analysis methodology seeks to differentiate between the various levels of amounts allocated to a Green Economy; beginning with the PSI and PRI signatories (Level 1), the consequent integration of ESG risks in the investment decisions of the investor, specific investments in CSI companies (Level 3), to specific products and services (Level 4). Regarding corporate practices, this study seeks to make only a brief analysis of the comprehensive practices of socio-environmental risk policies and thematic products and services.

### LEVEL 1

#### ADHESION TO VOLUNTARY COMMITMENTS (PSI AND PRI)

The adhesion to the voluntary commitments are demonstrative of the intention of the institutions to cover and integrate ESG into their processes, products and relationships in order to create enabling conditions for a Green Economy. In this sense, the four voluntary principles that make up the PSI (Principles for Sustainable Insurance) indicate the insurers’ intention to implement sustainable business practices in accordance with their commitment. Of the insurers studied who are PSI signatories, five institutions are PRI Signatories in Brazil

<table>
<thead>
<tr>
<th>Level 1</th>
<th>Level 2</th>
<th>Level 3</th>
<th>Level 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>PSI Signatories of PSI and PRI</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Itaú Seguros</td>
<td>Bradesco Seguros</td>
<td>Sul América</td>
<td>Mongeral Aegon</td>
</tr>
<tr>
<td>Pfizer</td>
<td>Porto Seguro</td>
<td>BB Mapfre</td>
<td>Terra Brasil Resseguros</td>
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</table>

<table>
<thead>
<tr>
<th>Technical Provision Signatories of PSI and PRI</th>
<th>2012 BRLm</th>
<th>2012 USDm</th>
</tr>
</thead>
<tbody>
<tr>
<td>Technical Provisions Market Total</td>
<td>432,153</td>
<td>221,616</td>
</tr>
<tr>
<td>Level 1 Only PSI Technical Provisions Signatories</td>
<td>233,194</td>
<td>119,689</td>
</tr>
<tr>
<td>PSI and PRI Technical Provisions Signatories</td>
<td>227,497</td>
<td>116,665</td>
</tr>
<tr>
<td>Level 2 Not possible to determine amounts</td>
<td>Not possible to determine amounts</td>
<td></td>
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<td>Level 3 Not possible to determine amounts</td>
<td>Not possible to determine amounts</td>
<td></td>
</tr>
<tr>
<td>Level 4 Not possible to determine amounts</td>
<td>Not possible to determine amounts</td>
<td></td>
</tr>
</tbody>
</table>

The majority of assets of PSI signatories are managed by PRI signatory managers or by the actual insurers, who are also signatories to this latter voluntary commitment, which demonstrates an intention to incorporate socio-environmental and governance aspects into the management of technical provisions.

In addition to the consideration of potential impacts of socio-environmental and corporate governance aspects in corporate practices of the insurance industry, the sector shows itself to be a relevant institutional investor. In this role, the integration of responsible investment practices in the management of guarantee reserves of these organizations can be considered as an effective and important contribution to the transition to the Green Economy.

22 Foreign Exchange rate - R$ 1.95/US$1.00 according to data from the Brazilian Central Bank available.
signatories of the PRI or apply a major part of their resources with managers who are signatories managers to the same voluntary commitment. Therefore, the majority of the signatory insurers to the PRI in Brazil have their assets managed by their own managers or investment managers signatories to the PRI.

**LEVEL 2 INTEGRATION; LEVEL 3 INVESTMENTS IN CSI COMPANIES; LEVEL 4 THEMATIC FUNDS**

Regarding the integration of ESG aspects into the management of insurers’ guarantee reserves, it was verified that, among PSI and PRI signatories, the path was still in a development phase. Only four managers integrated ESG aspects in their analysis, demonstrating that the voluntary commitments are still in an implementation phase for the majority of actors in this sector.

Therefore, it was not possible to measure the amount managed with integration practices. There was no clear direction on the part of the insurers that their reserves management paid attention to socio-environmental criteria. Among the insurers linked to financial conglomerates, the practices of the managers responsible for the management of the guarantee funds were described previously in the investment section. Even in these cases, however, practices do not exist that are directed towards the investments of the insurers’ assets. According to the information furnished by the insurers, it was not possible to identify the volume of resources invested in companies making up the CSI. Regarding the destination of resources to thematic funds related to the Green Economy, the insurers did not report this amount. The resources of the DPVAT Lead Insurer, which corresponded to BRL4.34 billion, are destined only for investment in Federal Government bonds, without practices mapped for the integration of ESG aspects.

**CORPORATE PRACTICES**

The insurers corporate practice analysis sought to reveal the level of integration of socio-environmental and governance aspects in order to identify the maturity and existence of enabling conditions towards the Green Economy. As described above, the methodology of corporate practices had only two levels.

**SOCIO-ENVIRONMENTAL RISK POLICIES**

Of the eight institutions analyzed, all are signatories to the PSI, but only four have a socio-environmental policy. Given the information available, however, it was not possible to determine to what extent the commitments and policies, available public information and the responses to the questionnaires from the insurers, only one institution declared that it had a socio-environmental risk analysis process for products included in the Large Risk category, that require legal documents such as environmental licenses and additional information about sectors considered to have more exposure to risks of this nature. Additionally, no socio-environmental integration practices were identified in the analysis process and insurance products risk underwriting, nor in other risk management activities in this industry.

**THEMATIC PRODUCTS AND SERVICES**

In addition to the policies and integration of socio-environmental risk analysis in the premiums collected, among the institutions studied, the products and services aligned with the concept of the Green Economy adopted by UNEP are still incipient or in development in such a way as it was not possible to classify them according to the criteria adopted by the proposed methodology.

**RESULTS ANALYSIS**

The Brazilian insurance industry, while at a stage of conceptual debates about the Green Economy and its integration in the day-to-day business of the sector, identifies and recognizes its relevance to the continuity of its activities. The companies that are debating the theme within the framework of CNseg (Brazilian Insurance Confederation), whether signatories to the Principles for Sustainability in Insurance or not, still do not have a uniform vision of how socio-environmental aspects relate to the risk management of their portfolios and the guarantee reserves of their liabilities.

Internationally, the insurance industry differentiates itself particularly in accountability practices in relation to the integration of ESG aspects. The reporting structures of international signatories to the PSI are presented in a comparable and comprehensive manner in relation to their practices in the implementation of the Principles, even between insurers operating in different sectors. Reserve management practices are also different in relation to the Brazilian industry with a greater adhesion to initiatives such as the PRI, which, in Brazil, can be explained by the strong regulation of the sector.

There is space in the market for the development of innovative solutions, from the review of risk analysis processes, customer acceptance, issuing of policies and maintenance of contracts, to the launching of new products and services with socio-environmental attributes.

It is fundamental however, that the dialogue among the regulatory organs facilitate this integration, given their strong impact on insurance activities and the management of insurance industry companies’ reserves. In this sense, the positioning of CNseg as a mediator between the companies and as spokesperson for the sector when dealing with the regulators is a differential that can define the further alignment of the insurers with the principles and practices that will direct it toward a transition to the Green Economy.

It is recommended that a framework be constructed that is capable of conceptually defining and aligning more material issues for the industry.

**CONCLUSION**

While showing distinct levels of maturity in the integration of socio-environmental aspects in their business practices, the credit, investment, and insurance industries in Brazil show an effective engagement in the understanding of these aspects, their impact on the processes, related products, and results of the institutions that participate in the Brazilian Financial System. The existing policies and processes for the analysis of socio-environmental risks are shown to be in a generally robust and transversal form within the operations of these institutions, and are already amply considered in financial decision-making. Even in sectors where the integration of ESG aspects are still shown to be conceptual, initiatives to move it forward are consistent and promising.

The involvement of the sector associations in all of the sectors analyzed in this study demonstrate an unprecedented commitment to the national financial industry, promoting dialogue, exchange of ideas, and most importantly the creation of synergies and common timetables among the organizations and the actual sectors.

The transition path of the financial industry to the Green Economy passes through a dialogue that involves metrics, tools, systems, and criteria for the development of analysis processes and decision-making. It is also fundamental that the sector reaches a consensus about units and periods for reporting this information in order to create more adequate conditions for the measurement and monitoring of the amounts to be directed into this new economy, whether in the form of creating enabling conditions or in the allocation of resources to sectors or financial products with socio-environmental attributes.

For this to occur, the SFN must work collaboratively, respecting the particularities of each institution, its business strategy, and segments of activity. The solutions must also
involve actors in the real economy in order to foster the development of projects that are attractive and relevant to the financial sector. Through the incrementation of processes, the development of tools, and collaborative dialogue, the Brazilian financial industry will have conditions to advance even further in the integration of socio-environmental aspects into its daily activities, from a position of leadership on both the national and international stage.

Therefore, the development of a measurement methodology to standardize and monitor the evolution of resources allocated to the financing of the Green Economy is recommended, as well as the establishment of periodical, formal dialogue among the three sectors, led by the trade association of the respective sectors.
## ANNEX II - THEMATIC LINES FOR CONSTITUTIONAL FUNDS

**PRODUCT/SERVICE**
- TNF Agro
- TNF Agroflorestal Sustentável Rural
- TNF Procuração
- TNF Produtor
- TNF Produtor Excelente
- TNF Produtor Florestal
- TNF Produção Ambiental
- TNF Procurador
- TNF Procurador Florestal
- TNF Procurador Sustentável
- TNF Procurador Sustentável Rural
- TNF Procurador Semanal
- TNF Procurador Semanal Sustentável
- TNF Procurador Agropecuário
- TNF Procurador Rural
- TNF Procurador Rural de Desenvolvimento Rural
- TNF Procurador Rural Florestal
- TNF Procurador Rural Agropecuária Irrigada
- TNF Procurador Rural Comer.
- TNF Procurador Rural Comer. Sustentável
- TNF Procurador Rural Semanal
- TNF Procurador Rural Semanal Sustentável
- TNF Empreendedor Individual
- TNF Empreendedor Individual Rural
- TNF Empreendedor Individual Rural Sustentável
- TNF Empreendedor Individual Rural Semanal
- TNF Empreendedor Individual Rural Semanal Sustentável

### ANNEX III - LIST OF THEMATIC INVESTMENT FUNDS

#### TABLE 14 LIST OF THEMATIC FUNDS

<table>
<thead>
<tr>
<th>ADMINISTRADOR</th>
<th>FUNDOS</th>
<th>FL (R$)</th>
</tr>
</thead>
<tbody>
<tr>
<td>BANCO J. SAFRA SA</td>
<td>SANTANDER S.A.</td>
<td>769,363.01</td>
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<tr>
<td>BANCO SANTANDER S.A.</td>
<td>SANTANDER S.A.</td>
<td>270,686,877.50</td>
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<td>BANRISUL</td>
<td>BANRISUL GESTÃO CORPORATIVA</td>
<td>3,036,545.55</td>
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<td>CAIXA</td>
<td>CAIXA FIA AÇÕES SIC</td>
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<td>FIA VOTORANH-ASSET</td>
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<td>WESTERN ASSET</td>
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<td>TOTAL</td>
<td></td>
<td>1,653,694,022.83</td>
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### ANNEX III - LIST OF THEMATIC INVESTMENT FUNDS

#### TABLE 15 LIST OF THEMATIC FUNDS

<table>
<thead>
<tr>
<th>ADMINISTRADOR</th>
<th>FUNDOS</th>
<th>FL (R$)</th>
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<td>HSBC</td>
<td>HSBC FIA DE AÇÕES SUSTENTÁRIO</td>
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BRAZILIAN FINANCES: A STRATEGIC 2020 AGENDA FOR RENEWABLE ENERGY AND AGRICULTURE (STUDY 3)
VII. BRAZILIAN FINANCES: A STRATEGIC 2020 AGENDA FOR RENEWABLE ENERGY AND AGRICULTURE (STUDY 3)

INTRODUCTION

PURPOSE AND SCOPE

The purpose of this study - the third part of the body of work prepared by GVCes as subsidy to the contribution to the FEBRABAN's "Inquiry on the Sustainable Design of the Financial System" conducted by UNEP in 2014 and 2015 - is to identify opportunities and barriers through the analysis of real situations in order to maximize the Financial Sector's contribution to the Green Economy. This is part of the strategic direction of the sector towards sustainable development.

In order for such practical conclusions to be reached in alignment with the grounds that guide the whole project, it was essential to define a focus. Using a sectorial perspective consistent with the work conducted on the field of Green Economy, three sectors were identified a priori: renewable energy, agribusiness, and biodiversity. Another focus of attention - although not an economic sector per se - were cities. Cities are increasingly perceived as a privileged locus for action and generation of sustainability experiences, to the extent they progressively concentrate more population, resources, economical activities, and political leadership, with much greater agility and autonomy than those obtained in actions at the national states level.

These sectors, however, are broad, therefore it was necessary to identify the most relevant activities and/or subsectors to this study, and, within each of them, specify attention point for the analysis. These definitions consider five main factors:

- Strategic importance to the Brazilian economy.
- Relevance to the SFN, as a source of business and operation area.
- Framework of the “Green Economy” criteria, as defined by UNEP.
- Real experiences and institutional framework, even if still premature or incomplete.
- Information availability, such as database and practical or academic literature.

When these factors were applied to the defined sectors, the scope of the analysis was defined as follows:

Renewable energy:
The “New Energy” segment was chosen, with a focus on distributed generation of solar power in small size units. This is a segment where global investments have grown exponentially in the past few years, whereas, in Brazil, very few actions have been taken, despite all the legal dispositions in place that, at least, point to that direction. With a strategic analysis, we perceived a non-neglectable risk that Brazil might lose an important window of opportunity, considering the timeframe from 2020-2030. There will be a need for the SFNs participation in these areas once the sector is developed.

Agribusiness:
We chose the low carbon agriculture segment, with a focus on the implementation of the ABC Program, a government program developed to channel resources from rural credit to a set of technologies and practices that share a goal of reducing the environmental impact from food production, as well as improving productivity and reducing greenhouse gas emissions in the field. Thus, Brazil would not only comply with its international commitments for climate negotiations, but it would also be ahead of the sustainability demands regarding food production and those associated to international trade, which are likely to appear in the 2020-2030 horizon.

Preliminary analyses on these two segments have already been conducted and can be found on the following pages in this report.

Biodiversity:
The native forest segment was selected as the focus of sustainable forest management of logging products. The study also looks at elements regarding emerging markets on ecosystem services.

Cities:
General outlook of challenges relating to societal changes and pressures on natural resources that cities are facing. This section discusses the challenges and opportunities in the move toward the concept of “smart cities”.

COVERAGE

It is important to highlight that the focuses aforementioned do not exhaust the potential SFN has in the chosen segments and sectors. This initial analysis is part of a first approach of the effective alignment with a sustainable development SFN has; the purpose is to produce knowledge and action propositions, build and test analytical methodologies that may be replicated both in Brazil and abroad. Thus, we welcome suggestions for the methodological improvement and identification of new study focuses.

METODOLOGY

The methodology used on this study was based mainly on previous works from GVCes on the relation between the financial sector and a low carbon economy23. On such studies, it was identified that the financial advancement of this type of economy cannot be found if the “financial economics” is separated from the so-called “real economy” sphere of production and consumption, where the combination of technologies, markets, preferences, prices, institutional framework and access to natural resources result in more or less favorable conditions for economic activities.

It is on the real economy - and in relation to it - that the various agents that make up the financial system operate, creating a set of relations where - in some respects - it is difficult to separate clearly the aspects that belong to the real economy from those in the context of financial economics. Moreover, it is also clear that there is an essential role of the government as a creator of the boundary conditions in which private agents and economic mechanisms, which provide scale and speed to the desired changes, will operate.

The following graphic prepared by GVces in its work on the subject in 2012 illustrates this scenario, showing the relationships and instances of activity involved.

**FIGURE 8. ANALYTICAL FRAMEWORK**

Considering the executive profile of this report, the application of the framework illustrated above is not presented in detail. Nevertheless, it was through its application that we elaborated the recommendations and proposals below.

**PRINCIPLES**

Even before entering into the specific contents of the analyzed sectors, it is necessary to emphasize some principles that guided the analyses. In order to analyze situations and formulate forecasts, one should bear in mind that:

- The main barriers are not “anti-Green Economy (GE)” factors, but issues that impact innovation and entrepreneurship in general:
  - High transaction costs and lack of accessible / reliable information
  - Difficulties in accessing capital due to business or financial factors
  - Lower economic ability and / or background of entrepreneurs.
  - Uncertainty as to the willingness of consumers to value GE attributes.
- SFN related general strategies for advancement in GE should include:
  - A focus on more mature and promising segments of the real economy for GE (not necessarily the ones with the highest volume).
  - The development of an institutional infrastructure.
  - An increase on the knowledge base.

Another important principle is to recognize that the SFN has a dual role in the GE development process: on the one hand, in its daily operations, it should be seen as the “last link in the chain”, which allocates the capital under its guard in reaction to economic conditions, incentives and risks, according to its usual rules and forms. On the other hand, it should be viewed as a sector that is able to look to the long-term scenario and to the major trends and, after considering them, take the lead, seeking solutions and proposing agendas that do not relate to everyday activities of its members. Instead, they should relate to the establishment of guidelines and strategies capable of modifying the boundary conditions in which they will operate.

Reflecting this broader view, we identified some major global trends to support the analyses from the study, which may affect the scenario below, with a view from today until 2020-2030:

- Search for greater prudence in the International Financial System.
- Climate uncertainty.
- Public policies to decarbonize the economy.
- Demand for more transparency.
- Strengthening of the global agenda for Sustainable Development.
- Advancements in Finance for Sustainable Development.
- Financial commitments previously established as business as usual.

In light of these criteria and methodological perspectives, the studies presented here were conducted.

**RENEWABLE ENERGY**

**INTRODUCTION**

Global scenario

Energy is a critical input for the functioning of any economic system, and a key factor in quality of life, security and prosperity of societies. Historically, economic growth has been accompanied by increasingly intensive use of energy: each percentage point of GDP growth represents a higher percentage of energy consumption. The increasing concentration of people in cities and contemporary life require far more energy per capita than rural life or other livelihoods that are less intensely dependent on technological services and industrial products. Any gains in productivity and energy use in the productive sectors have not been able to offset this increase, resulting in a society increasingly dependent on guaranteed energy supplies available in a highly concentrated way. This occurs both in geographical (cities) and temporal (peak hour and storage needs via hydroelectric reservoirs and fuel stocks) contexts. This situation also occurs in Brazil, quite intensely.

At the same time, energy production globally is the main source for Greenhouse Gases (GHG) emissions, mainly from burning fossil fuels. Facing the threat of climate change associated with increased concentration of GHG in the atmosphere, governments, businesses and citizens across the planet increasingly prioritize the pursuit and implementation of less impactful solutions, and reducing emissions from the production and use of energy is one of the most important fields for this. The scenario in the coming years is for even greater advances in this direction.

In this context, investments to develop technologies that reduce the impacts of obtaining energy from existing sources, and optimize the use of available energy deserve attention. Measures to increase energy efficiency (both in energy production, as in its distribution and use, privately or commercially) are an important activity worldwide. Moreover, there is a wide scope for their application in Brazil, where there are opportunities in the revitalization of existing plants, reduction of losses in transmission and distribution systems, and gains in the efficiency of industrial, commercial and residential applications. Technologies geared specifically to fossil fuels - such as CO2 capture and storage (CCS - Carbon Capture and
FOCUS ON NEW ENERGY

The importance of the “New Energy” (NE) in the global investment scenario is evident on the Global Trends in Renewable Energy Investment document, prepared annually by UNEP’s Collaborating Center for Climate & Sustainable Energy Finance from the Frankfurt School of Finance & Management, in partnership with the Bloomberg New Energy Finance24.

According to the criteria from this study, investments in NE are those directed to the following technologies:
- Biomass or waste, of any size.
- Geothermal and wind, with size above 1 MW.
- Hydraulic, with size between 1 and 50 MW.
- Waves and tides, of any size.
- Biofuels with capacity of at least one million liters per year.
- Solar, of any size, with units below 1 MW separately considered and referred to as small-scale projects or projects with small-scale distributed generation.

The fact that these are renewable energy sources is one of the attributes that gives strategic importance to NE, but it is not the only one. Other highly relevant aspects for the agenda. This segment is known as “New Energy”, and is the focus of this study.

GLOBAL INVESTMENTS ON NE, BY ASSET CLASS (2004-2015) 26

Asset Finance refers to all the money invested in power generation projects (excluding large hydro), either with internal company resources or with credit or equity. It excludes refinancing27.

In just eight years, from 2004 to 2011, global investments in NE grew 600%, going from 40 to 279 billion dollars. Even with a decrease in the last two years, the value registered in 2013 is 5.5 times higher than in 2004. The reduction in the amount invested observed in 2012 and 2013 is partly explained by the drop in installation costs of photovoltaic solar energy; despite the decrease in the financial value, the installed capacity of this new energy was higher than the previous year, going from 31 GW in 2012 to 39 GW in 2013. Another factor that contributed to the decline in investments were regulatory uncertainties and changes in subsidy policies in various countries such as the USA, Germany, France and the UK, among others.

It is worth noting the further growth in investment in small-scale distributed generation (solar photovoltaic installations in homes and commercial and industrial buildings), which has almost tenfold in nine years, from 8.6 to 80 billion dollars, in the 2004-2011 period. This is a sign that reinforces the perception that this source is likely to grow further in coming years, gaining increasing relevance. In addition, the data also indicate that in emerging countries, such as Brazil, investments grow more; the ratio of investment in these countries in comparison to developed countries grew from 4 per 1 in 2004, to 1.3 per 1, in 2013. In absolute figures, it went from 8 billion dollars in 2004, to 107 billion in 201128.

This large and rapidly growth of NE is explained by the convergence between the perception of its importance to the global challenges of the twenty-first century and the virtuous cycle fueled by cost reduction (as great works in remote or preservation areas, social and environmental impacts, accidents, pollution and generation of hazardous or radioactive waste).

Disruptive potential, once they represent - especially in the case of solar energy - a qualitative change in technology, by providing electrical or thermal energy without involving combustion and reducing or eliminating moving parts of the equipment.

The volume of investments in NE has grown rapidly in the last decade, as demonstrated on the graph below:

25 UNEP-Collaborating Center for Climate & Sustainable Energy Finance from the Frankfurt School of Finance & Management, 2014
26 UNEP Collaborating Center for Climate & Sustainable Energy Finance from the Frankfurt School of Finance & Management, 2014
27 UNEP Collaborating Center for Climate & Sustainable Energy Finance from the Frankfurt School of Finance & Management, 2014
BRAZIL IN THE GLOBAL CONTEXT

From the second half of the twentieth century, with the economic growth and rapid industrialization and urbanization, Brazil invested heavily in the construction of the necessary energy and infrastructure to meet the country’s needs. The combination of the country’s natural conditions and the technology available at the time guided past investments in the construction of large hydroelectric plants, with large reservoirs. In the 1970s, and in the following decades, the instability of the international oil market and limitations to the known national reserves made the country prematurely develop the production and use of ethanol from sugar cane as an automotive fuel technology. As a result, the country entered the 21st century in a privileged position in the energy scenario. While most of the world was dominated by fossil fuels - both for electricity production and for transportation uses - in Brazil, virtually all electricity comes from renewable sources (large hydroelectric plants built decades earlier) and much of the country’s fleet - especially private cars - can use biofuel. Thus, Brazil consolidates its image, nationally and internationally, of a country with a “clean energy matrix” and a renewable energy capacity, with the “world’s cleanest” electrical grid, or nearly so.

However, in the last decade, this position - which could give Brazil a great competitive edge in the international arena - has been changing rapidly. The discovery and early exploitation of large oil reserves (pre-salt) on the one hand and, on the other, the combination of climatic factors (reduction or relocation of the rainfall regime) together with technological and economic aspects have contributed to the constant growth of use of fossil fuels in the country, thus “dirtying” the national energy and electricity matrix. Specifically in relation to ethanol, the situation is even more critical, given that the main use of this fuel - the automotive fleet - is being replaced for gasoline through a pricing policy that makes it a more attractive option, with serious economic and market losses to the industry.

FIGURE 10. BRAZILIAN ENERGY MATRIX BY PRIMARY SOURCE - 2010 AND 2020

The chart above - based on official data from the Brazilian government and presented as evidence that “Brazil will remain as the country with the cleanest energy matrix in the world” - shows that the country’s energy matrix is supplied in 55% by fossil fuels, and that the picture projected for 2020 practically does not change this ratio. Moreover, an analysis of the data above indicates that from the additional 169.1 Mtoe to be offered in the country by 2020, 86.7 Mtoe will be supplied by fossil fuels, significantly increasing energy-related GHG emissions in the country.

With regard to the energy matrix of the country, renewable sources are still largely predominant, accounting in 2013 for 79.3% of all consumed electricity (of which 70.6% of hydraulic origin, especially large hydroelectric plants)28. Although this is higher than the international average (according to the International Energy Agency, IEA, renewable energies participation in the global energy matrix should go from 18.7% in 2008 to 32.2% in 203529), we must emphasize that this percentage was much higher in Brazil in recent years: 88.9% in 2011 and 84.3% in 2012. In short, we see that in a global context where there is a strategic priority related to the sustainable development, with a long-term plan to prioritize the use of renewable energy, Brazil is heading in the opposite direction with respect to the composition of its energy matrix.

BRAZIL’S INVESTMENTS IN NEW ENERGY

As mentioned above, the overall investment in NE sources in 2014 was around US$ 214 billion, regionally distributed as indicated in the figure below:

FIGURE 11. INVESTMENTS IN NEW ENERGY, BY REGION (2013, US$BN)

Of this total, Brazil’s investment, US$ 3.1 billion, represent only 1.4%, which seems to be a disproportionately small amount, especially when compared to the 2.8% and 26% portions, corresponding to India and China respectively, the other two large emerging countries depicted in the graph. Considering the relevance of NE sources as an emerging technology and the change they will possibly bring to the global energy scenario, the low priority Brazil places on the topic, both in absolute terms and in comparison to other emerging countries, should be a focus of attention, since it reinforces the impression that, with this new generation of clean energy, the country may be moving away from a leadership position. This concern is reinforced when one examines the details that account for the Brazilian investment in the area, as shown in the table below:

TABLE 16. BRAZIL’S INVESTMENT IN NE SOURCES, BY TECHNOLOGY AND FINANCING (2013)30

<table>
<thead>
<tr>
<th>Technology</th>
<th>Asset Finance</th>
<th>Public Markets</th>
<th>VC/PE</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wind</td>
<td>21</td>
<td>0.2</td>
<td>0.4</td>
<td>2.7</td>
</tr>
<tr>
<td>Biofuel</td>
<td>0.5</td>
<td>—</td>
<td>—</td>
<td>0.5</td>
</tr>
<tr>
<td>Biomass</td>
<td>—</td>
<td>0.1</td>
<td>—</td>
<td>0.1</td>
</tr>
<tr>
<td>SHP</td>
<td>0.03</td>
<td>—</td>
<td>—</td>
<td>0.03</td>
</tr>
<tr>
<td>Solar</td>
<td>0.01</td>
<td>—</td>
<td>—</td>
<td>0.01</td>
</tr>
<tr>
<td>Total</td>
<td>2.6</td>
<td>0.2</td>
<td>0.2</td>
<td>3.0</td>
</tr>
</tbody>
</table>

In the field of decentralized systems, there is a huge potential for solar photovoltaic generation, particularly for the residential segment. Since 2012, micro generation is already permitted in Brazil, but lack of adequate credit lines and the incidence of the ICMS tax on this type of electricity have made it unfeasible in most Brazilian states. The states of Minas Gerais and Tocantins already exempted this tax and it is expected that the state of São Paulo follow their lead. It is expected that the cost reduction and the maturation of the Brazilian market result in the expansion of solar energy in the country.

Looking at international examples, Germany managed to surpass 30 GW installed in just over a decade thanks to special pricing. More recently, China, Japan and the United States have stood out; the latter due to special financing terms offered to consumers.

**Financing**

Currently, the credit lines concentrate on BNDES Finem (projects over BRL20M, but there are exceptions), and the credit line for Renewable Electricity Generation is specifically directed for this purpose. It presents the following conditions for direct support: interest rates = TJLP + 1% pa + risk (up to 4.18% pa), participation in up to 70-90% of the project, amortization in 16 to 20 years. BNDES offers the same terms to the support line for Energy Efficient Projects (PROESCO).

BNDES has also supported the participants of public auctions for Renewable Energies, providing the following conditions for direct support: interest rate = TJLP + 1% pa + risk (up to 4.18% pa), participation in up to 70-90% of the project, repayable in 16 to 20 years.

BNDES funds are also being channeled indirectly through other banks, allowing more affordable terms to entrepreneurs. One example is the Climate Fund (Fundo Clima), launched by Caixa Econômica Federal with resources from BNDES, which has a total BRL 560 million budget allocation and should be used to fund solar projects in the auction scheduled for October 2015. Resources from the Climate Fund are divided in funds for acquisition and production of machines and equipment with higher energy efficiency, projects that contribute to reduce polluting gases emissions on urban transportation and projects for waste management.

Financing is also available for NE sources in state programs, such as DESENVOLVE SP - Green Economy Line, established to support the State Policy on Climate Change in the State of São Paulo, created by a state law in 2009. The conditions offered are: interest rates = IPC-Fipe+5% pa, participation in up to 100% of the project, amortization over a decade thanks to special pricing. More recently, China, Japan and the United States have stood out; the latter due to special financing terms offered to consumers.

There are also international contributions, such as those undertaken by the German bank KfW, which intends to invest a total of 1.3 billion euros in renewable energy projects in Brazil. Other players, such as investment funds with domestic and international capital aimed at NE sources have also been mentioned, though they still are not acting expressively in the country.

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31 The categories of investments are: Venture capital and private equity (VC / PE) amounts invested by funds of venture capital and private equity in equity of companies that are developing renewable energy technologies. Similar investments in companies that are developing renewable energy technologies (excluding large hydro) are considered as asset finance. Public markets amounts invested in equity of companies listed on stock exchanges that are developing renewable technologies to generate renewable and/or clean energy. Asset finance amounts invested in projects to generate renewable energy (excluding large hydro), either through its internal financing, credit, or equity. Excludes refinancing.

The chart below presents a summary of the current situation in Brazil regarding New Energy (NE) sources that are the focus of this study:

**TABLE 17. OVERVIEW OF THE CURRENT SITUATION IN BRAZIL IN RELATION TO NE SOURCES**

<table>
<thead>
<tr>
<th>Sources</th>
<th>Technology/Market Perspectives</th>
<th>Financing</th>
<th>Barriers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Onshore Wind</td>
<td>Higher towers (350m) capable of improving utilization of wind. Consolidated market; logistical challenge to expand to allow annual contractions/installation in a volume greater than 2 GW.</td>
<td>BNDES: Maximum 80% of the total, minimum of BRL20 million, credit for 16 years, with interest rates from 6.4 to 8.9% pa. Minimum ratio of nationalization of 60%.</td>
<td>Possibility of reducing incentives in the future in the face of increased competition from source</td>
</tr>
<tr>
<td>Biomass Cogeneration from Sugarcane Bagasse</td>
<td>Better use of sugarcane waste (bagasse, straw and leaves). Possibilities strongly linked to the ethanol market. Potential attached to the recovery of the sector (increased use of ethanol in gasoline) and better incentives</td>
<td>BNDES: Maximum 80% of the total, minimum of BRL20 million, credit for 16 years, with interest rates from 6.4 to 8.9% pa. Minimum ratio of nationalization of 60%.</td>
<td>Uncertain conditions of the ethanol market have repercussions on bagasse cogeneration. Lack of incentives to retrofit boilers.</td>
</tr>
<tr>
<td>SmPs Small Hydroelectric Plants</td>
<td>More efficient and lower cost turbines.</td>
<td>BNDES: Maximum 80% of the total, minimum of BRL20 million, credit for 16 years, with interest rates from 6.4 to 8.9% pa. Minimum ratio of nationalization of 60%.</td>
<td>Delay in the licensing term. Bureaucracy for the analysis of basic projects and projects enabling by Aneel, rising costs of construction.</td>
</tr>
<tr>
<td>Solar Photovoltaic Plants</td>
<td>Alternatives to silicon technologies, storage improvement, module efficiency improvement. In combination with wind farm projects, optimizing substations and transmission. Development of financing conditions. Domestic manufacturing of panels. Domestic refining of silicon.</td>
<td>RESIDENTIAL: Santander: 5 years, interest rate of 1.8% per month Banco do Brasil: 5 years, interest rate from 1.6 to 2.5% per month Caixa Econômica Federal: 8 years, interest rates from 1.7 to 1.75% per month Instituto Ideal: Support between BRL1,000 and 5,000 for systems up to 5 kW.</td>
<td>Minimum rates of nationalization of solar chain required by BNDES limit the financing capacity. High cost, in the market of the sector.</td>
</tr>
<tr>
<td>Solar Small-Scale Distributed Generation</td>
<td>More efficient and lower cost turbines.</td>
<td>COMMERCIAL: Banco do Nordeste (PNE Verde): 12 years, interest rate of 3.5% to 4.7% per year BNDES (FINEM): Minimum of 10 million, interest rate of 5% per year.</td>
<td>Need for better financing conditions, not meeting without ICMS tax charges.</td>
</tr>
</tbody>
</table>

**CONCLUSIONS AND RECOMMENDATIONS**

The scenario described above presents a set of opportunities for expanding the Green Economy and, at the same time, it identifies barriers that slow or prevent this from happening. An important part of this process is related to the so-called ‘real economy’, i.e., the sphere of production and consumption, in which the combination of technologies, markets, preferences, prices, institutional framework and access to natural resources results in more or less favorable conditions for economic activities. The various agents that comprise the Financial System operate on the real economy - and in relation to it.

For the purposes of this study - which aims to identify ways to align the financial system for sustainable development with a focus on certain segments of the "Green Economy" - the most important thing is not to accurately trace those dividing lines, but rather articulate knowledge to facilitate the formulation of recommendations for action of the SFN with the desired goal. Thus, the findings of this study were organized around sources that are the focus of this study. The research for policymakers of financial and nonfinancial public policies directly related to the SFN agenda.

1. **Recommendations in relation to the challenge of boosting the New Energy industry**

   - **For policymakers of financial and nonfinancial public policies directly related to the SFN agenda**
     - Increase inclusion of NE in public energy auctions for the SIN, National Integrated System.
     - Restore legal and contractual security of investments in the sector.
     - Promote NE and energy efficiency in the strategic agenda and public opinion.

   - **For private banks, public banks, investors and insurers**
     - Empower agents to operate on possibilities in NE.
     - Design appropriate programs and processes to business models in the field of NE.
     - Develop standards and analysis processes applicable to NE.
     - Train bank staff to provide and apply existing lines.
     - Promote NE and energy efficiency among their audience (educate the consumer and form public opinion).

2. **Recommendations in relation to the challenge of channeling more resources to New Energy**

   - **For policymakers of financial and nonfinancial public policies directly related to the SFN agenda**
     - Expand and make existing BNDES financing lines more accessible for NE.
     - Create funds to support the development of technologies and generation of knowledge related to NE.

   - **For private banks, public banks, investors and insurers**
     - Require resources from BNDES under appropriate conditions to meet NE projects (private banks).
     - Make resources available in the most appropriate conditions to the needs of NE projects, both directly or indirectly (public banks).
     - Develop products targeted to NE investors.

3. **Recommendations to the challenge of eliminating the lag of solar energy in Brazil**

   - **For policymakers of financial and nonfinancial public policies directly related to the SFN agenda**
     - Eliminate ICMS tax collection on power supply network for small systems.
     - Give effect to the existing legal infrastructure (e.g., facilitate installation and connection of generators to the network).
     - Implement measures to stimulate the market, such as feed-in tariffs.
For private banks, public banks, investors and insurers:

- Learn from experiences in other countries (Germany, Portugal, USA, Japan) and format suitable products for small-scale solar power distributed generation.
- Prepare to foster and give vent to currently pent-up demand by the unfavorable regulatory framework in Brazil.

4. Transverse recommendations in relation to the three challenges above:

For SFN sectoral organizations

- Articulate the different SFN sectors around a strategic agenda of alignment with the sustainable development and promotion of Green Economy.
- Represent the different SFN sectors with regulators, managers and government, in favor of a strategic agenda.

Specifically regarding NE:

- Disclose this strategic agenda with its members, encouraging its adoption and supporting it through dialogue facilitation and the creation / management / sharing of knowledge.
- Act along with government authorities for the execution of the short-term actions listed above.

For regulators and SFN managers

- Prioritize analysis and decision on regulatory issues affecting investment in NE (e.g. capitalization requirements and proper type of guarantee to finance projects in small-scale distributed generation).

AGRICULTURE

This work is part of the third study FEBRABAN commissioned to GVces and it aims to support the agents that make up the SFN in building an action agenda for sustainability in agriculture.

For this, in the last two months, GVces interviewed players, researched references on the sector and brought a set of diagnoses and recommendations that it has produced over the past few years on the subject. Additionally, more recently, we included the ABC Plan Observatory, an initiative led by the Center for Studies in Agribusiness of FGV, coordinated by the former Minister of Agriculture Roberto Rodrigues, where GVces is a technical and executive partner.

INTRODUCTION

Approximately 30% of Earth’s land are used for agriculture and livestock, which consume 70% of the available freshwater. Pressured by increased food consumption - more pronounced in emerging economies, particularly in South Asia and Sub-Saharan Africa - and dietary changes - increased protein consumption - the tendency is for the industry to continue expanding in the coming decades; either through increased productivity per hectare, or through the expanded use of land. FAO predicts that by 2050, there will be an increase of 70% in global food production, reaching 100% in developing countries. In turn, the World Bank projects a growth of 7% in the area used by the agricultural sector in Brazil between 2006 and 2030, strongly influenced by the expansion in the Amazon region, with 24%. In Brazil, the issue is particularly sensitive, not only because of its economic importance, but because of its relationship with the environment.

A key component of the Brazilian economy since the colonial era, the sector - which comprises a production chain that involves everything from the production of fertilizer and seeds to the marketing of processed foods - is now responsible for about a quarter of Brazil’s GDP.

Brazil has seen a large growth in its agricultural sector in recent years, which today represents about 25% of the GDP. In 2013, agribusiness exports totaled US$ 99.97 billion, substantially contributing to the Brazilian trade balance. Agribusiness advances every year, conquering markets in all regions of the world. Brazil is now the world’s largest exporter of sugar, ethanol, chicken and beef, orange juice, coffee and tobacco. The country is a major exporter of soy, pork, timber, shrimp, tropical fruit, among other products. Brazilian agribusiness, therefore, is characterized by a strong international integration, high technological level and clear comparative advantages. Brazil is currently the third largest agricultural exporter in the world after the United States and the group of 27 countries members of the European Union.

On the other hand, the sector has a close relationship with the environment. Besides the direct participation of agricultural practices in the volume of GHG emissions in Brazil and the world, especially from enteric fermentation, the sector is indirectly responsible for some of the pressure on the Cerrado and Amazon biomes - resulting from the expansion of agricultural activities and livestock. This pressure leads to loss of biodiversity, reduced ability to protect water resources, as well as promoting indirect emissions from deforestation (THREAT). At the same time, the agricultural areas of the country represent a significant stock of soil-incorporated carbon, a true sinkhole, in that their life cycle removes the CO2 present in the atmosphere, contributing to the reduction of global climate change (FRIEND).

Finally, the sector is strongly affected by temperature rises, by changes in precipitation patterns and the impacts of extreme events, since the activity is intrinsically related to natural environments and depends on the balance of these to subsist. Changes in weather patterns in Brazil affect agricultural activity with all their consequences, such as changes in water availability, soil erosion, the emergence of new pests, and diseases, with consequent negative impact on production, making the adaptation to a new climate reality a challenge for the sector (THREATENED). Thus, agriculture relates to the environment in three ways: as a sector that is threatened by the environment, as a threat and as a friend.
Finally, it is necessary to analyze the sustainability of agriculture as a matter of competitive nature. With increasingly demanding markets in regards to social and environmental requirements, particularly for products from emerging countries, and consumer demands regarding the traceability of products consumed, various opportunities open to entrepreneurs in a sector that represents a significant portion of the Brazilian international trade. Whether in relation to compliance with international standards (with consequent differential labeling and certification), or to the production of differentiated goods (e.g. organic products), Brazil has a chance to get ahead and stand out in the international commodity market, adding value to goods that suffer huge fluctuations in price each season and whose vulnerability should be minimized in all possible ways.

The availability of the Brazilian business community to offer products and adapt to technologies and practices designed for the new reality that improve business performance brings financial benefits in the short and medium terms and promotes safety for long-term investments.

In short, the productive sector must be prepared to monitor the changes in place, whether they are strategic, technical or managerial, they are essential to meet the global challenges on sustainability. On the other hand, and at the same time the financial sector needs to adapt strategically and operationally, to stimulate and meet the growing demand for financing that include social and environmental aspects.

Due to this multiple relevance of the sector and its position in the domestic economy, with positive implications for the food safety of the country and the world, this study on the role of the SFN on building an economy aligned with sustainable development contemplates, in this first edition, the agricultural sector. As a result, aspects of policies, plans and experiences are identified for this sector, which are more favorable or unfavorable to achieving the visions adopted as reference. Moreover, concrete proposals were suggested so that, within the financial sector - and within the next five years - there is greater alignment with the desired direction, and gains in speed and scale.

With that said, and considering that:

- Climate change presents itself as one of the greatest environmental challenges facing humanity in this century and the risks it brings to the well-being of individuals and the economies of nations impose a need for urgent and lasting actions.

- Brazil has committed to reduce its greenhouse gas emissions; and low-carbon farming is one of the strategies proposed by the federal government in order to fulfill the voluntary commitment made by Brazil in Copenhagen.

- The Sectoral Plan for Mitigation and Adaptation to Climate Change in order to Consolidate an Economy of Low Carbon in Agriculture (ABC Plan) incorporates the commitments made by Brazil under the National Policy on Climate Change (Law 12,187 / 2010 and Decreto 7390 / 2010) to mitigate greenhouse gas emissions in agriculture.

The existence and operation of the ABC Program, established by BACEN Resolution 3,896, of 08/17/2010, a credit line which allows farmers to adhere to the guidelines of the ABC Plan.

Investments of BRL197 billion between 2011 and 2020 will be required. These investments will be financed with budgetary sources, through agricultural credit lines and private sector investment to transform current agricultural practices in low-carbon practices.

- Technologies and investment purposes proposed by the plan - restoration of degraded pastures (ABC Restoration); recovery of APPs, Permanent Preservation areas and Rls, (ABC Environmental); direct planting (ABC Direct Planting); agriculture-forest integration – ILPF (ABC Integration); planting of commercial forests (ABC Forest); biological nitrogen fixation (ABC Fixation); treatment of animal manure (ABC Manure Treatment); organic agriculture (ABC Organic); and palm oil (ABC Palm Oil/Dendê) - bring economic and environmental benefits that go beyond the reduction of GHG.

This study focused its analysis and recommendations in the ABC Plan, in particular in the ABC Program (please see below). From that position, GVces believes that if the social players and economic agents directly concerned with the issue search for solutions for the effective implementation of the objectives and goals of the ABC Plan, by 2020 we will have an agricultural sector with less environmental impact, generating positive externalities for the society, and that is better positioned in the international market for food production.

ABC PLAN AND PROGRAM

During the 15th Conference of Parties to the UN Framework Convention on Climate Change (COP-15), held in Copenhagen - Denmark, the Brazilian government published its voluntary commitment to reduce greenhouse gas emissions (GHG) from 36.1% to 38.9% by 2020, estimating a volume reduction of around one billion tons of CO2 equivalent (tCO2 eq). To that end, different actions have been proposed, such as the reduction in deforestation rates, the development of reforestation projects, the supply from hydroelectric, wind power, recovery of degraded pastures, the use of charcoal from planted forests in steel mills, crop-livestock integration, etc.

These commitments were confirmed in Article 12 of Law 12,187, from December 29, 2009, which established the National Plan on Climate Change (PNMC). PNMC provides that it is up to the Executive Branch to establish Sector Plans for the Mitigation and Adaptation to Climate Change, aimed at consolidating a Low-Carbon Consumption Economy in various sectors of the economy, including agriculture. On December 9th, 2010, Decree 7390, which regulated Articles 6, 11 and 12 of the PNMC, was published. It states that the following action plans should be considered for the prevention and control of deforestation in the biomes, and sectorial mitigation and adaptation plans to climate change, including the Sectoral Plan for Mitigation and Adaptation to Climate Change for the Consolidation of Economics of Low-Carbon in Agriculture – ABC Plan.

Launched in December 2010 and published in 2011, it was drafted from the formation of a Working Group under the Executive Branch and with the later incorporation of civic society representatives. Between 2010 to mitigate greenhouse gas emissions in agriculture, there were detailing and modifications of the original commitments of agriculture signed at COP-15, which came to be composed by the adoption of the following:

42 Off this total, BRL 157 billion would be made available through the rural credit, with funds from the BNDES and other financial institutions. 
43 The application of these resources will result in costs to the Union, on an equalization rate of the order of BRL 35 billion coming from the Federal Budget.
44 Among these benefits are reduced need for further deforestation; recovery of the quality and productivity of the soil; reducing erosion; greater infiltration of rainwater; less water vaporization from the soil; reduction of production costs; low incidence of pests (less use of pesticides); diversification of production and minimization of climatic and market risks; animal welfare, due to the microclimate generated by tree component. Source: GVagro.
45 ABC Plan Observatory – GVagro and GVces.
46 Idem.
1. Repair an area of 15 million hectares of degraded pastures through proper management and fertilization.
2. Increase adoption of Integration Agriculture-Forest (iLPF) systems and Agroforestry Systems (SAPFs) in 4 million hectares.
3. Expand the use of Direct Planting System (SDP) on 8 million hectares.
4. Biological Nitrogen Fixation (BNF): expand the use of biological fixation in 5.5 million hectares.
5. Promote reforestation in the country, expanding the area of Planned Forests currently used to produce fibers, timber and wood pulp in 3 million hectares.
6. Expand the use of technologies for treatment of 4.4 million m3 of animal manure for power generation and production of organic compound.

For each program, a series of actions were proposed. They include the strengthening of technical assistance, training and information, technology transfer strategies, field days, conferences, seminars, workshops, implementation of Reference Technological Units, information campaigns, and public bids for the hiring of Technical Assistance and Rural Extension services. Complementary activities, such as research and technological development, encouraging certification mechanisms, reducing costs for production flow, adding value at the origin, fostering forest nurseries, and others are provided.

The action that involves increased visibility and more resources is the ABC Program, which provides loans to farmers to convert their production systems in processes that reduce GHG emissions. Its goal is to ensure the continuous improvement of the systems and practices of sustainable use and management of natural resources that reduce GHG emissions, and to increase atmospheric CO2 fixation in the vegetation and soil of various sectors of the Brazilian agriculture. The ABC Program is composed of several lines of credit to finance investment - investment purposes - and was released in the 2010/2011 crop year.

TABLE 18. LIST OF COMMITMENTS ON AGRICULTURE THAT FORM THE BASIS OF THE ABC PLAN, AS WELL AS THEIR ESTIMATES OF MITIGATION OF GHG EMISSIONS.

<table>
<thead>
<tr>
<th>Technical Process</th>
<th>Commitment (Increase in area/ha)</th>
<th>Mitigation Potential (millions Mg CO2 eq)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Degraded Pastures Recovery</td>
<td>15 million ha</td>
<td>83 to 104</td>
</tr>
<tr>
<td>Agriculture-Forest Integration</td>
<td>4 million ha</td>
<td>18 to 22</td>
</tr>
<tr>
<td>Direct Planting System</td>
<td>8 million ha</td>
<td>16 to 20</td>
</tr>
<tr>
<td>Biological Nitrogen Fixation</td>
<td>5.5 million ha</td>
<td>10</td>
</tr>
<tr>
<td>Planted Forests</td>
<td>3 million ha</td>
<td>6</td>
</tr>
<tr>
<td>Animal Manure Treatment</td>
<td>4.4 million ha</td>
<td>6.9</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>133.8 to 162.5</td>
</tr>
</tbody>
</table>

TABLE 19. PURPOSE OF INVESTMENT AND REFUND DEADLINES

<table>
<thead>
<tr>
<th>Purpose</th>
<th>Deadline (years)</th>
<th>Grace period (years)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Degraded Pastures Recovery</td>
<td>18</td>
<td>3</td>
</tr>
<tr>
<td>Agriculture-Forest Integration</td>
<td>8⁴⁶</td>
<td>3</td>
</tr>
<tr>
<td>Commercial Forests</td>
<td>12 / 15</td>
<td>8</td>
</tr>
<tr>
<td>Palm Tree (Dendezeiro) Forests</td>
<td>12</td>
<td>6</td>
</tr>
<tr>
<td>Animal Manure/Waste Treatment</td>
<td>10</td>
<td>5</td>
</tr>
<tr>
<td>Organic Agricultural Production Systems</td>
<td>8</td>
<td>3</td>
</tr>
<tr>
<td>Forest Seeding Nurseries</td>
<td>5</td>
<td>2</td>
</tr>
<tr>
<td>Rebuilding / maintenance APP and Legal Reserves</td>
<td>15</td>
<td>1</td>
</tr>
<tr>
<td>Direct Planting “On the Straw”</td>
<td>10</td>
<td>5</td>
</tr>
<tr>
<td>Biological Nitrogen Fixation</td>
<td>10</td>
<td>5</td>
</tr>
</tbody>
</table>

For the 2013/14 crop year, an investment of BRL 4.5 billion in production techniques of low carbon in the field via an ABC Program line of credit was expected. The credit for this crop year is financed at 5.0% per year to farmers with annual gross income of over BRL1.6 million, and 4.5% per year to farmers with annual gross income of up to BRL1.6 million, with a repayment term up to 15 years.

One possible reason for the low uptake of producers from the ABC Program is the higher transaction cost when compared to other offers of rural credit. Moreover, financing quality technical assistance linked to the ABC Program could also ensure the correct implementation of the techniques advocated by the ABC Program, especially iLPF, which requires specific technical and regionalized knowledge, since tree species and spacing between planting lines vary by climate, soil type, management, intrinsic characteristics of each region and state of the country, directly influencing the success of the rural enterprise.

ABC PROGRAM – ANALYSIS AND RECOMMENDATIONS

Programmed and implemented Volumes

Until July 2014, after four crop years, the ABC Program has provided loans to contract the accumulated value of BRL8.2 billion, according to the table below. This means an implementation of 62% available resources in crop years, BRL13.05 billion since its inception to the end of the 2013/14 crop year.

TABLE 20. TOTAL AMOUNT AVAILABLE AND IMPLEMENTED FOR THE ABC PROGRAM SINCE THE 2010/11 CROP UNTIL THE END OF 2013/14 CROP YEAR

<table>
<thead>
<tr>
<th>Program</th>
<th>2010/11</th>
<th>2010/12</th>
<th>2010/13</th>
<th>2010/14</th>
</tr>
</thead>
<tbody>
<tr>
<td>Available amount</td>
<td>BRL13,050,000,000.00</td>
<td>BRL8,120,465,095.85</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Contracted amount</td>
<td>BRL8,120,465,095.85</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Contracted / Available</td>
<td>62%</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>


<table>
<thead>
<tr>
<th>Program</th>
<th>2010/11</th>
<th>2010/12</th>
<th>2010/13</th>
<th>2010/14</th>
</tr>
</thead>
<tbody>
<tr>
<td>ABC</td>
<td>2,000.00</td>
<td>418.50</td>
<td>3,150.00</td>
<td>1,624.86</td>
</tr>
<tr>
<td>BB</td>
<td>113.60</td>
<td>850.00</td>
<td>1,272.87</td>
<td>1,500.00</td>
</tr>
<tr>
<td>Total</td>
<td>2,300.00</td>
<td>1,298.50</td>
<td>4,422.87</td>
<td>2,743.20</td>
</tr>
</tbody>
</table>
| Source: Ministry of Agriculture, Rural Development, and Food and Agriculture- Brazil’s Central Bank

For the 2013/14 crop year, 62% of the estimated volume of 4.5 billion was programmed, leaving 38% unprogrammed, which implies a difference of BRL 2.8 billion. The value programmed for each crop year is not as expected. For the 2013/14 crop year, an investment of BRL 4.5 billion in production techniques of low carbon in the field via an ABC Program line of credit was expected. The credit for this crop year is financed at 5.0% per year to farmers with annual gross income of over BRL1.6 million, and 4.5% per year to farmers with annual gross income of up to BRL1.6 million, with a repayment term up to 15 years.

FIGURE 12. CONTRACTED VALUE VERSUS VALUE AVAILABLE FOR THE ABC PROGRAM IN 2011/12, 2012/13 AND 2013/14 CROP YEARS

One possible reason for the low uptake of producers from the ABC Program is the higher transaction cost when compared to other offers of rural credit. Moreover, financing quality technical assistance linked to the ABC Program could also ensure the correct implementation of the techniques advocated by the ABC Program, especially iLPF, which requires specific technical and regionalized knowledge, since tree species and spacing between planting lines vary by climate, soil type, management, intrinsic characteristics of each region and state of the country, directly influencing the success of the rural enterprise.
From the agricultural financing point of view, the ABC Program represents a paradigm shift for all parties involved. Lines of traditional rural credit financing were always directed to finance specific and concrete items such as agricultural machinery, seeds, fertilizers etc. In these cases, the internal processes for framework analysis boil down to checking specific codes for each fundable item. Differently, the ABC Program intends to finance an installation process of technologies and practices that assist in GHG mitigation in agriculture, i.e., the big difference is that the resources from the program will finance a set of items (a project) that meets a goal and not the items individually. It is strategic, in those early years, to ensure an attractive interest rate to the ABC Program, a rate that is capable of stimulating taking credit from it, rather than from other lines.

It is also strategic to ensure resources are allocated for research, technology dissemination, and staff training in a proportional way to the disbursement with Treasury equalization. For this, it is necessary to expand and accelerate the training of technical assistance and rural extension networks in the practices recommended in the ABC Plan, particularly in the Amazon, thus ensuring the effective role of the National Agency for Technical Assistance and Rural Extension (Anater) on disclosing the program and the benefits of the recommended technologies, in order to shorten the path between the new technology and its assimilation by producers. It is also necessary to address the current lack of knowledge on the existence of the program and its lines by the farmers, technical assistants and financial agents, expanding outreach efforts of the Program. This could be achieved, among others, through the creation of a Web portal for the dissemination and transparency strategy, providing information of interest to the government, farmers, financial officers and other segments of civil society.

FINANCING SOURCES AND TRANSFER AGENTS

For the 2013/14 crop year, total operations contracted totaled BRL3.027 million, out of which BRL2.741 million via Banco do Brasil (BB) and BRL286.12 million from BNDES. BB continues to be a protagonist in the distribution of resources to finance the practices advocated by the ABC Program, as shown in the Figure below.

FIGURE 13. TOTAL AMOUNT CONTRACTED FOR THE ABC PROGRAM IN 2011/12, 2012/13 AND 2013/14 CROP YEARS

BB has strived to unlock the program using its own resources, from Rural Savings. The use of this source by BB to fund the actions of the ABC Program was crucial to unleash the performance of the line, but there is a built-in investment that is paid by the Union, as an equalization of interest in relation to the interest rates from the market. Such investment is hidden, but it needs to be considered for purposes of calculating the value of a ton of carbon mitigated by the ABC Program. In addition, BB’s advancement in the disbursement of the ABC Program was possible thanks to initiatives such as the training of financial officers, with the support of a booklet produced exclusively for this purpose, which guides them. Between July 2013 and March 2014, 1,428 municipalities have raised funds from the ABC Program via BB.

The constitutional funds, particularly the FCO and FNO, have also developed specific lines that are also known as ABC Program, which fund the same purposes of the ABC Program by BB and BNDES. However, for eligible producers to these operations, the effective interest rate is substantially lower, ranging from 3.53% to 4.12%, compared to 5% of the ABC Program.

One concern is that similar lines of credit may “cannibalize” the ABC Program. Taking resources from the ABC Program is more bureaucratic and laborious due to the requirement of developing a systemic technical project - aligning productivity and GHG mitigation - compared to other lines of investment, guided only by a list of eligible items. Credit lines as Moderfrota, Moderinfra, and Moderagro, that have intersections with the ABC Program, have interest rates of 5.5%, a little above the interest rates in the ABC Program, but they have less technical and environmental requirements, which can reduce the appeal of ABC lines for rural producers. The 2013-14 crop year ended with a total of 12,103 contracts signed, with 11,231 via BB and 872 via BNDES.

FIGURE 14. NUMBER OF CONTRACTS ENTERED INTO FOR THE ABC PROGRAM IN 2011/12, 2012/13 AND 2013/14 CROP YEARS

From the operations contracted via BNDES, we highlight Bradesco’s participation as a transfer agent of resources, with BRL152.4 million. Bradesco was the private bank with the largest amount of contracted operations in the ABC Program. Private banks have shown little interest in the ABC Program: in the 2013/14 crop year, from the BRL3.02 billion actually used; BRL2.74 billion were executed by BB, and only BRL286.1 million were transferred by other - public and private - financial institutions with funds from BNDES. The low participation of private banks was due to the high risk involved in the operations of the ABC Program, especially:

1. The long maturity of the operation (up to fifteen years for debt amortization).
2. The difficult access to information by the competent environmental authorities, as, for example, the situation of environmental regulation of the tenderer.
3. The high transaction costs for taking ABC credit from BNDES.
4. The risk of the operations of private banks are not shared with the BNDES, since the operation risks from the ABC Program are fully attached to the bank that transfers the funds, if BNDES derates operation.
With regard to the source of funds used in transfers from the ABC Program, the importance of the participation of the Rural Savings in the total disbursement, accounting for 80% of disbursements, is noticed. Undoubtedly, this is due to BB’s participation in the outcome of the line and, adding the FCO - also managed by the bank - their share rises to 93% of the total contracted.

To ensure competitiveness of the program, it is necessary to reduce the transaction cost for private banks taking the ABC credit with BNDES. In addition, there should be investments in access to information by the competent organs, such as the formalization of the process for environmental regularization of rural properties with the implementation of the Rural Environmental Registry - CAR.

The resources from the ABC Program are concentrated in the states of the Southeast and Midwest areas in Brazil. With fewer contracts, but with higher average value per contract, the Midwest became, in the 2013/14 crop year, the region with the largest destination of funds from the ABC Program: BRL 1.1 billion, compared to BRL1.03 billion in the Southeast).

The North and Northeast regions had 8.4% and 6.3% share in the disbursement in the 2011/12 and 2012/13 crop years, respectively, to 10.4% on the 2013/14 crop year, while the Northeastern region had 2011/12 and 2012/13 crop years, in that order, and 8.9% in the 2013/14 crop year (Figure 8).

The increase in the contracted value in the Northern and Northeastern regions in Brazil was achieved mainly after some obstacles were overcome. These obstacles include the expansion and training of the technical assistance and creation of ANATER, dissemination of information about the ABC Plan and Program among rural producers, training of regional players in the technical and financial requirements prescribed by the ABC Program, better proximity with the MAPA from the North and Northeast regions, the environmental regulation process in progress with the implementation of the Rural Environmental Registry (CAR, in portuguese), among others.
However, when comparing the total contracted value of the regions vis-à-vis the amount offered by the Federal Government via the Agricultural Livestock Plan (PAP), the ABC Program has not reached the expectation of contracted resources in none of the crop years analyzed, even considering the recent low interest rates of the line and advances of the financial and productive sector in regards to training and dissemination of agricultural techniques advocated in the ABC Program. Thus, there is still great scope for increasing disbursement from the ABC Program. Therefore, one should endeavor to increase the borrowing from the ABC Program in areas where the introduction of the planned technological innovations can offer greater gains in GHG mitigation through a climate intelligence program in agriculture, to indicate the priority areas for the implementation of government actions, from the analysis of vulnerabilities and risks arising from climate change. This intelligence effort could develop criteria for prioritizing areas in the states aimed at adaptation/mitigation actions based on the synergy between the goals of Federal and State Plans, as PPCDAM, State Plans to Control Deforestation, water conservation plans, etc. In particular, it is suggested that the focus of the implementation of the ABC Plan are 535 municipalities with low capacity rate pastures, 112 of them in the Amazon. Thus, a land-saving effect could be an advantage, equivalent to 71 times the current rate of deforestation in the Amazon, thus fulfilling the objective of the plan, which includes reducing deforestation pressure in the Amazon region and increasing the livestock efficiency in the Amazon and in other regions of Brazil as well.

**Purpose of Investment**

From the operations contracted via BNDES, we note that 71% of the contracted value are intended for pasture recovery, which is consistent with the need for recovery of more than 50 million hectares of existing degraded pasture in the country. The ABC Environmental (ABC Ambiental) and ABC Waste Treatment (ABC Tratamento de Dejetos) lines get smaller amounts of resources. Operations from the ABC Program via BNDES in the 2013/14 crop year for Biological Nitrogen Fixation (BNF) (which has a heating power 296 times higher than CO₂) were not performed either. It is noteworthy that for the disaggregated analysis for purposes of investment, there is no data for all operations, since SICOR does not discriminate this information in its base. Thus, the data below are provided by BNDES and correspond only to its operations. The recovery of degraded pastures is the main credit line in the program, concentrating 80.32% of the credits in the 2012/13 crop year. However, the distribution of the resource is still excessively concentrated in a few states, especially in Central-South regions of the country. Most municipalities with degraded pastures, a program priority, have not borrowed any resources from the ABC Program.

The main obstacle for the borrowing of resources in Para State is the lack of understanding about sustainable farming and livestock practices by producers, for example, ILPF as well as the processes for borrowing the resources from the ABC Program. The land and environmental issues that are still being regulated also end up being significant barriers to the borrowing of ABC resources, as well as the bureaucracy for approving the project for the borrowing of resources from the financial agents.

Thus, the reach of the ABC program in general is low. Both in the 2011/12 as in the 2012/13 crop years, only six municipalities with degraded pasture in the country used funds from the program in a consistent volume with the one needed to promote recovery of the total degraded pastures.

The direct planting system, another important action from the ABC Program, did not take off in the main agricultural frontier of the country, called Mapitoba (which includes areas from the states of Maranhao, Piaui, Tocantins, and Bahia).

**Monitoring and Governance**

While monitoring the funds advances, a follow-up on the balance between the amount of carbon mitigated and/or captured by the production techniques funded by the ABC Program is pending. There has been no practical action to put the Virtual Multi-Institutional Laboratory on Climate Change and Agriculture in operation, and it is still necessary to create special lines of credit to purchase the equipment needed for the analysis of carbon in the soil with the level of detailing that the ABC Plan requires. Only with this structure is that one can evaluate the true efficiency of the program and the achievement of goals.

However, there is good news in the governance of the program: BACEN has enhanced its monitoring of the operations of the ABC Program with the creation of a computerized control system for operations in 2013, SICOR. In 2014, the system was made available on the Internet, increasing transparency of application of agricultural credit, which includes the ABC Program. The SICOR gathers information from all financial operations of rural credit, including the ABC Program. Through the SICOR-web, users can query information and values of contracts relating to rural credit in the country.

BNDES also contributed to the transparency of the ABC Program making its disaggregated data available for the ABC Observatory for investment purposes, which are not covered by SICOR, and which allowed a more comprehensive analysis of the results.
Investments are needed in the ability to provide physical monitoring of the reduction of carbon emissions by ABC agricultural practices, the ultimate goal of the Program. For this, the process of creating the Multi-Institutional Virtual Laboratory of Climate Change must be accelerated, the network of chemical analysis of the soil laboratories must be expanded, a baseline carbon stock in soils of different regions of the country must be established, and a geo-reference on the areas being funded must be obtained, in a similar way to what is done in PPCDAM (Plan for Prevention and Control of Deforestation in the Amazon), where there is constant monitoring of deforestation by satellite images.

CONCLUSIONS

It is noteworthy that, despite the efforts by BACEN, BNDES, and the civil society, the ABC Program has been presented in a disaggregated way for investment purposes. It is necessary, for transparency and accountability principles, that information is made available to society periodically, so the effectiveness of the program can be evaluated.

This study has focused on the analysis and recommendations of the ABC Plan, more specifically, on the ABC Program, a line of credit that allows farmers to comply with the guidelines of the Plan. We considered the analysis of agriculture in Brazil, the advanced stage of the institutional and regulatory framework, the resources available, the positive impacts that go beyond the mere contribution to mitigating climate change. From that position, GCvces believes that if the social players and economic agents directly concerned with the issue work together to find solutions for the effective implementation of the objectives and goals of the ABC Plan, we will have, in 2020, an agricultural sector with much less environmental impact and that will generate positive externalities for society, as well as being better positioned in the international food production market.

The main recommendations of the study are presented below and are organized around the different actors who work on the advancement of the ABC Plan in Brazil.

RECOMMENDATION 1

STIMULATE THE SUPPLY AND DEMAND FOR DEMANDED AND EXECUTED RESOURCES:

Despite committing BRL157 billion, which will be available through rural credit for the period 2010-2020 with funds from BNDES and other financial institutions until July 2014 - i.e., after four growing seasons - the ABC Program only allowed for the contraction of financing of BRL8.12 billion, showing a small demand for the lines offered, which require a low transaction and compliance costs for the taking of ABC credit from private banks.

To ensure competition in the program, it is necessary that the public sector reduce the high transaction and compliance costs for the taking of ABC credit from private banks and public banks with BNDES. In addition, competent bodies must invest in access to information, such as the formalization of the environmental regularization process of rural properties with the implementation of CAR.

RECOMMENDATION 2

ACCELERATE THE PARADIGM SHIFT IN THE CREDIT BORROWING DECISION PROCESS:

From the point of view of agricultural financing, the ABC Program represents a paradigm shift for all parties involved. Lines of traditional rural credit were always directed to finance specific and concrete items, such as agricultural machinery, seeds, fertilizers etc. In these cases, the internal processes to analyze the framework boil down to checking specific codes for each fundable item. Differently, the ABC Program intends to finance an installation process for technologies and practices that assist in mitigating GHGs in agriculture, i.e., the big difference is that the resources from the program will finance a set of actions that meet a goal and not isolated items. It is strategic, in those early years, ensuring the ABC Program an interest rate that is attractive enough and able to stimulate taking credit for it, rather than from other lines.

RECOMMENDATION 3

ENCOURAGE THE PROVISION OF RESOURCES FOR THE ABC PROGRAM FROM PRIVATE BANKS:

The total contracted operations during the crop year 2013/14 amounted to BRL3.03 billion, BRL2.7 billion via Banco do Brasil (over 90%) and BRL286.12 million from BNDES. Banco do Brasil is the major player in the distribution of resources from the ABC Program. To ensure competition in the program, it is necessary that the public sector reduce the high transaction and compliance costs for the taking of ABC credit from private banks and public banks with BNDES. In addition, competent bodies must invest in access to information, such as the formalization of the environmental regularization process of rural properties with the implementation of CAR.

RECOMMENDATION 4

PRIORITIZE THE AMAZON AND THE REHABILITATION OF PASTURELANDS:

Efforts should be undertaken to increase the borrowing of credit from the ABC Program in the areas where the introduction of the planned innovative technologies may offer greater gains in the GHG mitigation. This will occur through a climate intelligence program in agriculture to indicate priority areas for the implementation of government actions, from the analysis of vulnerabilities and risks arising from climate change. These intelligence efforts could develop criteria for prioritizing areas in the states aimed at adaptation/mitigation actions based on a synergy between the goals of Federal and State Plans, such as PPCDAM, State Plans to Control Deforestation, water conservation plans, etc. In particular, it is suggested that the focus of the implementation of the ABC Plan are 535 municipalities with low stocking rate on pasture, 12 of them in the Amazon. Thus, the effect of land-saving, equivalent to 71 times the current rate of deforestation in the Amazon, is tapped, consequently fulfilling the objective of the plan, which includes reducing deforestation pressure in the Amazon region and increasing the efficiency of livestock and that region and other regions in Brazil.

RECOMMENDATION 5

INCREASE THE CAPILLARITY OF TECHNICAL ASSISTANCE AND ACCESS TO INFORMATION ON THE ABC PROGRAM FOR RURAL PRODUCERS:

Ensuring there is allocation of resources for research, training and dissemination of technologies proportional to the disbursement with equalization from the Treasury is a strategic issue. Therefore, it is necessary to expand and accelerate the training programs for technical assistance and rural extension network in regards to the practices recommended in the ABC Plan, particularly in the Amazon, thus ensuring Anater’s effective role in disseminating the program and the benefits of the recommended technologies, in order to shorten the distance between the new technology and its assimilation by the producer. It is also necessary to address the current lack of knowledge about the existence of these lines by farmers, technical assistants, and financial agents, expanding outreach efforts. This could be achieved, among others initiatives, through the creation of a Web portal providing relevant information to the government, farmers, financial officers and other segments of civil society, as a part of the communication and transparency strategy.

RECOMMENDATION 6

ADVANCE ON THE FINANCIAL MONITORING OF THE PROGRAM:

Despite efforts by the Brazilian Central Bank and BNDES, the financial information on the ABC Plan is not being presented in a disaggregated way for investment purposes. It is necessary, according to transparency and accountability principles, that this information regarding transactions for both public and private banks is made available to society periodically, so the effectiveness of the program can be evaluated. BACEN announced that, as of 2015 (2015/2016 crop year), information on the ABC Program will be available for investment purposes.

RECOMMENDATION 7
ADVANCE ON THE PHYSICAL MONITORING OF CARBON REDUCTION THROUGH THE ABC PROGRAM:
The same way, investments in the physical ability to monitor the reduction of carbon by ABC agricultural practices, which is the ultimate goal of the program, are needed. For this, the process of creating the Multi-Institutional Virtual Laboratory of Climate Change must be accelerated, the network of chemical analysis of the soil laboratories must be expanded, a baseline carbon stock in soils of different regions of the country must be established, and a geo-reference on the areas being funded must be obtained, in a similar way to what is done in PPCDAM (Plan for Prevention and Control of Deforestation in the Amazon), where there is constant monitoring of deforestation by satellite images.

Considering the importance of the ABC Plan for the competitiveness of the Brazilian agricultural sector, as well as its innovative character, there is a clear agenda for public policies, and for advancements in the national public and private financial sector agenda. The seven recommendations presented above were organized below according to the different policies, and for advancements in the national public and private financial sector agenda. The agricultural sector, as well as its innovative character, there is a clear agenda for public policies, and for advancements in the national public and private financial sector agenda. The seven recommendations presented above were organized below according to the different policies, and for advancements in the national public and private financial sector agenda.

Government:
➢ Expand the communication effort of the ABC Program to technical assistants, rural producers, and financing agents on the economic, social, and environmental benefits of the recommended technologies.
➢ Ensure that the production arrangements that reduce greenhouse gas emissions also allow for an incremental income for farmers, in order to make the producers’ adherence to the new system attractive.
➢ Expand and accelerate the training of technical assistance and rural extension network in regards to the recommended practices from the ABC Plan.
➢ Ensure Anater’s effective role in the dissemination of the program and recommended technologies in order to shorten the distance between the new technology and its assimilation by the producer.
➢ Implement monitoring systems for the financing granted to ascertain whether they are actually promoting the reduction of greenhouse gas emissions, similar to what is done in PPCDAm (Plan for Prevention and Control of Deforestation in the Amazon), where there is constant monitoring of deforestation with satellite images.
➢ Improve coordination between the federal government and state agencies that may enhance the effectiveness of the program, inserting the ABC practices across state and local agricultural programs.
➢ Insert specific proposals from ABC Program in the Multi-Year 2016-2019 Plan bill.
➢ Encourage the installation of State and Municipal Program Managing Committees.
➢ Ensure greater involvement of the Ministry for Agrarian Development in the implementation of the Program.
➢ Ensure there is allocation of resources for research, training and dissemination of technologies proportional to the disbursement with equalization from the Treasury.
➢ Develop efforts to increase the borrowing from the Program in the regions where the introduction of the planned technological innovations can offer greater gains in mitigating greenhouse gases.
➢ Accelerate the process of organizing a Multi-Institutional Virtual Laboratory for Climate Change.
➢ Use geo-reference data from the funded projects to monitor their development and to estimate the accumulation of carbon in relation to the initial stock indicated in the technical design.
➢ Advance on solving land ownership problems in the North.
➢ Set clear rules regarding environmental due diligence of banks.
➢ Advance on the implementation of the CAR (Rural Environmental Registry) reducing the costs attached to the gathering of information by agents in the financial sector.

Private and public banks:
➢ Support the strategic agenda for the advancement of the ABC Program, with the aim of stimulating demand for program resources.
➢ Negotiate the reduction of transaction costs between private banks and BNDES, including access to public database which facilitates access to information on projects to be funded according to the ABC Program.
➢ Increase the number of trained staff in the ABC Program.
➢ Train the productive sector on how to create and submit projects.
➢ Support the strategic agenda for the advancement of the ABC Program, with the aim of stimulating demand for program resources.
➢ Increase the number of trained staff in the ABC Program.

SFN trade associations:
➢ Monitor the progress of this agenda (induction).

SFN Regulators:
➢ Advance on the monitoring and transparency of amounts allocated by SFN for the ABC Program.

This first study on the contribution of the National Financial System to sustainable development does not exhaust the possibilities of performance in the agricultural sector. Insights and additions are possible, which may include work on: family farming; organic agriculture; forestry; inputs and pesticides; machinery and equipment. In addition, we understand that there is room for research in the following related topics, exploring the possibilities of participation of the financial sector - as a protagonist or inducer - in the inclusion of sustainability in agriculture.

Integration between agricultural and energy policies
Coordination between government departments responsible for Energy and Agriculture, allowing better use of energy cogeneration potential of crop residues and use of biofuels in vehicle fleets, besides the use of charcoal for the steel industry.

Labeling and certification
Adequacy of agricultural products to international standards and market preferences, internalizing environmental issues on pricing and the image of this economic activity.

Investments in R&D and rural extension
Development of better agricultural techniques, equipment, plant varieties and pasture management, and its dissemination among rural producers.

PES (Payments for Environmental Services)
Development of domestic and international PES mechanisms, offering compensation to human activities that restore, recover, maintain, and improve ecosystems that generate environmental services such as biodiversity preservation and conservation of water resources.

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ABCB Observatory. http://www.observatorioabc.com.br
INTRODUCTION TO THE DISCUSSION OF ECONOMIC OPPORTUNITIES IN BRAZIL FOR BIODIVERSITY AND CITIES
INTRODUCTION TO THE DISCUSSION OF ECONOMIC OPPORTUNITIES IN BRAZIL FOR BIODIVERSITY AND CITIES.

This section provides an introduction to the discussion in Brazil of economic opportunities related to native forests and the development of “smart cities”, a concept related to the Green Economy. Presented first are discussions regarding biodiversity (focusing on native forests) and, afterward, discussions regarding cities.

BIODIVERSITY

As the theme “biodiversity” is a widely considered theme in the Brazilian reality, for the framework of this study, the segment of native forests, with a focus on sustainable forest management, was selected for a more in-depth analysis. This looks to the mobilization of a huge natural capital, in which Brazil clearly has a differential and competitive advantage at the global level. The existence of these conditions, however, has not been sufficient to overcome the problems that create difficulties and delays for entrepreneurs in the area. Below, the relevant aspects related to native forests will be discussed.

INTRODUCTION

In study conducted in 2010, FAO stated that forests occupy slightly over four billion hectares, which corresponds to 35% of continental areas or approximately 0.6 hectares per capita. The five countries with the greatest forest cover are the Russian Federation, Brazil, Canada, the United States, and China. Together, these countries account for more than half of the forested area in the world.

The FAO study also highlighted that, although deforestation rates and forest loss through natural causes are still considered high, they have in fact been reduced from 16 million hectares/year to 13 million hectares/year in the last decade. At the same time, reforestation and the expansion of native forests in some countries have significantly reduced net global forest loss. In fact, the net change in global forest cover in the period from 2000 – 2010 was estimated at 5.2 million hectares/year (an area equivalent to the territory of Costa Rica), compared to negative 8.3 million hectares/year in the period 1990-2000.

It needs to be noted that the majority of forest loss is still occurring in tropical countries, while the greatest gains are being made in countries with boreal forests, indicating that the loss of biodiversity due to deforestation continues despite the latest increases in forested area.

THE STATE OF BRAZILIAN FORESTS

Brazil stands out as the second country with the largest forested area in the world, with 13% of the globe’s forests, and the country with the largest area of tropical forests. The biggest Brazilian forest biomes are the Amazon Forest and the Atlantic Forest, which are known for their great biodiversity. Both, and particularly the Atlantic Forest, have suffered from a long process of conversion to other uses, especially to agriculture and urban expansion.

Historically, the Brazilian economic development process paid little attention to forests as economic assets, and limited their value to logging potential. Logging, however, was not conducted in a sustainable manner that would guarantee the continued flow of wealth and avoid the depletion of these resource stocks, and the result was significant losses of forested area.

Currently, it is recognized that the value of the forests goes far beyond their logging potential and that the sustainable exploitation of these other components of value from the forests requires a revision of the current economic development model in regions dominated by these forests. Some sustainable logging initiatives are already in place, particularly in the Amazon, such as the concession plans of public forests administered by the Brazilian Forestry Service (SFB), as well as reduced impact forest management plans certified by the Forest Stewardship Council (FSC). However, there is still a lack of economic development policies capable of fostering the sustainable exploitation of other components of value associated with Brazilian forests.

Forest ecosystems generate a series of benefits called ecosystem services that, despite being essential for economic development, are not adequately valued and, consequently, have not been considered in current economic plans and models. These ecosystem services translate not only into the supply of logging and non-logging products, but also into the regulation of natural processes that determine the quality and quantity of water resources, atmospheric carbon capture and the regulation of rainfall systems, as well as cultural benefits, particularly tourism.

Invariably, ecosystem services of the Brazilian forest generate positive externalities on different scales. The control of the quantity and quality of water resources is already a critical theme in the Southern and Southeastern states of Brazil, atmospheric carbon capture in the context of climate change is a sensitive theme on a global scale, and the regulation of rainfall systems involve externalities on national and international scales – studies show that humidity coming from the Amazon Forest is a determinant for rainfall in the Brazilian South and Southeast, as well as the Southern United States. In Brazil, the reforestation of 3% (14.3 thousand out of 493.4 thousand hectares) of the vegetation that comprises the Cantareira, Alto Tiete, Guarapiranga and Rio Grande systems would reduce the amount of sediments dumped into water bodies and therefore contribute to increase water availability.

The deforestation and degradation of Brazilian forest ecosystems, however, have been limiting the availability of ecosystem and associated services, generating risks of economic losses, especially in the region dominated by the Atlantic Forest, where the management of water resources is becoming more and more complex.

PRESERVATION AND RECOVERY OF BRAZILIAN FOREST ASSETS

The preservation of Brazilian forests is necessary for its ecosystem services, including logging, to be exploited indefinitely. For recovery of the forest whose areas have been converted to human use, it is necessary that at least part of the lost ecosystem services be recovered, particularly in the Atlantic Forest domain, where forests have been reduced to less than 10% of their original cover.

Both the preservation and recovery of Brazilian forests could be financed through fiscal instruments and/or through payments for ecosystem services (PES). In the case of PES, the main modalities would be the REDD+ in the context of forest preservation, and atmospheric carbon capture contracts in the case of forest recovery.

Given the global scale of part of the benefits generated by Brazilian forests, the PES systems could also capture resources from external investors, be they governments, multinational institutions or private institutions. In the case of ecosystem services whose externalities have a more restricted reach, the PES systems would capture resources internally. Regardless of the control of water quantity and quality, for example, the resources could come from water use charges, watershed committees or even from the Brazilian National Water Agency (ANA).

A NEW ECONOMIC DEVELOPMENT MODEL FOR BRAZILIAN FOREST REGIONS

A new economic development model that prioritizes activities directly related to the forests and that cover the diverse ecosystem services associated with them appears to be the best option to conciliate socio-economic development with the conservation of Brazilian forests and biodiversity. More importantly, the sustainable exploitation of the forests should reduce deforestation pressures on the forests themselves, as in this model the forests would be considered a necessary factor for the generation of a continuous flow of wealth and no longer be just another obstacle to this end.

Under these terms, four guidelines are presented for the promotion of economic development associated with the sustainable use of Brazilian forest resources:

- **Sustainability in the exploitation of logging and non-logging products**
  - As a way to guarantee a continuous supply of logging and non-logging products, a law must be established that requires a management plan based on the principles of sustainable exploitation (these principles would be defined by the regulations) for all logging and non-logging extraction activities in all private and public forests in Brazil.

- **Add value to forestry products**
  - Logging and non-logging products from Brazilian forests are very often exported in their raw state. Incentives should be given to develop processing industries as a way of reaching new markets and adding value to exports. It should be highlighted that initiatives for these types of industries should favor local communities, as they represent a new source of employment.

- **Foster tourism**
  - Since Brazil has a vast surface area, the tourist potential for Brazilian forests is underexplored, given that a significant part of the Brazilian conservation units do not have adequate visitor infrastructure. The necessary investment to increase ecological tourism is relatively low and the returns tend to compensate. In the United States, visits to the conservation units managed by the U.S. Forest Service contribute US$ 14 billion/year to American GDP.

- **Foster research on biodiversity; development of new business opportunities**
  - Great diversity is a natural characteristic of Brazilian forests. The economic potential associated with this biodiversity, however, is far from being realized, and there are high expectations that new medicinal and pharmacology (including cosmetics) discoveries will be made. In this sense, it is important to invest in the development of new products through research efforts regarding (a) the characterization of the biodiversity, (b) its properties with economic interests and (c) its ecology.

Understanding the biodiversity is the first step in developing key assets that have an economic interest, and the ecological study of the species of interest, and/or its population, is essential for proposing parameters that will guarantee sustainability in its economic management, in situ and ex situ.

EMERGING MARKETS FOR ECOSYSTEM SERVICES

Ecosystem services are defined as those contributions (direct and indirect) made by ecosystems to the wellbeing of humankind or even as benefits from the environment received by people

- **Provision of food, raw materials, water resources, genetic resources, medicines, ornamentation.**
- **Regulation of climate, pollution, biological control of plagues and diseases, water purification.**
- **Habitat: maintenance of life cycles of migratory species and biological diversity.**
- **Cultural: recreation, tourism, etc.**

As the occurrence of such services can be associated with different segments of the economy, the compilation of specific data from the sector is limited. It is, therefore, possible to turn the market for ecosystem services more representative, even though they are still in their initial stages and voluntary in the Brazilian context, namely through the forest bonds segment and the carbon credits segment for greenhouse gas emissions. Other segments of interests for the country are rights over water use and reverse logistics.

Forest Bonds Segment (Environmental Reserve Quotas)

An important legal framework that deals with Brazilian forests is the Forest Code. Originally from 1934 and later revised in 1965, in 2012 a new version was enacted through Law 12,651 from May 25th, 2012. The 1965 Code, governed by Law 4,771/1965, was proposed in a context where the Brazilian population was concentrated in coastal areas and where there were extensive areas of the Cerrado, Pantanal, Atlantic and Amazon Forest ecosystems. But Brazilian reality transformed in such a way over time - heavy migration to urban areas (see the following section about ‘Cities’), expansion of agribusiness in the country’s interior, mechanization of agriculture, among other aspects, that Brazilian society approved a revised version of the Forest Code, the so-called ‘New Forest Code’ (NFC).

Among the main innovations in the New Forest Code are: i) the creation of the Environmental Regularization Program (PRA) - that has the objective of increasing the level of regularization and legalization of rural producers -, ii) the establishment of new criteria for Areas of Permanent Reserves, ecological tourism stimulate local economies, as it supports commerce and generates jobs. The Amazon Forest, especially, shows a great potential to develop culinary tourism, and Amazonian products have received much coverage in national and international haute cuisine.

Foster research on biodiversity; development of new business opportunities

Great diversity is a natural characteristic of Brazilian forests. The economic potential associated with this biodiversity, however, is far from being realized, and there are high expectations that new medicinal and pharmacology (including cosmetics) discoveries will be made. In this sense, it is important to invest in the development of new products through research efforts regarding (a) the characterization of the biodiversity, (b) its properties with economic interests and (c) its ecology.

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50 There are 193 million acres (78,043,329 ha) in parks, the equivalent of about US$ 180 per hectare per year, according to the American Forest Service.
51 Kumar, 2010 and the Millennium Ecosystem Assessment, 2005
52 Orlos, 2013
53 Soares-Filho et al, 2014
54 Law 12,651/2012, Article 66
CRA is a registered bond representing an area of native vegetation that exists or is in the recovery process and is the successor to the Forest Reserve Quota (CFR) - issued under Law 4,771/1965. The CRA is issued by an organ of the National Environment System (Sisnama). It is worth noting that the CRA must be preceded by the Rural Environmental Registry (CAR). Annex I provides more detail about the CAR.

The economic potential of this segment is significant. It is estimated that there is an environmental liability in the order of 87 million hectares in Permanent Preservation Areas (APP) and Legal Reserve Areas (ARL) that are irregularly occupied, as shown below:

**FIGURE 20. LAND DISTRIBUTION IN BRAZIL IN MILLIONS OF HECTARES (MILLIONS OF HECTARES)**

<table>
<thead>
<tr>
<th>Concept</th>
<th>Mha</th>
</tr>
</thead>
<tbody>
<tr>
<td>Brazilian continental territory</td>
<td>850</td>
</tr>
<tr>
<td>Area with natural vegetation predominant</td>
<td>537</td>
</tr>
<tr>
<td>Area with pasture or agriculture and pasture combination dominant</td>
<td>211</td>
</tr>
<tr>
<td>Area with agriculture dominant</td>
<td>67</td>
</tr>
<tr>
<td>Permanent Preservation Area (APP)</td>
<td>103</td>
</tr>
<tr>
<td>Natural Vegetation in APP</td>
<td>59</td>
</tr>
<tr>
<td>Natural Vegetation deficit in APP</td>
<td>44</td>
</tr>
<tr>
<td>Necessary Legal Reserve (RL)</td>
<td>254</td>
</tr>
<tr>
<td>Estimated natural vegetation deficit for allocation to RL</td>
<td>43</td>
</tr>
<tr>
<td>Natural vegetation deficit in APP and for allocation to RL</td>
<td>87</td>
</tr>
</tbody>
</table>

The economic potential of this segment also depends on the costs of environmental recovery, equivalent to the opportunity cost of the purchase of CRAs. It is possible to estimate that about 56% of the Legal Reserve deficit can be reduced through the segment of CRAs. Rio de Janeiro Green Stock Exchange (BVRio) created a platform to negotiate CRAs. Currently, however, the segment has 1,900 participants offering CRA, in an amount of about two million hectares, but as there is not sufficient volume for delivery, the BVRio developed a futures market for CRAs (CRAFs). There is evidence that the segment for CRAs can grow in Brazil.

**REVERSE LOGISTICS SEGMENT**

The segment for reverse logistics is at initial stage of development in Brazil as a consequence of, and stimulated by the National Plan on Solid Waste (PNRS) – Law 12,305 from 2010 (BRAZIL, 2010). The policy establishes that reverse logistics systems be created and put into practice for various solid wastes. To this end, the BVRio developed Credits for Reverse Logistics for Packaging (CLRs), issued by waste picker cooperatives and that can be purchased by companies with obligations under the framework of the PNRS. Currently there are around 70 cooperatives offering CLRs. Recycling activities involve between 700,000 and 1 million waste pickers. Regarding recyclable waste, Brazil has a recovery rate of 27%, which rises to 65.3% in the case of packaging. Still, it is estimated that the country fails to generate an additional BRL8 billion per year by throwing away trash that could be recycled, particularly taking into consideration the economic advantages of recycled materials over virgin materials.

**GREENHOUSE GAS (GHG) SEGMENT**

With respect to GHG emissions, the National Plan on Climate Change (PNMC, Law 12,187/2009) envisages one of the instruments as being the Brazilian Emissions Reduction Market (MBRE), where trading of “securities representing certified, avoided greenhouse gas emissions” will take place. However, this market has not been put into operation and may eventually be adopted after 2020, in a scenario of obligatory commitments to reduce emissions in Brazil as a result of international negotiations.

For now, therefore, carbon credits are restricted to the voluntary market, particularly the REDD projects (responsible for 38% of the credits traded globally in 2013). Brazil is the main provider of such credits in Latin America, with a REDD+ project between the state of Acre and the German development bank KfW, for example, to the order of 8 MtCO2e transacted. It is also important to highlight the history of the country in relation to CD (Clean Development Mechanism) projects, it being the third largest leading actor in this framework (5% of total global projects), after only China and India.

**FRESHWATER RIGHTS SEGMENT**

With respect to a market for freshwater rights, there is no legislation in place in the country which envisages the commercialization of water capture and use grants, although the increasing demand for water resources and the lack of supply (in some areas) suggest an economic potential to be explored. At the present, there is a voluntary market for the “production of water” expressed in the form of payments for environmental protection and recovery services for water resources such as the Producet Program from the National Water Agency that has 16 projects in varying stages of development and states.

**CONCLUSIONS**

Brazil has a great potential for developing an economy based on natural resources and creating markets capable of channeling financial resources for preservation. The potential of the Brazilian forests goes far beyond logging products and includes ecosystem services. This is a critical agenda for public policymakers in Brazil, and the financial sector may take the lead for its progress. Estimates on economic potential for exploring tourism and vegetation recovery – about 87 million hectares – point to high potential markets, still underexplored. Although they are innovative processes, if developed, they may represent promising markets for SFN operation.

Brazil has already shown good development in ecosystem services, particularly forest bond segments (CRAS) and reverse logistics and, while at an initial stage, such development is supported under the Forest Code and the PNRS. Similarly, a GHG market has a legal basis in the framework of the PNMC, although it has not been regulated yet. Finally, a potential market for the Brazilian scenario would be water use rights, but there is no legislation on this matter so far. Here, we can clearly spot a leadership agenda for SFN, since the development of these segments represent gain opportunities for the sector, while contributing to the preservation of Brazilian natural resources.
Due to this, cities and their national connections - their economic and social networks, both national and international - are at the heart of the debate about economic growth, development and sustainability. Globally, urban areas are home to around 50% of the population and are estimated to reach 60% by 2030. They are responsible for the consumption of 60 to 80% of all energy produced globally. The concentration of people in cities is irreversible and brings with it important changes to the landscape - as it impacts the expansion of areas for agriculture and the degradation of natural ecosystems -, that result, for example, in alterations to local climate and loss of habitat. Cities have become engines of economic growth, income generation, employment, innovation and creativity, and offer important opportunities to improve living standards, but are highly unsustainable in terms of the consumption of natural resources and waste generation, of increased demand for energy, utilities, mobility, accommodation and housing, infrastructure and maintenance. Therefore, discussions about the transition to sustainability and the green economy must consider improvements in the governance of cities.

**THE URBAN SCENARIO IN BRAZIL**

Since 1970, Brazil has been a predominantly urban country. In Brazil, 84.4% of the population lives in urban areas, particularly the large capitals such as Sao Paulo (the city alone accounts for around 6% of the Brazilian population and 27% of the population of the state), Rio de Janeiro, Salvador, Brasilia and Fortaleza, which together account for an urban population of 25 million people - 13% of the Brazilian population. Brazil has 16 cities with populations over one million that in total represent 22% of the country’s population\(^6\). These numbers do not include the populations of neighboring cities that contribute to (and live off) the economies of the large Brazilian cities. In Brazil, the urban population growth rate has been greater than that of the rural population since 1950. In the 1970s, the number of inhabitants living in urban areas in Brazil (32 million) outnumbered the number of inhabitants in rural areas (41 million) for the first time, and since then the growth rate of the rural population has been negative.

The challenge to accommodate so many people in Brazilian cities is huge and creates pressure on demands for housing, electric energy, mobility, access to potable water, basic sanitation, infrastructure and basic services. At the same time, the historical model of Brazilian urbanization, which lacked planning, collapsed. The national average of those with access to treated water is less than 50% (48.29%)\(^6\) and while the Brazilian average of those with access to treated water is 82.70%, access to water in large cities is compromised by the availability of water. The large conurbations pose an important challenge to water sources, whether through the pressure for access to water, or through the quantity of effluents that flow into them daily: nine states have already suffered from the challenge to water sources, whether through the pressure for access to water, or through the quantity of effluents that flow into them daily: nine states have already suffered from water stress, and 55% of Brazilian municipalities will suffer water deficits before 2015\(^6\). Due to this, cities and their national connections - their economic and social networks, both national and international - are at the heart of the debate about economic growth, development and sustainability. Globally, urban areas are home to around 50% of the population and are estimated to reach 60% by 2030. They are responsible for the consumption of 60 to 80% of all energy produced globally. The concentration of people in cities is irreversible and brings with it important changes to the landscape - as it impacts the expansion of areas for agriculture and the degradation of natural ecosystems -, that result, for example, in alterations to local climate and loss of habitat. Cities have become engines of economic growth, income generation, employment, innovation and creativity, and offer important opportunities to improve living standards, but are highly unsustainable in terms of the consumption of natural resources and waste generation, of increased demand for energy, utilities, mobility, accommodation and housing, infrastructure and maintenance. Therefore, discussions about the transition to sustainability and the green economy must consider improvements in the governance of cities.

The urban scenario in Brazil

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66 According to IBGE data for 2011 GDP (last series available broken down by state). The Southeast region also accounts for 50% of electrical energy consumption.
68 Simon et al. UN-Habitat, 2011
69 IBGE. 2010 Demographic Census.
70 2012 Data. Source: Sanitation Ranking 2014, Trata Brasil
population over the same period, which was 3.7%. Of this amount, 90.4% of the waste is collected and, when the total collected between 2012 and 2013 is compared, a small evolution can be seen in the coverage of collection services72. However, the portion that is not collected daily is not disposed of correctly and increases the problems of the population around the disposal locales in terms of health, environmental pollution and climate. Of the total of solid urban waste collected in 2013, 417% was disposed of improperly.

With the institution of the National Plan on Solid Waste (PNRS), in 2010, through Federal Law 12.305/2010; selective waste collection, in accordance with its nature and composition, rapid response to problems such as extreme climatic events. It is also projected for 2020 (ICT Sustainability Index, 201076). The greatest potential for reduction in cities is in solutions for transport, logistics77 and electricity78.

To achieve this potential, US$37 trillion needs to be invested around the globe in the next 25 years in urban intelligence solutions (Booz & Company, 2010). It is a trend seen in the reorganization of urban spaces around the world and connected, mainly, by the common movement of the citizen taking a central role in the emergence of a new society.

Here are some highlights of innovative solutions built around the three pillars of urban life: transportation, mobility, energy, and food.

- In Amsterdam, pedestrians and drivers monitor transport options via their smartphones.
- In Barcelona, a digital map pinpoints the location of trains, taxis, subways and buses.
- Stockholm treats mobility, energy and natural resource consumption in a systemic manner: government and private initiatives launched apartments downtown that were projected to be sustainable, producing the energy used by the inhabitants with solar panels, capturing rainwater, and collecting waste through a system of tubes that direct it to recycling or fuel production.
-库里巴是考虑的10个“最聪明的城市”在世界79。投资在2018年之前在城市中已经有多样化的投资在其他城市中，如此的“智能交通系统”已经建立在巴西联邦区（BRT）, which inspired the

SMART CITIES

The collapse of the historical model of organizing life in cities - and new demands for large-scale solutions for transport, education, health, electric generation and distribution, security, and food that took on the slogans of efficiency, de-centralization, and interconnectedness - led to a movement called “Smart Cities”. Smart cities are resilient and sustainable, capable of adapting, responding rapidly and efficiently to changes and external threats, such as climate change, disasters, storms, hurricanes, and meet the basic demands for food, energy, or any other type of security79. The concept of smart cities is achieved as a result of the interaction between cities, citizens and organizations; these are the leaders, with the city offering itself as a platform of interconnected services, which is the basis that allows the city to become what is wanted of it. It is therefore critical that the community embraces this idea and the processes that will allow for the existence of smart cities.

The traditional technologies and processes that are part of the current model of development (and considering the limit of resilience of the natural ecosystems) result in an unsolvable equation and, for this reason, efficiency is the order of the day. The global, interconnected society and the political organization of nation-states clash with one another; the complexity of the challenges demand local responses articulated in regional contexts and individual leadership and creativity sustained by the collective.

For this reason, information and communication technologies (ICT) show an important contribution and ensure the vital processes for the so-called “smart cities”. They facilitate the management of urban services and infrastructure, the sharing of information, the decision-making on the part of public and private managers and citizens, and the prevention of, or rapid response to problems such as extreme ICT tools can be applied in the composition of public and private socio-technical institutional ecosystems, encouraging the interaction and emergence of creative solutions. They offer a new system of governance for smart cities.

Focusing only on the potential in relation to the mitigation of climate change, information and communication technologies (ICT) could offer a reduction of 7.8 GtCO2 in global emissions by 2020, which represents 15% of total emissions predicted for this year (Smart 2020, 2008). In Brazil, an estimated 27% reduction was projected for 2020 (ICT Sustainability Index, 201076). The greatest potential for reduction in cities are in solutions for transport, logistics and electricity.

72 ABRELPE (Brazilian Association of Public Cleaning and Special Waste Companies), 2013
73 ABRELPE (Brazilian Association of Public Cleaning and Special Waste Companies), 2013
75 GFG Projects, Cadamos Ciudades Inteligentes e Mobilidade Urbana (Smart Cities and Urban Mobility Booklets), 2014
emat-s-carbono/
77 According to a study by FIT (2013), in the case study of South Korea, the transport sector had the greatest potential of reducing GHG emissions with the application of ICT solutions. The expectation is of a 30% reduction in emissions from the sector in this country in relation to emissions projected for 2000 (business as usual scenario). The study by the same organization about Ghana (FUT 2010) also pointed to the transport and logistics sector as one of the most promising in relation to the adoption of ICTs to reduce emissions. In Brazil, the sector was responsible in 2012 for 46.8% of national emissions of GHG (gross emissions of 204,327,442 tCO2), which increased 14% between 1990 and 2012 (SEEG).
78 In India, solutions for smart management of electrical energy could bring about a reduction of 30% in electrical energy loss. (The Climate Group and Coca-Cola, 2008). In Brazil, buildings located in urban centers are responsible for 47% of the country’s electrical energy consumption (WELKHER, 2013).
80 WESS et al., 2013, p. 10
Traffic jams, a mobility problem that plagues citizens of large cities, result in unproductive time losses, energy waste and public health problems which affect companies’ performance and the economy of the country. The problem is compounded by the disorderly growth of urban areas, and the increase of private vehicles on the streets as a result of an increase in the population’s average income, incentives for auto industry, and a lack of efficient public transport options. Answers will come through better urban planning and vehicle flow management, reducing average distances travelled and average commuting times.

On the part of the public sector, it is necessary to invest in the diversification of modes of collective urban transport, mainly those that are less carbon-intensive, such as train and subway. The BRT bus system produces half of the emissions per kilometer travelled than a normal bus and is a more cost-effective alternative that is being implemented in many countries. The efficiency of this mode is achieved through separate, high-performance lanes that allow the passing of vehicles stopped at the stations with elevated or subterranean stretches that are integrated with other modes, high-capacity transfer terminals, and the option of prepayment, which accelerates boarding.

In addition to improving the quality of service and reducing travel time, to encourage the migration to public transport from private vehicles it is necessary to encourage access to information about times, lines, and routes. The ICT group of tools called smart logistics provide exactly this.

While public-private partnerships are a functional instrument for infrastructure investment and operation of transport systems, other associations between the two sectors have been shown to be useful in providing solutions that reach out to users, improve the quality of service, and make it more user friendly. An example of this is the “Smart Bus” project developed by Telefónica Viva and implemented in partnership with Ericsson and the municipal government in Curitiba. The initiative saw 3G connections installed in the city’s buses, and inaugurated an information center that provides information about education, security, health and other public services, as well as estimates of real-time arrival at the final destination. Additionally, the system’s integrated buses are monitored, allowing drivers to complete their routes more quickly. The results combine social, economic, and environmental benefits: reductions in commuting times, in the consumption of fuel, and consequently in carbon emissions.

Solutions can also be applied to private vehicles: “eco driving” offers information to drivers about fuel consumption and how they are driving; real-time traffic alerts update drivers about traffic so they can avoid congested areas; carpooling organizes rides; and systems that optimize logistic networks enable the coordination of trucks, avoiding the use of vehicles with idle space.

Based on this, some companies are already exploring opportunities that strengthen and reposition their businesses. Clients of Porto Seguro can access a map feed by Google-Earth for generating electricity, smart parking systems that optimize logistic networks enable the coordination of trucks, avoiding the use of vehicles with idle space. BMW, as part of an effort to reposition their businesses, launched a car sharing service by which vehicles are rented for short periods by clients who pay a monthly fee to have a car available when needed without the worry of fuel, maintenance, insurance, fees or taxes. The expansion of these two solutions appears to be a trend according to a study by KPMG, conducted with auto industry representatives in various countries. Combining these with ICTs that collaborate in vehicle security, monitoring of drivers, an increase in internal combustion engine efficiency, and newer, lighter materials, are making cars more economical.

This shows the emergence of a new market guided by the demand for bus/car information system services and the development of software and apps for the sector. The speed with which this process evolves in the next years depends on incentives, public policy and a favorable regulatory scenario. On the part of the companies, an important step is the articulation of intra- and inter-sectorial initiatives so that their mobility plans, for example, have a regional impact.
INTELLIGENCE IN ELECTRICITY PRODUCTION, DISTRIBUTION AND CONSUMPTION.

Electricity production, distribution and consumption in large cities needs to be rethought starting with solutions that encourage decentralization, monitoring and efficiency, and that demand new planning and management models for the electric system. This applies to reducing wastage and consumption, as well as the promotion of alternative renewable sources and improvements in services supplying information for preventative actions in supply problems.

The “Smart 2020” report predicted that energy efficiency encouraged by ICT tools would result in savings of around US$ 946.5 billion globally by 2020. Potential for this can be found in the review of industrial processes and planning, and the utilization of buildings, with direct economic and environmental gains: the average cost of a megawatt saved by energy efficiency projects by industry is inferior to the marginal cost of expansion estimated in the 10-year Energy Plan, and the reduction of pressure on the supply of energy avoids the expansion of the matrix, which has become less carbon efficient in recent years, thereby postponing large investments in electrical generation infrastructure and the use of fossil fuels.

In industrial production, dematerialization is an important innovation brought by ICT, substituting physical products and processes for virtual ones. The result is the reduction of energy use and reduced pollutant and waste generation. Shaping of infrastructure and co-development of ICT tools among organizations are also options to make operations viable with lower costs and lower electrical energy use. An example of this is the infrastructure access and backhaul of the LTE (4G) network shared by the cellphone operators TIM and Oi in the RAN Sharing project, with the objective of guaranteeing 4G coverage across all of Brazil.

The initiative avoids the duplication of network elements such as antennas, cables, base stations, battery banks and air-conditioning, implying less energy consumption and reducing visual pollution in cities caused by this equipment. In addition to this, it optimizes the work of maintenance crews by reducing their total travel time.

From the perspective of generation, distribution and consumption of energy, smart grids are revolutionary tools that use information technology in the electric system to increase generation distribution in various countries around the world. This technology has three main benefits: reduction of energy consumption on the part of utility by supplying service that is equal or better, reduction of supply system failures, and end-to-end integration - from generators to consumers.

Among the innovations brought by smart grids, it is worth noting the change in the role of consumers, who now assume control of their consumption using smart meters. Additionally, since the establishment in Brazil of the Energy Compensation System (ANEEL Normative Resolution 482) in 2012, the tool may also be used for microgeneration, allowing excess production from residents and companies to be integrated into the network and calculated.

This decentralization of production fosters an expansion of renewable sources, especially solar photovoltaic, and reduces technical losses during transmission by bringing generation closer to the centers of consumption. It is estimated that, by 2030, Brazil will be the sixth largest country in the world in investment in this type of technology with the installation of more than 63 million smart meters.

The greatest innovation provided by the application of the technology, in all cases, is the transformation of the relationship between energy companies and the citizens. Interaction between the actors, greater transparency, through constant communication between consumers and utilities, and the empowering of those involved in decision-making that impact their electrical bills and the environment are what makes these systems the “electrical energy networks of the future.”

However, for this future to become the present in Brazil, barriers need to be addressed. One of them is the weak regulation of steps of the process, such as the installation of networks and the commercialization of the energy generated; another is planning for the expansion of energy distributed in the country which still needs to be developed. As well, there are inherent challenges in the complexity of the national electric system such as the numerous interconnections for transmissions, a barrier for the insertion and advance of smart grids.

AGRICULTURE AS A MEANS OF A NEW RELATION WITH PUBLIC SPACE.

Urban agriculture has performed a fundamental role in the maintenance of life and interactions in cities in various moments throughout history. The practice has been disseminated since Antiquity and was encouraged by Allied governments during the Second World War to reduce pressure on food distribution. In Cuba, urban gardens saved the country from epidemics that resumed being supplied with tools and agricultural supplies from the Soviet Union. Though falling into disuse and even being prohibited by some municipalities in the United States, urban agriculture has been gaining strength recently in the context of the economic crisis, increasing food prices, awareness of the impacts caused by traditional productive processes and supply chains, and the increasing appreciation for local products. The intangible benefits of these initiatives include powerful incentives in collective and cooperative work that strengthen community and emotional ties, citizens taking back public spaces, and the sense of belonging to a community. Additionally, the result is a city that is esthetically more pleasant.

In Brazil, civil society organizations have assumed the mission for spreading the benefits of urban agriculture. This is the case of the Alternative Technologies Exchange Network (Rede de Intercâmbio de Tecnologias Alternativas), which, since 1995, in Belo Horizonte, has been devoted to the development of agriculture production in small spaces in and around the city. The projects have extended to other municipalities in the state such as Betim, Nova Lima and Ribeirão das Neves, where private and public land is being cultivated.

It is difficult to find arguments against the practice once the win-win dynamic of enhanced food safety, job creation, and improved population health is established between citizens and local governments. It also does not require sophisticated
technology or significant investments, and moderate productivity is capable of meeting the demand for some foodstuffs of those involved, and of nourishing community relations. Support from the city administration is an important input for the diffusion of these solutions in the public sphere.

In conclusion, the advance towards “smart cities” demands that cities: i) be efficient, doing more with less, and this includes: rigorous budget evaluation and management, realizing continuous communication with the community. Of the 60% of Brazilian cities that have an active technical architecture that enables it to act in smart cities, evaluating and developing skills on smart growth, or in other words, that there is planning for growth, and necessary changes wide with long-term debt securities, substituting the riskier and more expensive project finance for long-term debt securities, substituting the riskier and more expensive project finance and technological innovations. Business Proposals for Public Policies for a Low-Carbon Economy in Brazil: Energy, Transport and Agriculture). Accessed at: http://www.mckinsey. 

It is also worth noting that, in the United Kingdom these bonds total around the order of US$ 1.5 billion. http://www.ft.com/cms/s/0/2c2e4156-7f18-11e2-a566-00144feabdc0.html#axzz3CTjjtW40

In summary, the advance towards “smart cities” demands that cities: i) be efficient, doing more with less, and this includes: rigorous budget evaluation and management, realizing continuous communication with the community. Of the 60% of Brazilian cities that have an active technical architecture that enables it to act in smart cities, evaluating and developing skills on smart growth, or in other words, that there is planning for growth, and necessary changes...
ANNEX I - RURAL ENVIRONMENTAL REGISTRY (CAR)

Article 29 of the New Forest Code (Law 12,651/2012) introduces the Rural Environmental Registry (CAR). Article 29 stipulates:

"The Rural Environmental Registry (Cadastro Ambiental Rural – CAR), creates within the framework of the National Environmental Information System (Sistema Nacional de Informação sobre Ambiente - SINIMA), a national electronic public registry, obligatory for all rural properties, with the end of integrating the environmental information of the properties and rural possessions, to create a database for economic and environmental control, monitoring, and planning and to combat deforestation."

CAR was regulated by Decree 7830 of October 17th, 2012, which governs the Rural Environmental Registry System – SECAR. The objective of the CAR is to unify environmental information across Brazil. It should be noted that the CAR will not be considered in the recognition of property possession or claims and does not eliminate the need for compliance with Article 2 of Law 10,267/2001 (which deals with the certification of rural properties). Therefore, the CAR is a declaration of the environmental situation of the property or possession. The registration of the rural property in the CAR must be made along with the municipal or state environmental organ, that, in terms of regulation, will require from the rural owner or holder, the identification of the owner or holder; proof of ownership or possession; identification of the property by plan or specification description containing geographical coordinates with a least one reference point on the perimeter of the property, informing the location of remnant native vegetation, the Areas of Permanent Preservation, the Areas of Restricted Use, consolidated areas and the Legal Reserve. Further.

Also, Law 12,651/2012 (NCF) establishes in Article 78-A that five years from the date of the publication of the Law (October 17th, 2017, accordingly) financial institutions will only concede agricultural credit of whatever modality to property owners whose rural properties are registered in the CAR.

Sources: Law 12,651/2012 and Mukai, 2013.